

### Cultural Analysis in/of the Anthropocene

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# CULTURAL ANALYSIS IN/OF THE ANTHROPOCENE

Kim Fortun

>The Anthropocene is Functionally and Stratigraphically Distinct from the Holocene.< This was the title of a January 2016 article published in *Science*, the flagship journal of the American Association for the Advancement of Science.<sup>1</sup> The article advances arguments about both the geophysical distinctiveness of the Anthropocene, and its temporal emergence, putting its bets with >the Great Acceleration< after WWII, with dramatic growth in human population and consumption, use of persistent industrial chemicals, airborne radioactivity from bomb testing, and a waste stream riddled with plastics. The article reinforces the core point of >the Anthropocene<, challenging both established scientific claims and deeply entrenched popular assumptions that humans are relatively meaningless drivers of grand earth systems.

News coverage of the January 2016 publication in *Science* was also noteworthy. Writing in *Bloomberg Business*, for example, Eric Roston described being struck – shocked, even – by the assemblage the *Science* paper pulls together, drawing out the combined effects of population growth, industrial resource use, fossil fuel burning, and agriculture. He went on to write that while the paper isn't »meant to read like an indictment – it's a research article, after all – yet the evidence of global change caused by humans speaks for itself<. We humans, Roston suggests, have »installed a new operating system for our 4.5 billion years old planet< – and it isn't working very well. Roston then points to examples of an Anthropocenic world, and to what can only be read as ethico-political implications.<sup>2</sup> The bottom line for Roston (in my reading), is that the Anthropocene *is* and *should not* be – complicating distinction between descriptive and evaluative statements, a long-standing ground of social theory and science writ large. The Anthropocene thus returns us to and calls for something beyond entrenched philosophical frameworks, calling out new relationships between the empirical and the political, between what is and what needs to be.

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- 1 Colin N. Waters et al.: The Anthropocene is Functionally and Stratigraphically Distinct from the Holocene. In: *Science* 351 (2016), issue 6269, aad2622. URL: <http://www.sciencemag.org/content/351/6269/aad2622> (Accessed: 8. 1. 2016).
  - 2 *Eric Roston*: Welcome to the Anthropocene: Five Signs Earth Is in a Man-Made Epoch. In: *Bloomberg Business News*, 7. 1. 2016. URL: <http://www.bloomberg.com/news/articles/2016-01-07/welcome-to-the-anthropocene-five-signs-earth-is-in-a-man-made-epoch> (Accessed: 8. 1. 2016).

Pointing to an earlier analysis published in *Nature*, which pegged the beginning of the Anthropocene in 1610, with European colonization of the Americas,<sup>3</sup> Roston also acknowledged how the debate about timing matters, and is recognized to matter among earth scientists. Roston quotes authors Simon Lewis (a plant ecologist) and Mark Maslin (an earth systems scientist) arguing that a lot rides on timing, that »definition will inform the stories that we tell about human development«.<sup>4</sup>

Lewis and Maslin evaluated nine ways of establishing the beginnings of the Anthropocene, pointing to the advantages and disadvantages of each. The emergence of both agriculture and industrialization is discounted for being too local and asynchronous, for example. 1964 is better, they say, because of the wide array of markers of human activity associated with the Great Acceleration (since the 1950s) and because of the clear radioactivity spike associated with nuclear bomb testing (that began in 1945 and continued through the Partial Test Ban Treaty of 1963). But they argue that 1492 tells a better story, one that captures both the stunning and violent consequences of European colonization, and the way colonization of the Americas laid ground for European economic growth, industrialization and ever intensifying fossil fuel use.

Lewis and Maslin demonstrate with compelling detail how European colonization had dramatic and enduring earth system effects, including global interlacing of previously separate biota (partly resulting from trade and exchange of food species) and shifts in the composition of the atmosphere (a dip in atmospheric CO<sub>2</sub> that they refer to as the 1610 Orbis spike). As they recount the story, European colonization led to staggering human death (according to multiple sources they cite, around 50 million people in the Americas died between 1492 and 1650), resulting in dramatic declines in farming and fire use, resulting in the regeneration of forests and other vegetation, drawing massive amounts of carbon dioxide out of the atmosphere, resulting in a reduction of carbon dioxide levels by 7 to 10 parts per million (equivalent to the amount of carbon dioxide we're *adding* to the atmosphere every three or four years today, Roston points out). This, Lewis and colleague argue, is the beginning of what should be recognized as the Anthropocene – because of the geophysical evidence, but also because of what it *means*. This way of dating the Anthropocene, they argue, »highlights social concerns, particularly the unequal power relationships between

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3 Simon Lewis/Mark A. Maslin: Defining the Anthropocene. In: *Nature* 519 (2015), pp. 171–180. URL: <http://www.nature.com/nature/journal/v519/n7542/full/nature14258.html> (Accessed: 8. 1. 2016).

4 Eric Roston: The Year Humans Started to Ruin the World. In: Bloomberg Business News, 11. 3. 2015. URL: <http://www.bloomberg.com/news/articles/2015-03-11/the-year-humans-started-to-ruin-the-world> (Accessed: 8. 1. 2016).

different groups of people, economic growth, the impacts of globalized trade, and our current reliance on fossil fuels.«<sup>5</sup> It is (in my reading) a clear call to responsibility.<sup>6</sup>

One could perhaps argue with these particular interpretations. But what I want to point to, instead, is the mode of knowledge production in play. In reaching for a start date for the Anthropocene, Waters, Lewis and colleagues work comparatively, interweaving different forms of interpretation, attuned to the social implications of their claims.<sup>7</sup> This begins to be kaleidoscopic, modeling a way of knowledge making that I think we need to cultivate and infrastructure going forward.

Humanities and social science scholars have also joined the Anthropocene fray, rightly concerned with what the Anthropocene counts and discounts as problems, and with what it engenders going forward. One key concern of humanities and social science critics is that the Anthropocene reinscribes humans at the center of the universe, potentially licensing the pursuit of a whole array of risky high tech-fixes (geo-engineering albedo modification, for example, artificially increasing the earth's ability to deflect incoming sunlight).<sup>8</sup>

Another line of argument centers on concern that with generic humans at the center of this story, capitalism drops from the picture, as do uneven human responsibilities and grossly unequal, racist effects.<sup>9</sup> Still, other humanities scholars read the

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5 Lewis/Maslin, as in fn. 3, p. 177.

6 Lewis and Maslin address this call to responsibility directly in a short article posted in June 2020, saying that: »In addition to the critical task of highlighting and tackling the racism within science, perhaps geologists and geographers can also make a small contribution to the Black Lives Matter movement by unflinchingly compiling the evidence showing that when humans started to exert a huge influence on the Earth's environment was also the start of the brutal European colonisation of the world.« *Simon Lewis/Mark Maslin: Why the Anthropocene Began with European Colonisation, Mass Slavery and the >Great Dying< of the 16th century*. In: *The Conversation*, 25. 6. 2020. URL: <https://theconversation.com/why-the-anthropocene-began-with-european-colonisation-mass-slavery-and-the-great-dying-of-the-16th-century-140661> (Accessed: 20. 4. 2021).

7 Waters et al., as in fn 1, here p. 1; Lewis/Maslin, as in fn 3, here p. 2.

8 *National Research Council: Climate Intervention: Reflecting Sunlight to Cool Earth*. Washington, DC 2015. URL: <https://www.nap.edu/catalog/18988/climate-intervention-reflecting-sunlight-to-cool-earth>. (Accessed: 8. 1. 2016). Importantly, this report notes that the committee that undertook the evaluation of albedo modification was »concerned that understanding of the ethical, political, and environmental consequences of an albedo modification action is relatively less advanced than the technical capacity to execute it«.

9 *Donna Haraway: Anthropocene, Capitalocene, Plantationocene, Chthulucene: Making Kin*. In: *Environmental Humanities* 6 (2015), pp. 159–165; *Jason W. Moore: Introduction*. In: id. (ed.): *Anthropocene or Capitalocene? Nature, History, and the Crisis of Capitalism*. Oakland, CA 2016, pp. 1–11; *Christian Parenti: Environment-Making in the Capitalocene: Political Ecology of the State*. In: *ibid.*, pp. 166–185; *Heather Davis/Zoe Todd: On the Importance of a Date, or Decolonizing the Anthropocene*. In: *ACME: An International Journal for Critical Geographies* 16 (2017), issue 4, pp. 761–780; *Francoise Vergès: Racial Capitalocene*. In: *Gaye*

Anthropocene more generously, encouraged by the way it brings an array of things together with critical import, skating across temporal and geographic scale, challenging »the capacity of contemporary political discourse, ecological processes, economic calculations, and perhaps even modes of representation«.<sup>10</sup>

Here, I take the dense and charged discursive space provoked by the Anthropocene as an empirical referent and starting point – as an effort to »make environmental sense«, an effort different but akin to other efforts that I have followed through anthropological work over the last decade focused on what I have termed »late industrialism« – what industrialism (including the material forms and processes of industrialization as well as its cultural dimensions) has become as it has cohered, aged, ossified, degraded, crumbled, and retrenched over time.<sup>11</sup> In conceptualizing the Anthropocene, scientists have foregrounded the way industrialism has, over time, changed the very grounds (in all sense of the term) on which life plays out. It is an impressive formulation that deserves ethnographic attention on its own terms. Cultural analysts need to understand the history behind the concept, and the dynamics and »thought styles« of the community of earth scientists who developed it.<sup>12</sup> We also need to respond to the call from the earth science community for research across disciplines, helping detail the sociocultural and political-economic dimensions and implications of the Anthropocene. We need to be at the table, so to speak, ready with analyses that can supplement analyses from the natural, physical and computer sciences, engineering, the arts, social sciences and humanities, law and medicine, and the vast heterogeneity of knowledge forms often gestured at as »local« or »traditional«. There have been many calls for such interdisciplinary work for many years. It is time we figure it out. Cultural analysts, I think, can play formative roles.

The cultural analysis that I encourage here thus faces in multiple directions, working to understand both the sciences of the Anthropocene (as cultural phenomena), the people and places that are producing and living within the Anthropocene, and the way circulations of Anthropocene science shapes, differentiates, and connects these

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Theresa Johnson/Alex Lubin (eds.): *Futures of Black Radicalism*. New York 2017, pp. 72–82; Kyle Whyte: *Indigenous Climate Change Studies: Indigenizing Futures, Decolonizing the Anthropocene*. In: *English Language Notes* 55 (2017), issue 1–2, pp. 153–162; Arun Saldanha: *A Date with Destiny: Racial Capitalism and the Beginnings of the Anthropocene*. In: *Environment and Planning D: Society and Space* 38 (2019), issue 1, pp. 12–34; Kathryn Yusoff: *A Billion Black Anthropocenes Or None*. Minnesota 2019.

10 *Timothy Morton*: *Hyperobjects: Philosophy and Ecology After the End of the World*. Minneapolis 2013 (Posthumanities 27).

11 *Kim Fortun*: *From Latour to Late Industrialism*. In: *HAU: Journal of Ethnographic Theory* 4 (2014), pp. 309–329; *Id.*: *Ethnography in Late Industrialism*. In: *Cultural Anthropology* 27 (2012), issue 3, pp. 446–464.

12 *Ludwig Fleck*: *Genesis and Development of a Scientific Fact*. Chicago 1981 [1935].

places. The argument is also methodological and infrastructural, recognizing that we will need to reconfigure our knowledge practices and build supporting means of production.

In what follows, I delineate different aspects of what cultural analysis needs to become as the Anthropocene continues to unfold. The list is, of course, partial and deserves collaborative analysis and elaboration. My title for the essay plays off the title of George Marcus's influential article, >Ethnography in/of the World System< to signal my commitment to the continuing project of re-fashioning ethnography so that it stays tuned to and responsible to its historic moment.<sup>13</sup> One overarching question regards the way ethnography and cultural analysis need to be conceptualized, practiced and infrastructured differently when in a planetary rather than a merely global frame, addressing extensive toxic contamination, climate volatility and the strangling hold of petro-capital, all interlaced, without capacity for coordinated response across regions, types of expertise and complex bundles of problems. There is, I argue, a toxic vitality to be dealt with, resulting from ever intensifying cross-scale and system interaction that undermines structures we have long depended on.

News from many places brings life into the analysis. In recent coverage of the impacts of climate change around the world, for example, one headline is that »Radical Warming in Siberia Leaves Millions on Unstable Ground«.<sup>14</sup> The article describes how melting permafrost had turned whole regions of the rapidly warming Arctic into swamps where there once was stable ground, literally bringing deep history to the surface. The bodies of giant woolly mammoths (that disappeared from the region about 100,000 years ago) have been exposed, fueling a boom in mammoth hunting that feeds Chinese interests in ivory. The melting and decomposition of these animals release more greenhouse gases, further accelerating climate change. The unstable ground has also moved people and their practices. Many people have just moved away. Others have stayed in place, but with new connections to organized crime that came with (now practically industrial scale) mammoth tusk hunting. Still others are still trying to work the land as agriculturalists, though the availability of arable land has plummeted, as has the number of cow and reindeer herds. Established ways of making sense of the land, weather and ways to live have been forcefully undercut. Spotty Internet infrastructure and a lack of educational opportunities exacerbate the knowledge challenges of living in contemporary Siberia, making it difficult to find,

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13 *George Marcus*: Ethnography in/of the World System: The Emergence of Multi-Sited Ethnography. In: *Annual Review of Anthropology* 24 (1995), issue 1, pp. 95–117.

14 *Anton Troianovski/Chris Mooney/Michael Robinson Chavez*: Radical Warming in Siberia Leaves Millions on Unstable Ground. In: *Washington Post*, 3. 10. 2019. URL: <https://www.washingtonpost.com/graphics/2019/national/climate-environment/climate-change-siberia/> (Accessed: 10. 10. 2019).

share and collectively work with the many kinds of information needed for decision making and planning.

The region has drawn many journalists and academic researchers from many disciplines. A record-breaking heat wave in 2020, for example, has been studied by a transnational group of meteorologists that come together in the *World Weather Attribution*, a collaboration of meteorologists who analyze the possible influence of climate change on extreme weather events, proactively »engaging with media to change the global conversation around climate change, influencing adaptation strategies and paving the way for new sustainability litigation«.<sup>15</sup> Another international group has studied the impacts of permafrost degradation on built infrastructure, including housing and industrial infrastructures. Their paper explicates variability in climate-change projections, the capacities of Russia's administrative regions to cope with projected climate-change impacts, and how such capacity could be bolstered through research-guided planning.<sup>16</sup> Still another group of researchers have been taken in by the Batagaika crater, the largest permafrost crater in the world, which over the last few decades expanded from a small gully to a one-kilometer-long, 100 meters deep gash – that researchers can rappel down to grab samples that help them characterize ecosystems and climates from other eras. The work is dangerous since the rim of the crater is very unstable, especially in summer. The Batagaika crater is talked about as »the gateway to the underworld«, and as one of many examples of ways »global warming is >inflicting wounds across Siberia«.<sup>17</sup>

Journalists and scientists seem to have been all over the Siberian story, with impressive effort and results. There is more to unpack, of course. It would be instructive to sketch for example, how researchers in different disciplines and different geopolitical locations frame and characterize permafrost, load bearing capacities and the administrative capacities of different scales of government. We know from the history and anthropology of science that there can be vast differences, with both conceptual

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15 Andrew Ciavarella et al.: Siberian Heat Wave of 2020 Almost Impossible Without Climate Change. In: World Weather Attribution, 15. 7. 2020. URL: <https://www.worldweatherattribution.org/siberian-heatwave-of-2020-almost-impossible-without-climate-change/> (Accessed: 15. 8. 2020); also see <https://www.worldweatherattribution.org/about/> (Accessed: 15. 8. 2020).

16 Dmitry A. Streletskiy et al.: Assessment of Climate Change Impacts on Buildings, Structures and Infrastructure in the Russian Regions on Permafrost. In: Environmental Research Letters 14 (2019), issue 2, article ID 025003.

17 Richard Stone: Siberia's >Gateway to the Underworld< Grows as Record Heat Wave Thaws Permafrost. In: Science Magazine. American Academy of Arts and Sciences, 28. 7. 2020. URL: <https://www.sciencemag.org/news/2020/07/siberia-s-gateway-underworld-grows-record-heat-wave-thaws-permafrost> (Accessed: 2. 2. 2021).

and operational implications.<sup>18</sup> It also would be instructive to learn more about how people living on Siberia's unstable ground are creating new explanatory frameworks, reference data, and ways of collectively stewarding both the land and knowledge about it. And it would be good to know how Siberia's future is imagined by different actors, with what implications for different social groups. Most challenging, I think, is that we need to know how all these studies could be linked and how cultural analysts might help with translations across disciplines and between research and practice. The need for cultural analysis is expansive.

Siberia is not the focus of my own research, but I find it compelling to think about. This, it seems to me, is what the Anthropocene looks like on the ground, and this is what cultural analysis today must attend to, literally and figuratively. There needs to be *more* cultural analysis, with research designs with great scope and durability. New kinds of collaboration will be needed, in turn calling for new research infrastructure and modes of scholarly communication – and these will have to be built as we go, on grounds likely to be increasingly unstable (geologically, ecologically, atmospherically, politically, discursively and conceptually). This, it seems to me, is the work of cultural analysis ahead.

## Settings Without Grounds

What was long considered inert and inanimate has come alive, so to speak. Novelist and essayist Amitav Ghosh uses these terms in describing the arrival of the Anthropocene as rather like the scene in *The Empire Strikes Back* in which Han Solo lands the Millennium Falcon on what he takes to be an asteroid, only to discover that he has entered the gullet of a sleeping space monster.<sup>19</sup>

Ghosh notes that the experience of the land coming alive beneath one's feet wouldn't be a great surprise to people who live in the great deltas of the world, where riverbanks (and the villages atop them) come and go as a matter of routine – though with increasing violence as the climate deregulates. It is people with expectations of >bourgeois regularity< for whom the Anthropocene is a great cultural shock, Ghosh says, especially because they are the farthest removed from its consequences.<sup>20</sup>

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18 See, for example, *Kate Brown: Manual for Survival: A Chernobyl Guide to the Future*. New York 2019; *Helen Longino: Studying Human Behavior: How Scientists Investigate Aggression and Sexuality*. Chicago 2013; *Sharon Traweek: Beamtimes and Lifetimes: The World of High Energy Physics*. Cambridge, MA 1988.

19 *Amitav Ghosh: The Great Derangement: Climate Change and the Unthinkable*. Chicago 2016, p. 3.

20 *Ghosh*, as in fn 18, pp. 35–36.



Ghosh stresses that failures to address climate change are imaginative and cultural failures, deeply imbricated in the literary forms and conventions that »came to shape the narrative imagination in precisely that period when the accumulation of carbon in the atmosphere was rewriting the destiny of the earth«. <sup>21</sup> Ghosh's primary concern is the novel, which he describes as having come of age hand-in-hand with statistics and ideas about the probable regularity of things. Novels, according to Ghosh, building off arguments made by literary theorist Franco Moretti, »offered the kind of pleasure compatible with the new regularity of bourgeois life«. Novels do this by relegating narrative – connections between unlikely events – to their background. Observed, everyday details of time and place, laced with rich character profiles – what can be called thick, local description – is what makes a novel work. Such details are what Moretti calls »fillers« – used to convey the rhythm and order of a novel's setting, conceived – as Ghosh put it – as a self-contained ecosystem. A »sense of place« – crafted by the writer to be specific and thus discontinuous with its surrounds – is, according to Ghosh, »famously one of the great conjurations of the novel as a form«. <sup>22</sup> Such discontinuity, Ghosh argues, is out of synch with the Anthropocene, an epoch in need of modes of narrative that can connect across great distances in time and space, accommodating »fantastic forms of causality«, weathering the torrents of the times.

Novels aren't the usual genre of academic cultural analysis (though they certainly can be), but the genre ideals are similar enough to warrant consideration in imagining what cultural analysis in the Anthropocene must become. What counts as the settings of our studies will need to change. The ways places are delimited and connected to their surrounds will get more complicated. The genre forms capable of carrying anthropocenic analysis aren't yet clear. The usual monograph and journal article likely won't suffice.

Great works of cultural analysis have already put the local in global flows, highlighting environmental impacts. Putting the local in a planetary frame draws even more systems, dynamics and histories into the picture, and we need to recognize that ways these dynamics are understood shapes what they are. If carbon or lead are not understood and called out as pollutants, for example, their presence in the world is different – quantitatively and qualitatively. Planetary dynamics are thus a matter of both earth and cultural systems, materiality and interpretation. In calling out and debating the Anthropocene, many natural and physical scientists expressly acknowledge this. Debates among scientists about how the Anthropocene should be historicized and characterized are clearly heuristic, puzzling through different indices that could be used to mark epochal shifts, recognizing that it is not about what is unquestionably correct but about what a particular explanation *means*. The place of cultural analysis

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21 Ghosh, as in fn 18, p. 7.

22 Ghosh, as in fn 18, p. 59.

## SKETCHING ETHNOGRAPHY

### Across Scales and Systems

**deutero**            **reflective/learning capacity**

How are people and organizations denoting and worrying about the phenomena you study?  
What reflective learning capacities are there in this setting and problem domain?

**meta**                **dominant discourses**

What discourses constitute and circulate around the phenomena you study?  
What discourses shape or deflect problem characterization in this domain?  
Where are there discursive risks and gaps?

**macro**              **law, political economy**

What laws, economies and militarisms undergird and shape the phenomena you study?  
What dispossessions are foundational?

**meso**                **organizations**

What social formations produce opportunities, problems and vulnerabilities (and their uneven distributions) in this domain?  
What organizations are implicated in the phenomena you study? What geopolitics are in play?

**bio**                  **bodies**

What are the bodily effects of the phenomena you study?  
What bodies are produced in this domain, by what processes and with what distributions across social groups?  
How are bodies racialized?

**micro**              **practices**

What practices – at home, work and play – produce wealth, health, problems and harms in this domain?  
What (labor, reproductive, communicative) practices constitute and are animated by the phenomena you study?

**nano**                **language, subjectivity**

What kinds of subjects are produced by and imbricated in the phenomena you study?  
What thought styles and affective dispositions direct attention, care and action in this domain?

**edxo**                **education and expertise**

What educational and research programs produce (or fail to produce) knowledge capacity in this domain?  
What modes of expertise and education are imbricated in the phenomena you study?  
What knowledge forms are suppressed or discounted?

**data**                **data infrastructure**

What data, infrastructure, analytic and visualization capabilities account for and animate the phenomena you study?  
What data and communication infrastructure supports recognition, characterization and mitigation of problems in this domain?

**techno**              **roads, industrial infrastructure, green infrastructure**

What technical infrastructures underpin and shape this domain?  
What technical conditions produce and delimit the phenomena you study?

**eco-atmo**            **ecology, climate**

What ecological systems are depended on in this domain and how are they stressed?  
What ecological and climatic conditions situate the phenomena you study?

**geo**                  **earth systems**

What geological formations, contaminations, resources and scarcities ground the phenomena you study?  
What earth systems are implicated in this domain and how have they changed over time?

*Figure 1: Sketching Ethnography. Across Scales and Systems*

within the sciences has perhaps never been so apparent. Cultural analysts need to attend to this, drawing it out, building on it, adding layers of interpretation.

To render the local in anthropocenic terms involves recognition not only of earth system dynamics, but also of ways earth systems are driven and constantly reshaped by human aspirations, modes of measurement, technologies, laws and a tangle of other factors. Material conditions – ecological as well as technological – are always constitutive of the whole, as are the data infrastructures and forms of expertise that both underpin and account for these conditions. I use the graphic in Figure 1 to visualize and direct this kind of analysis, wanting to draw out multiple scales and systems *and their interaction*. The resulting vitalism – which is often toxic – is the context the Anthropocene engenders.<sup>23</sup>

>Setting< in the Anthropocene becomes something more than what it is in the novel form described by Ghosh (and in many works of cultural analysis). Volatilities that now regularly disrupt the regularities of any setting need to be drawn out, explicating both operational and affective results. Statistical analysis remains crucial, but needs to be seen as always culturally encoded – motivated and shaped by prior conceptions of what is significant, relevant and feasible. Places need to be drawn out as both specific and linked and overlapping, and never discontinuous with their surrounds, diverting what Ghosh describes as one of the great conjurations of the novel form – the making of places as self-contained ecosystems. Such discontinuity, Ghosh argues, is out of synch with the Anthropocene.

Geographer Simon Dalby points to a critical dynamic: »Globalization is, it turns out, a profoundly physical process, not just a matter of trade and cultural change networked by communication technologies. The global economy is effectively a new geomorphic force at work in the biosphere.« This has implications at all scales. Setting needs to be treated as a dynamic, open system, with geomorphic forces recognized as both drivers and effects.<sup>24</sup>

Ecological and earth systems, infrastructure and the data available to characterize a place shouldn't be seen as special topics, but as context for *all* cultural analysis.

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23 This graphic is best seen as a partial, adaptive visualization of what cultural analysis in late industrialism needs to attend to, functioning as a prompt, not an algorithm. Questions can be recast to focus on particular phenomena (energy transition, for example, or civic data capacity). New scales, systems and questions can be added to the list, or a whole new set of questions can be formulated to deepen and extend analysis of a particular scale or system (science in practice, for example: *Mike Fortun/Kim Fortun: Anthropologies of the Sciences: Thinking Across Strata*. In: Jeremy MacClancy (ed.): *Exotic No More: Anthropology for the Contemporary World*. Chicago 2019, pp. 241–263. URL: <http://centerforethnography.org/content/fortunm-and-fortunk-2019-anthropologies-sciences> (Accessed: 15. 1. 2021).

24 *Simon Dalby: The Anthropocene Thesis*. In: Mark Juergensmeyer et al. (eds.): *The Oxford Handbook of Global Studies*. Oxford 2018.

Whatever the focus and figure of contemporary cultural analysis, the Anthropocene is its context.

Thinking in these terms isn't fully new, but there are new dynamics and synergies to attend to. Late industrialism has itself intensified, drawing ever more systems into ever tightening interactions, often with runaway effects.

I have worked to conceptualize >late industrialism< for a number of years (2012, 2014) striving to draw out issues of particular concern for environmental health governance: the ubiquity of toxic chemicals in everyday lives; their cumulative effect and the difficulty of attending to this in science, law and healthcare; the sobering weight of commercial interests on what we know and do about environmental health problems; the aging and out-of-dateness of many of industrialism's built, organizational and conceptual forms; an urgent need for fundamentally new social contracts and alternative futures.

Part of what late industrialism affords or points to is the way the everyday real is produced through the interaction of many scales and types of systems, sedimented with history, laced with commercial interests. Ecological and atmospheric systems. Technical and political economic systems. Discursive and perspectival systems. All interlaced, often with schismogenic tendencies. Tight couplings makes the system volatile, often in harmful ways, often putting the most vulnerable at further risk.

Further, many late industrial systems are aged, over-extended, exhausted and sometimes contaminated. This is what makes late industrialism *late*. These over-extended, aged systems include knowledge systems, which – paradoxically – make late industrialism difficult to see and conceptualize. They blind us to our own entanglements.

Thinking in terms of late industrialism, there are two scales of analysis that I want to call out as especially important in contemporary cultural analysis. One is what can be called the data scale, where data infrastructure, practices, capacities for visualization and use can be drawn in. This can be studied through interviews and observation of data practices, reaching to understand the processes and effects of data selection, curation, association, validation and accreditation that shape whatever is the focus of our studies. We also can track the formative effects of software, algorithms, and digital platforms on the processes and people we seek to understand. I have found it especially productive to mobilize a mode of data ethnography in which cultural analysts search for and try to access and use data in order to understand the data capacity and ordering of a particular place or problem domain.

Imagine, for example, a search for data on lead contamination in a particular place. You could look for data on blood lead levels in children, for example, on lead levels in soil and how they are distributed across neighborhoods and cities (perhaps pointing to their source), and on lead levels in the water at daycare and primary schools. In so doing, you may learn about the extent of lead contamination in that place. Or you

may not, because the data isn't available. You will, through participant observation in the data, learn about the extent, form and function of lead data infrastructure – which we need to learn to read, just as we read other texts and semiotic assemblages. Such data infrastructure not only denotes the real but makes it what it is. Problems come to the fore through data infrastructure, or are missed, or can be purposefully occluded. Responses and enactments of social contracts follow. Data infrastructures are thus key sites of power and politics. They also vitalize – bring to life – other scales, animating particular practices, legitimating laws and policies, guiding engineered movements of soil, water and the many substances that pollute them.

This, in turn, points us to another dynamic of late industrialism – a dynamic that couples the force of capital to education, expertise and particular ways of thinking and talking about our realities. This dynamic results from the escalating influence of commercial entities and logics on what we think and know. On one hand, this is widely acknowledged. There is widespread, healthy cynicism about the hold advertising has on our imaginations and recognition that greenwashing is well-oiled. There's also growing recognition of the energy-politics nexus, calling out ways petro-capital has shaped what is considered possible and desirable, fueling investment from both left and right political formations.<sup>25</sup> What is less apparent is the way commercial interests shape our conceptual underground, so to speak, heavily weighting how we think, imagine, create and critique. Important work on the powerful delimitations of social media platforms have alerted us to some of this. Work that has drawn out corporate deceit, denial and manufactured doubt is also critical,<sup>26</sup> exposing cover-ups as well as active (though still surreptitious) production of corporate claims through influence on what studies are done and not done, through corporate ghostwriting of policy proposals and scientific publications (many apparently >peer reviewed<) and through heavy presence in bodies like the US National Academies.<sup>27</sup>

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25 *Fernando Coronil*: *The Magical State: Nature, Money and Modernity in Venezuela*. Chicago 1997; *Bret Gustafson*: *Bolivia in the Age of Gas*. Durham, NC 2020; *Thea Riofrancos*: *Resource Radicals: From Petro-Nationalism to Post-Extractivism in Ecuador*. Durham, NC 2020.

26 *Gerald Markowitz/David Rosner*: *Deceit and Denial. The Deadly Politics of Industrial Pollution, With a New Epilogue*. California 2013; *David Michaels*: *Doubt Is Their Product: How Industry's Assault on Science Threatens Your Health*. Oxford 2008; *Allan Brandt*: *The Cigarette Century: The Rise, Fall, and Deadly Persistence of the Product That Defined America*. New York 2007; *Naomi Oreskes/Erik M. Conway*: *Merchants of Doubt: How a Handful of Scientists Obscured the Truth on Issues from Tobacco Smoke to Global Warming*. London 2010.

27 *Paul D. Thacker*: *Science – Especially Climate Research – Needs a >Sunshine< Law*. In: *Grist*, 15. 2. 2021. URL: <https://grist.org/fix/climate-science-needs-sunshine-law/> (Accessed: 1. 2. 2021); *Paul D. Thacker/Jon Tennant*: *Why We Shouldn't Take Peer Review as the >Gold Standard<*. In: *Washington Post*, 1. 8. 2019. URL: [https://www.washingtonpost.com/outlook/why-we-shouldnt-take-peer-review-as-the-gold-standard/2019/08/01/fd90749a-b229-11e9-8949-5f36ff92706e\\_story.html](https://www.washingtonpost.com/outlook/why-we-shouldnt-take-peer-review-as-the-gold-standard/2019/08/01/fd90749a-b229-11e9-8949-5f36ff92706e_story.html) (Accessed: 1. 2. 2021).

But it goes deeper still. As public institutions have fallen aside in so many places, commercial interests have gained an increasing hold on education (and thus the production of perspective and expertise) at all levels. Again, this is not a fully new phenomenon, especially in the United States, but the power dynamics have intensified, partly because of the increasing role of private philanthropy in education.<sup>28</sup> Big Tech often brings educational programming with them when they locate new facilities, for example, making this part of the deals they make with local governments.<sup>29</sup> These goals are often narrowly instrumental, aiming to create a pipeline between schools and corporate tech jobs in the region. Cultivating critical understanding of platform capitalism isn't likely to be a priority. The petrochemical industry also has a heavy presence in education in the United States. Bayer Corporation, for example, runs an award winning, much lauded science education initiative branded as *>Making Science Make Sense®<*.<sup>30</sup> Its aim is to »advance science literacy across the United States«. Bayer is a multinational pharmaceutical and chemical company with clear, vested interests in how science is understood; in 2018, Bayer purchased Monsanto Corporation, seen by many as the queen of greenwash.

## From Ethnography to Infrastructure

Thinking in terms of intersecting scales and systems isn't new. Actively doing research of this order will be. Translating this research into praxis will be even harder.<sup>31</sup>

Consider, for example, a recently published study focused on the energy-water nexus in California, where couplings across scales and systems are particularly tight –

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28 *Rafael Heller*: Big Money and its Influence on K-12 Education: An Interview with Sarah Reckhow. In: Phi Delta Kappan, 30. 4. 2018. URL: <https://kappanonline.org/heller-sarah-reckhow-k12-education-funding-foundations-big-money/> (Accessed: 1. 2. 2021).

29 *Jeff Bryant*: How Corporations Are Forcing Their Way Into America's Public Schools. A Story unfolding in Virginia reveals how big Corporations want to control Schools right down to the Curriculum, in: Salon, 11. 2. 2020. URL: [https://www.salon.com/2020/02/11/how-corporations-are-forcing-their-way-into-americas-public-schools\\_partner/](https://www.salon.com/2020/02/11/how-corporations-are-forcing-their-way-into-americas-public-schools_partner/) (Accessed: 1. 2. 2021).

30 *Bayer Global*: United States of America. Making Science Make Sense. URL: <https://www.bayer.com/en/us/makingsciencemakesense/home> (Accessed: 6. 5. 2021).

31 *David Griggs et al.*: An Integrated Framework for Sustainable Development Goals. In: Ecology and Society 19 (2014), issue 4, p. 49. URL: <http://dx.doi.org/10.5751/ES-07082-190449> (Accessed: 20. 8. 2019); *Måns Nilsson/Dave Griggs/Martin Visbeck*: Policy: Map the Interactions Between Sustainable Development Goals. In: Nature News 534 (2016), issue 7607, p. 320; *Julia Szinai et al.*: Evaluating Cross-sectoral Impacts of Climate Change and Adaptations on the Energy-Water Nexus: A Framework and California Case Study. In: Environmental Research Letters 15 (2020), issue 12, article ID 124065. URL: <https://iopscience.iop.org/article/10.1088/1748-9326/abc378> (Accessed: 15. 1. 2021).

partly because of landscape and atmospheric dynamics, partly because of industrial activity and patterns of human settlement, and partly because California is among the most researched and regulated places on the planet (yet still has stunning environmental injustice hotspots). The study reviews >the fragmented literature<, develops a generalized framework for understanding the implications of climate change on the energy-water nexus, then demonstrates the framework with a quantitative analysis of what should be expected in California by the end of the century – connecting expected decreases in the state’s snowpack to falling water supplies and hydropower generation simultaneous with increased need for electricity due to rising temperatures and subsequent increased use of air conditioning and irrigation, for pumping groundwater to the surface, and for moving water across the vast reach of the state (from the wetter north to the drought prone south). It then assesses electricity demand from various water adaptation strategies, pointing to increased space cooling (air conditioning) demand coupled with decreased hydropower generation as the priority linkage. The authors say that their study >highlights the value of coordinated adaptation planning between the energy and water sectors to achieve mutually beneficial solutions for climate resilience<.<sup>32</sup> A researcher unconnected to the study – Nathalie Voisin, a water resources engineer at the Pacific Northwest National Laboratory – says it is unique because of >the emphasis on the linkages, when usually the linkages are points of limitation in other papers<. Voisin also notes that while economic and social science analysis are important in evaluating water-energy connections and transitions, they weren’t captured in the study.<sup>33</sup>

Julia Szinai and her colleagues’ study is an expansive, quantitative analysis of links between water and energy systems, and resulting resource demands and vulnerabilities. It is an impressive and important study. What would it look like to add economists and other social scientists to the mix? What would it look like to add cultural analysts (working the nexus of social sciences and the humanities)? What additional linkages could we draw out? How might new frameworks for quantitative analysis – such as the one advanced here – be read for their discursive risks and gaps? How could we draw insight from past cultural studies into the picture?

Cultural analysis of/in the Anthropocene can’t be carried out alone; entrenched figurations of the researcher as lone hero will need to shift. In part, this is because of the complexity at hand and corollary need for interdisciplinary expertise. It is also because we need more dynamic analyses – a capacity to stay with analyses as conditions shift, moving with the volatilities as though on a raft in a storm. And this, in

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32 Szinai et al., as in fn 31.

33 *Kate Wheeling*: Adaptation Can Compound Climate Change Impacts on Energy and Water. In: Eos: Science News by American Geophysical Union, 15. 2. 2021. URL: <https://eos.org/articles/adaptation-can-compound-climate-change-impacts-on-energy-and-water> (Accessed: 1.3.2021).

turn, produces a need for new ways of infrastructuring cultural analysis itself – so that we can watch the systems we study change over time, interlaced with other systems – likely studied by other researchers, both within our discipline and outside. This is the creative promise of open science and supporting infrastructure. There are, of course, many concerns and questions about how to do this. We need to work through these. But we also need to build expansive data infrastructure for a next generation cultural analysis that will allow us to expand our data types, preserve, curate and share our data, and use it to make new kinds of claims, with new kinds of evidentiary and social standing. Together, we need to get at the cross-scale, cross-system dynamics that is our context and responsibility.

This won't be straightforward. Simply archiving and sharing data so that geographically distributed cultural analysts can work in tandem is not so simple. Nor is it simple to infrastructure and practice modes of collaboration that actually unsettle entrenched category schemes and social hierarchies (across generations, and between researchers in the Global North and Global South, for example). Funding, crediting and sustaining decentered collaboration is also complicated.

I've learned about these challenges through shared work to build the *Platform for Experimental Collaborative Ethnography*, open-source software that supports digital workspace for collaborative cultural analysis. We first built PECE to support our own work, but came to see that it could become an important community resource.<sup>34</sup> The software is now freely available as a GitHub download and supports an array of >instances<, each with an array of projects.<sup>35</sup>

Building PECE has become a project on its own terms, with many conceptual and social as well as technical challenges. The questions and issues that need to be addressed seem to be endless. How, for example, can we build digital data infrastructure encoded with counter-hegemonic epistemic commitments? What kinds of data can we draw into ethnography to get at the many scales and systems that need to be documented and analyzed – in motion? What data needs to be private and tightly secured? What data can be shared, enriching an ethnographic data commons? How can data sharing (expansively conceived to include analytic frameworks, interpretive annotations, data visualizations, and curated collections of all these) enable new kinds of research relations, questions and insights? What workflows and technical infrastructure support research relations that are proactively anti-imperial? How can data infrastruc-

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34 Mike Fortun et al.: What's So Funny About PECE, TAF and Data Sharing. In: Collaborative Anthropology Today: A Collection of Exceptions edited by Dominic Boyer and George Marcus. Ithaca 2020; Mike Fortun/Kim Fortun/George Marcus: Computers in/and Anthropology: The Poetics and Politics of Digitization. Routledge Companion to Digital Ethnography. London 2017.

35 See *Platform for Experimental Collaborative Ethnography*: About. URL: <https://pece-project.github.io/drupal-pece/> (Accessed: 6.5.2021).



ture help us stay with analyses over time, collaboratively stewarding and expanding them as the phenomena studied changes? How can we best explain and demonstrate cultural analysis so that it seems relevant to people in other disciplines and beyond the university? How can we design against deep enculturation to think of and practice cultural analysis as a solo enterprise, recognizable only in already established genre forms and publication venues, evaluated through impact factors? What forms of peer review, at what stages of the research process, can keep up with what cultural analysis needs to become?

Work on PECE often seems both overwhelming and inadequate. But we know the wolf is at the door, so to speak. If we don't build our own digital research infrastructure, commercial providers will. The commercial hold on scholarly infrastructure has advanced at an alarming rate in recent years, despite the buzz around open access publishing and open science. Indeed, major initiatives to extend open access scholarly publishing – as in Plan S, in particular – may already be effectively captured by commercial publishers.<sup>36</sup> While more scholarship has become openly accessible, what counts as open and who is able to publish >openly< is often still delimited to those inside elite enclaves (particular countries, like Germany, for example, or particular institutional systems, like University of California).<sup>37</sup> Elites still have privileged access to both publication venues and published research products.<sup>38</sup>

Somewhat counterintuitively, digitization (since the mid-1990s) has been in step with increasing consolidation of the scholarly publishing industry, with five companies (Reed-Elsevier, Wiley-Blackwell, Springer, and Taylor & Francis and Sage) accounting for more than 50 per cent of published output by 2006 (up from 20 per cent

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36 Paul M. Eve: The Emergence of Threat Infrastructures: Plan S and Behavioral Change. In: Martin Paul Eve (Blog), 3. 7. 2020. URL: <https://eve.gd/2020/07/03/the-emergence-of-threat-infrastructures-plan-s-and-behavioral-change/> (Accessed: 15. 4. 2021).

37 Marcel Knöchelmann: Pay to Publish Open Access: On the DEAL-Wiley Agreement. In: Zenodo, 22. 1. 2019. (Preprint version after review for Science & Technology Studies forthcoming Spring 2021). URL: <https://zenodo.org/record/2545583#.YIsvIn1KiqA> (Accessed: 6. 5. 2020); Jeffrey Brainward: California Universities and Elsevier Make Up, Ink Big Open-Access Deal. In: Science. American Association for the Advancement of Science, 16. 3. 2021. URL: [https://www.sciencemag.org/news/2021/03/california-universities-and-elsevier-make-ink-big-open-access-deal?utm\\_campaign=news\\_daily\\_2021-03-16&et rid=378015482&et\\_cid=3701690](https://www.sciencemag.org/news/2021/03/california-universities-and-elsevier-make-ink-big-open-access-deal?utm_campaign=news_daily_2021-03-16&et rid=378015482&et_cid=3701690) (Accessed: 18. 3. 2021).

38 Marcel Knöchelmann: The Democratisation Myth: Open Access and the Solidification of Epistemic Injustices. In: SocArXiv, 9. 6. 2020. URL: <https://osf.io/preprints/socarxiv/hw7at/> (Accessed: 6. 5. 2021); Angela Okune et al.: Conceptualizing, Financing and Infrastructuring: Perspectives on Open Access in and from Africa. In: Development & Change, 28. 1. 2021. URL: <https://doi.org/10.1111/dech.12632> (Accessed: 1 February 2021); Angela Okune: Open Ethnographic Archiving as Feminist, Decolonizing Practice. In: Catalyst: Feminism, Theory, Technoscience 6 (2020), issue 2, pp. 1–24. URL: <https://doi.org/10.28968/cftf.v6i2.33041> (Accessed: 15. 2. 2021).

in 1970).<sup>39</sup> Profit margins have been high, sometimes near 40 per cent, partly because the companies don't pay for key inputs (the research itself and peer review).<sup>40</sup> A study published in 2015 (based on a data set ending in 2013), showed that the social sciences had the highest level of concentration, with 70 per cent of papers published by the top five publishers.<sup>41</sup> Increasingly, these large commercial publishers companies are pursuing vertical integration as a >rent-seeking< business strategy, »with exclusionary effects upon researchers/institutions in the global south«. <sup>42</sup> Journal impact factors, bibliometric data and, in turn, university rankings are also generated by many of these same commercial corporations.<sup>43</sup>

Even more sobering, in my view, is the capturing of the *backend* of scholarly communication, where research data is preserved, curated, accessed and used. Consider, for example, Elsevier's 2013 acquisition of Mendeley, a digital platform where researchers can share references, papers, and commentary. Established in 2007 by and for researchers, Mendeley had become an open access icon. Response to the Elsevier acquisition from some corners of the research community was harsh.<sup>44</sup> But Mendeley has continued to extend its services. In 2016, for example, Mendeley Data

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39 Reed-Elsevier, Wiley-Blackwell, Springer, and Taylor & Francis are the top four publishers across fields; Sage is the fifth for social sciences, while American Chemical Society is fifth for the natural and medical sciences.

40 RELX: Results for the year to December 2018 (21.2.2019). URL: <https://www.relx.com/~media/Files/R/RELX-Group/documents/press-releases/2019/relx-results-2018-pressrelease.pdf> (Accessed: 6. 5. 2021).

41 Vincent Larivière/Stefanie Haustein/Philippe Mongeon: The Oligopoly of Academic Publishers in the Digital Era. In: PLOS ONE 10 (2015), issue 6, e0127502. URL: <https://doi.org/10.1371/journal.pone.0127502> (Accessed: 6. 5. 2021).

42 Alejandro Posada/George Chen: Publishers Increasingly in Control of Scholarly Infrastructure and This is Why We Should Care. In: The Knowledge G.A.P., 20.9.2017. URL: <http://knowledgegap.org/index.php/sub-projects/rent-seeking-and-financialization-of-the-academic-publishing-industry/preliminary-findings/> (Accessed: 8. 5. 2021).

43 George Chen/Leslie Chan: University Rankings and Governance by Metrics and Algorithms. URL: <https://zenodo.org/record/4730593#Ylwg3uspDOQ> (Accessed: 6. 5. 2021). [Forthcoming: George Chen/Leslie Chan: University Rankings and Governance by Metrics and Algorithms. In: Ellen Hazelkorn/Georgiana Mihut (eds.): Research Handbook on University Rankings: Theory, Methodology, Influence and Impact. Cheltenham 2021.].

44 David Dobbs: When the Rebel Alliance Sells Out. In: The New Yorker, 12. 4. 2013. URL: <https://www.newyorker.com/tech/annals-of-technology/when-the-rebel-alliance-sells-out> (Accessed: 15. 1. 2021); Ingrid Lunden: Confirmed: Elsevier Has Bought Mendeley For \$69M-\$100M To Expand Its Open, Social Education Data Efforts. In: TechCrunch, 8. 4. 2013. URL: <https://techcrunch.com/2013/04/08/confirmed-elsevier-has-bought-mendeley-for-69m-100m-to-expand-open-social-education-data-efforts> (Accessed: 15. 1. 2021); Clare Shaw: Elsevier Buys Mendeley: Your Reaction. In: The Guardian Blog, 10. 4. 2013. URL: <https://www.theguardian.com/higher-education-network/blog/2013/apr/10/elsevier-buys-mendeley-academic-reaction> (Accessed: 15. 1. 2021).

was launched to allow researchers to share citable data sets,<sup>45</sup> becoming, for example, one of a cluster of repositories promoted by the US National Institute of Health for sharing COVID-19 data.<sup>46</sup> In 2016, Elsevier also acquired SSRN (Social Science Research Network), a repository for pre-prints. In 2017, Elsevier acquired BePress, which includes Digital Commons, a cloud-based institutional repository now used by hundreds of universities, research centers and public libraries.<sup>47</sup> Elsevier said that acquisition of BePress »was part of a deliberate effort to shift the company from journal publishing into research and technology data management«.<sup>48</sup> Librarians were particularly vocal in criticizing the BePress acquisition, noting that over the years (since BePress was established by academics as a non-profit in 2011) they had invested a great deal of time and money in helping develop it. One commentary explained that »[t]he move into institutional repositories means that Elsevier now offers services at almost every stage of the scholarly workflow – from initial research to citation management, publication and deposit into a repository«, highlighting that academic researchers now have »An Elsevier-Enabled Workflow – From Start to Finish«.<sup>49</sup>

These projects may not be overdetermined by commercial interests, but they are encoded with them. And that is a problem we need to acknowledge and assume responsibility for.

It is often argued that we have to recognize the expertise and labor provided by the commercial publishing industry (at high cost). The work done inside commercial publishing is indeed notable, but it also anteriorizes a future that looks too much

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45 *Mendeley*: Mendeley Data is Out of Beta. In: Mendeley Blog, 28. 04. 2016. URL: <https://blog.mendeley.com/2016/04/28/mendeley-data-is-out-of-beta> (Accessed: 15. 1. 2021).

46 *Julie Goldman*: From the NIH: Sharing, Discovering, and Citing COVID-19 Data and Code. COVID-19 Data and Code Resources in Generalist Repositories. In: Harvard Medical School Blog, 8. 5. 2020. URL: <https://datamanagement.hms.harvard.edu/news/nih-sharing-discovering-and-citing-covid-19-data-and-code> (Accessed: 15. 1. 2021).

47 When, in 2001, BePress joined forces with California Digital Libraries (formed a few years earlier by the University of California), Robert Cooter, co-CEO of BePress said that »The primary goal of our company is to place the publishing power in the hands of the individual researcher. Our relationship with the California Digital Library ensures that cutting-edge research will be more readily available with lower barriers of access. We are quite pleased to have the insight of CDL and its member communities to help shape our future efforts.« Catherine Candee, then director of California Digital Library, concurred, saying that »CDL is committed to the concept of scholar-led innovations in the communication of research.« See *Anonymous*: California Digital Library, bepress Announce Partnership Information. In: Information Today 18 (December 2001), issue 11. URL: <https://www.infotoday.com/It/dec01/news14.htm> (Accessed: 12. 1. 2021).

48 *Lindsay McKenzie*: Elsevier Expands Footprint in Scholarly Workflow. In: Inside HigherEd, 3. 8. 2017. URL: <https://www.insidehighered.com/news/2017/08/03/elsevier-makes-move-institutional-repositories-acquisition-bepress> (Accessed: 15. 1. 2021).

49 *McKenzie*, as in fn 47.

like today, driven by many forms of inequality, imperialism and injustice, grounded in knowledge infrastructure already laced tight with corporate interests. It will take considerable work and skill to organize around this. Supporting legal regimes and financial models will have to be figured out. The subjects of research – cultural analysts themselves – will need to change. What counts as scholarly work and a >contribution< will need to be reconfigured (acknowledging the work of infrastructure and institution building, among other things). Supporting educational programs will have to be developed. Data infrastructure to support and evaluate next-generation cultural analysis will have to be designed and built (and constantly studied, critiqued and refashioned).

Long-running acknowledgement that we are part of and responsible for what we study will need to become technically infrastructured. This is yet another call of the Anthropocene – to realize in built form, practice and affect what we critique.

## Figuring Out

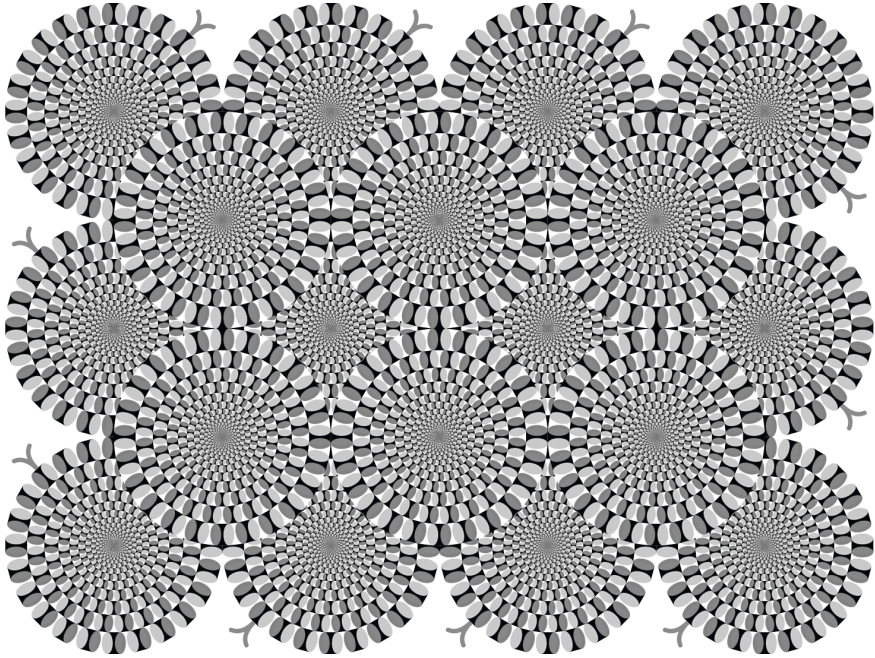
Almost two decades ago, anthropologist and STS scholar Michael M. J. Fischer argued that a key task for cultural analysts is to track how very differently positioned people – buffeted by different volatilities – have »outrun the pedagogies in which they are trained«, putting them into constant figuring out mode.<sup>50</sup> The cultural analyst was called upon to understand their tactics, the technologies drawn on in the effort, and the >lively languages< invented to give names to what they were dealing with and imagining – names that could come to be institutionalized in law, common sense and the next wave of technical forms.<sup>51</sup> This line of work for cultural analysis continues to be critical, and ever more complicated as the people we study deal with intensifying entangles of systems, scales and problems. Cultural analysts also need to *refract* this work, directing the questions at themselves and at cultural analysts as a community of practice – considering how we ourselves have outrun the pedagogies in which we were trained, and what this calls for going forward. Our grounds, too, are unstable and we need to rebuild accordingly. The infrastructure we invest in will be formative in many ways, enabling some kinds of practice, sociality and sense-making, while disabling others, directing our attention by design.

The challenge is not to rebuild with capital-intensity, striving for solid ground. The instabilities of structures we have long depended on – and the instabilities of all structures, and our places within them – are our context and responsibility.

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50 Michael M. J. Fischer: *Emergent Forms of Life and the Anthropological Voice*. Durham, NC 2003, p. 9.

51 Fischer, as in fn. 49.



*Figure 2: This graphic of a nest of interlaced, ever-moving ouroboroses figuratively suggests both where contemporary cultural analysts are situated, and what we need to study, understand and help steward.*

And this brings me to the last priority for contemporary cultural analysis that I will foreground here: what I think of as streaming ethnographic ethics: recognizing that there are ethical judgements and implications at every stage of our research process: in the selection of topics, in research design, in data creation, analysis and interpretation, in the way we infrastructure our data and relay out findings. Every project – like every stream – is different. And the flow is difficult to model. There won't be standard solutions. But we need to recognize that there are moments of responsibility and politics all through the research process, from conception through infrastructuring, data preservation and sharing, publication and beyond. It is time for our critique of Capital to loop, becoming praxis, acknowledging the work of cultural analysis as ethically and politically charged at many junctures.

Figure 1 >Sketching Ethnography. Across Scales and Systems< (presented above) helps, visualize the kind of scale and system crossing that cultural analysts need to be ready for going forward, working collaboratively. But the graphic has all the limits of two-dimensionality and seemingly clear delineations and categories. Even if

approached as a heuristic rather than as a representation, the graphic doesn't adequately convey the intense dynamism of the Anthropocene and the contemporary writ large – how interaction across systems and scale have strengthened and accelerated, producing effects that are far beyond what established conceptual schemes and infrastructures are prepared to handle. Here, again, the distinction between the descriptive and prescriptive is collapsing: systems are at a boil, with injurious effects.

The figure of an ouroboros – like Ghosh's sleeping dragon that we find ourselves within – is good to think with here. And not just one ouroboros but many – nested and entangled (Figure 2)<sup>52</sup>. The systems that we study are intensely entangled, and we work from *within*. What we thought was solid ground is constantly moving, vital. This, in my view, is both the context and object of cultural analysis in/of the Anthropocene.



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52 CMG Lee: An Optical Illusion Similar to Rotating Snakes by Kitaoka Akiyoshi. In: Wikipedia Commons, 8. 2. 2013. URL: [https://commons.wikimedia.org/wiki/File:Peripheral\\_drift\\_illusion\\_rotating\\_snakes.svg](https://commons.wikimedia.org/wiki/File:Peripheral_drift_illusion_rotating_snakes.svg) (Accessed: 1. 2. 2021).