

Notes

JOINT PREFACE

1. See Lynch 1982; Price 2016.
2. For more information on these partnerships, see Ethnographic Terminalia, <http://ethnographicterminalia.org>; “Anthropology of the World Trade Organization,” Institut interdisciplinaire d’anthropologie du contemporain, February 12, 2008, <http://www.iiaac.cnrs.fr/article1249.html>.
3. But here, as in other respects, we find the aforementioned collaborative partnerships trailblazing. See, for example, Matsutake Worlds Research Group 2009; the exhibition catalogs and zines produced by Ethnographic Terminalia, <http://ethnographicterminalia.org/about/publications>; Abélès 2011.
4. See, for example, Boyer and Marcus, forthcoming.

INTRODUCTION

1. For anthropological and other social scientific approaches to the study of energy, see, for example, Boyer 2014; Daggett 2019; Howe 2014, 2015a, 2015b; Howe and Boyer 2016; Howe, Boyer, and Barrera 2015; Hughes 2017; Krauss 2010; Love and Garwood 2011; Mason and Stoilkova 2012; Nadaï 2007; Nader and Beckerman 1978; Nader 2004, 2010; Pasqualetti 2011a, 2011b; Pinkus 2016; Scheer 2004; Strauss, Love, and Rupp 2013; Watts 2019; White 1943; Wilhite 2005; Winther 2008; Winthereik 2018; Wolsink 2007.
2. Throughout this text I use the terms “we” and “our” with different intentions that I believe the reader will find clear in context. In some instances, “we” (or “our” or “us”) is in reference to the collaborative research team of two. At other times, the “we” refers to those of you who are reading this text and therefore engaging in a conversation about the issues that are included here. And finally, there are instances where “we” is meant to speak of and to a grander category of human beings. The latter usage of “we/our” is clearly universalizing in some ways, indexing “all of humanity.”

However, my intention is not to presume that all humans are equally positioned to act or respond to the environmental dilemmas that are the context for this project nor to suggest that all people—past, present, or future—are their root causes. Instead, I want to draw attention to humans as a species that has, through some of its agents over time, manipulated earth systems and “resources” to the point where it is now unclear whether a collective human effort will be able to control the environmental consequences that have come from carbon incineration and other earth-altering practices. Above all I want to emphasize that “we” is always a heterogeneous human.

3. For anthropological work on global warming, climate models, climate politics, and climate impacts, see Barnes et. al. 2013; Crate and Nuttall 2009; Edwards 2013; Henning 2005; Hulme 2011; Klein 2015; Lahsen 2005; McNeish and Logan 2012; Monbiot 2009; Oreskes and Conway 2011; Rhoades, Zapata, and Aragundy 2008; Roncoli, Crane, and Orlove 2009; Strauss and Orlove 2003.

4. By “subjunctive future” I resort to a (rarely used) grammatical form, the future subjunctive (available in Spanish and other language systems) to indicate what might be or that which could be were a certain set of predecessor events and qualities to unfold prior to that future moment being indicated: a hypothetical future action. In contemporary usage, the future subjunctive has been subsumed into the present subjunctive and appears only rarely (for instance, in literary or legal documents). However, here I want to underline both the future (temporality) and the subjunctive (possibility). I contrast this with Kim Fortun’s “future anterior” (2001, 353). For Fortun, the future anterior is a formula for prefiguring the future by assessing the past (and thus aspiring to a better and better-understood future), whereas the future subjunctive is less sensitive to the past than it is to the present-cum-future.

5. I use the term “fisherfolk” to designate both those who actively fish and those who process and vend the fished products. We never encountered a fisherwoman in the isthmus during our research, though women were very involved in fishing as a livelihood. The *séptima* neighborhood—a working-class barrio where many Juchitecan fisherfolk live—is buzzing with women cleaning, drying, and selling fish in the predawn morning.

6. Social scientific work on infrastructures has been burgeoning. See, for example, Anand 2017; Appel 2012; Barnes 2014; Bowker et al. 2010; Carse 2014; Gupta 2015; Harvey and Knox 2015; Howe, Lockrem et al. 2015; Larkin 2013.

7. Beyond privately owned parcels of land, two forms of land tenure serve as important social forms in the isthmus and in Oaxaca more generally—*bienes ejidales* (or ejidos) and *bienes comunales* (or *comunas*, *comunidades*). Ejidos, a product of the Mexican Revolution, allow mestizo peasant farmers to collectively maintain and manage a communal estate, usually for the purposes of farming; members are referred to as *ejidatarios*. In the 1990s ejido collectives were able (and sometimes encouraged) to privatize land parcels, converting them into private properties with deeded owners. Bienes comunales are likewise collectively managed communal estates, but they are recognized as having belonged historically to indigenous peoples, gathered together as an *asamblea* or *comuna*; members are referred to as *comuneros*. Bienes comunales maintain a governing structure that calls upon the community’s overall

membership (the *asamblea*) to vote in matters of land disposition. The commissariat (*comisariado*)—composed of a president, secretary, and treasurer—is charged with the administration of proper procedures and decision making, and they are in turn supervised by a *consejo de vigilancia* (oversight committee), comprising three comuna members, with elections taking place every three years. For more on ejidos and bienes comunales, see Cornelius and Myhre 1998; Castellanos 2010.

8. Remoteness is, of course, relative. For those communities being impacted by the extraction of fossil fuels and those laborers who work in the industry, extraction can be intimately felt on a daily basis.

9. This research was a collaborative project with Dominic Boyer—beginning in 2009 and concluding in 2013—that investigated the political and ecological dynamics of wind power development in Oaxaca, Mexico. For more on collaborative analytics in anthropology see Marcus 2018 and on authoring and writing in anthropology see Wulff 2017.

10. In 2013 the Mexican state undertook energy reform measures, revising its seven-decade-long commitment to nationalized oil production and ending Pemex's role as the sole owner and operator of the country's fossil fuel assets. In spring 2017 an Italian company was the first international operator to drill in Mexican waters, and it is expected that oil production will increase in the coming years. On Mexican energy reform, see the International Energy Agency report, "Mexico Energy Outlook."

11. See Booth 2010, for example.

12. On wind resources in the isthmus, see Almeyra and Alfonso Romero 2004; Alonso Serna 2014; Aiello et al. 1983; Borja Díaz, Jaramillo Salgado, and Mimiaga Sosa 2005; Caldera Muñoz and Saldaña Flores 1986; Elliott et al. 2003; Hoffman 2012; Sánchez Casanova 2012.

13. In June 2016 the US, Canada, and Mexico agreed that they would jointly commit to 50 percent noncarbon fuel sources (for electricity generation) by 2025; this represents a significant upscaling of Mexico's original formulation. Note that "clean" energy sources in this context include not just renewables but also nuclear energy, carbon capture and storage plants, and energy efficiency. Under that definition, 37 percent of North America's electricity in 2015 came from clean energy sources (Eilperin and Dennis 2016). Just 22 percent of Mexico's electricity generation in 2014 came from nonfossil fuels, according to its government, though the country has pledged to raise that to 34 percent by 2024.

14. La Asociación Mexicana de Energía Eólica, A. C.

15. The number of Mexican households that could be served by this quantity of wind-powered electricity is difficult to predict. Calculations of household electricity are complex and contingent on several factors. Electricity demands differ from state to state according to climate, habits, and installed devices. For one study of both urban and nonurban households in Mexico derived from the Encuesta Nacional de Ingresos y Gastos de los Hogares 2008 (ENIGH), see Cruz Islas 2013, 198.

16. Or, for that matter, any other environmentally disruptive extractive practices exercised in the name of modernity and growth. See Bebbington 2009; Galeano 1997; Gudynas 2009; Johnson, Dawson, and Madsen 2007; Liffman 2017; Turner 1995;

among others. On waste see, for example, Alexander and Sanchez 2018; Alexander and Reno 2012; Gabrys 2013. On the petropolitics of oil and its afterlife specifically, see Behrends, Reyna, and Schlee 2011; Breglia 2013 (Mexico); Coronil 1997 (Venezuela); Klieman 2008 (historic, Congo); Sawyer 2004 (Ecuador); Mitchell 2011.

17. This can also be taken as a sign of cynical reason, or what Peter Sloterdijk (2014) calls “enlightened false consciousness”: people are equipped with knowledge but refuse to act accordingly.

18. For examples of oil and crises, see Bini and Garavini 2016; Dietrich 2008; Mitchell 2011; Love 2008. However, from my point of view, questions of energy transition in the Anthropocene provide a deeper impetus to enact and live energy/environment “otherwise.” The environmental precarity of the present—in its global sweep and interlinked ecocrises of melt, seawater rise, and climatological decay/precarioussness that are scientifically proven—suggests a unique condition for energy as well as encounters with and articulations of environment.

19. Changing our collective forms of energy is, from my point of view, an unqualified necessity, and this book is certainly not an argument against renewable energy nor against wind power as an important node of that apparatus. The question, rather, is how transitions can be undertaken with more care and attention to potential harm than has often been the case in the past.

20. Kathryn Yusoff describes this potential as the “extinguishment of the late Holocene human subject” (2016, 5).

21. Again, I want to bracket the grand human “we” here in the recognition that not all humans have contributed equally to, nor will suffer equally with, anthropogenically induced changes to the earth system (see Davis 2010 for an excellent, related discussion). There has been a tendency, in discussions about the Anthropocene, to imagine “future humanity” as a way to erase contemporary social differences and inequalities, including climate racism, as Kathryn Yusoff has pointed out (2016, 2). I do not want to rehearse that elision here, but I do want to focus on modulating the false separation of human and nonhuman survival and extinctions.

22. See, for example, Scranton 2015.

23. Humans as a “weedy species” (Wake and Vredenburg 2008) seems to be a more and more resonant designation, especially in the context of “ruins” and “blasted landscapes.”

24. Wind machines (to test aerodynamics, for example) or fans (for cooling) are instances of human-generated wind, but their fundamental property continues to be (gaseous) movement and interaction. Unlike solid (minerals, coal), liquid (water), or viscous (oil) resources, wind is only generative when it is in motion. It is contrastatic.

25. The ecology of relationships builds from Descola 2013a, 5. In seeking to avoid a strict division between ontological and phenomenological being, I am thinking of productive pairings of the two. See, for example, Bennett 2010; Braun and Whatmore 2010; Chen 2012; Descola 2013a, 2013b; Jasanoff 2010; Massumi 2009.

26. For a range of more recent interpretations as to what constitutes “Nature’s” end or its radical reformulation, see, for example, McKibben 1989; Latour 2004a.

27. Claude Lévi-Strauss and allied structuralists come to mind, but the human sciences have been in a more protracted discussion over the definitional qualities of nature/culture for far longer.

28. See, for example, Strathern 1980, 1992.

29. See for example Dipesh Chakrabarty's influential 2009 essay, "The Climate of History: Four Theses." His theses are (1) "anthropogenic explanations of climate change spell the collapse of the age-old humanist distinction between natural history and human history"; (2) "the idea of the Anthropocene, the new geological epoch when humans exist as a geological force, severely qualifies humanist histories of modernity/globalization"; (3) "the geological hypothesis regarding the Anthropocene requires us to put global histories of capital in conversation with the species history of humans"; (4) "the cross-hatching of species history and the history of capital is a process of probing the limits of historical understanding." For further perspectives on the Anthropocene, see, for example Steffen, Crutzen, and McNeill 2007; Steffen et al. 2015.

30. In his 2014 distinguished lecture delivered at the American Anthropological Association meeting, Bruno Latour saw the advent of the Anthropocene, and scholarly work on it (1) to focus upon "human agency" as its central tenet, (2) to explicitly conjoin the "physical" and "social" sciences, and (3) to raise moral questions of responsibility (or as Haraway would have it, response-ability), all of which anthropology has been doing all along (Latour 2014, 2–4).

31. In fact, it would be impossible to narrate a history of anthropology without accounting for the significant role of nonhuman animals in ethnographic work from the inception of the discipline to the present. Early examples include Lewis Henry Morgan (1868) on the American beaver (a more naturalist account) or his account of Iroquois phratries (wolf, bear, and turtle, for example) and Boas's research on seal-hunting practices among Inuit peoples on Baffin Island (1883). While some human/nonhuman animal encounters are described in more programmatic terms (such as hunting), anthropology has represented a wide range of animal-human lifeways. Think of Cushing and Benedict on Zuni animal tricksters, Mauss's (1979) explicit ecological frame for his "social morphology" hypothesis, or Rappaport's (1968) deeper ecological approach concerning humans and their eco/animal. Douglas's 1957 discussion of human/animal relations among Lele peoples, for one, presages many contemporary discussions of human/nonhuman relationality. She writes that for Lele, one of the defining principles of animals is "their own acceptance of their own sphere in the natural order. . . . Most run away from the hunter, . . . but sometimes there are individual animals which, contrary to the habit of their kind, disregard the boundary between humans and themselves. Such a deviation from characteristically animal behavior shows them to be not entirely animal, but partly human" (1957, 48–49).

32. Social scientists concerned with other-than-human life as well as those committed to more deeply investigating the ways that inanimate materials shape human (or nonhuman) beings are many and growing. See, for example, Alaimo and Hekman 2008; Candea 2013; Coole and Frost 2010; de la Cadena 2015; Franklin 2007; Hartigan

2015, 2017; Hird 2009; Kirksey 2014; Kohn 2013; Lowe 2010; Myers 2016; Nadasy 2007; Nading 2012; Paxson 2008; Porter 2013; Raffles 2010; Stengers 2010; Stewart 2011; Tsing 2012, 2015. In the humanities, see Wolfe 2009 among others.

33. For biology, see, for example, the paradigm-altering biological research of Lynn Margulis (1970); John Hartigan's excellent work on genomics, science, and racism in Mexico (2013). Regarding physics, Karen Barad, a theoretical physicist and feminist philosopher, develops the concept of "agential realism," which serves as an epistemological and ontological framework to center on the nature(s) of materiality and those relationships to discursive forms. The intention is to reform both "agency" and "realism," to underscore how human and nonhuman factors intervene in how knowledge is produced. In other terms, agential realism tries to move beyond the usual dyadic interpretation that distinguishes between social constructivism and conventional forms of realism (2003). Thus, agency, for Barad, "is a matter of intra-acting; an enactment, not something that someone or some-thing has."

34. See Alaimo 2010, 2016. Also see Haraway 1996.

35. The literature on actor-network theory is too massive to fully include here. However, for a comprehensive, chronological list of ANT texts and responses, see "ANT Resource," Centre for Science Studies, Department of Sociology, Lancaster University, <http://www.lancaster.ac.uk/fass/centres/css/ant/ant.htm>, last updated 2000.

36. Kim Fortun warns, for example, of what she calls the "Latour effect" in anthropology and science studies: that is, a singular focus on practices of expertise and actor networks in late industrialism that does not account for the material and social matrix of the toxic and inhospitable environments that make up people's lives today (2014).

37. See Barad 2003, 806–7.

38. On "worlds" and "worlding," see, for example, de la Cadena 2015; Viveiros de Castro 1998.

39. In "Posthumanist Performativity," Barad (2003) is responding to theorists of performativity, in this case Judith Butler, but by extension a whole oeuvre of post-structuralist work on discourse and the hailing of iterative linguistic performance that has derived (largely) from the work of linguist J. L. Austin.

40. Many alternative designations for our current age have been proposed in recent years: "Eurocene" (Grove 2016); "#Misanthropocene" (Clover and Spahr 2014); "Naufragocene" (Mentz 2015); and perhaps best known (currently), Donna Haraway's "Chthulucene," a period of "collaborative work and play with other terrans," where "flourishing occurs across assemblages of intra-active multispecies life, that includes more-than-human, other-than-human, inhuman, and human-as-humus" (2015).

41. See Strong et al. n.d. for citation practices and female authorship in cultural anthropology.

42. Compare to Tim Morton's "agrilogistics" (2016), which locates roots of the Anthropocene in the advent of agriculture and its material and ideological force beginning about ten thousand years ago. The Plantationocene indexes a more recent period of colonial expansion and its continuing effects.

43. In 2016, after seven years of study, an eminent group of scientists and scholars called The Anthropocene Working Group—composed of geologists, engineers, paleobiologists, geographers, historians, and philosophers among others—declared that the

world had entered a new geological epoch called the “Age of Man.” The panel reported that biospheres, lithospheres, hydrospheres, cryospheres, and atmospheres everywhere on earth contained the imprint of human activity, including radioactive debris, plastic tides, displaced soil, and increased methane and carbon dioxide.

44. For a useful overview of Anthropocene “sources,” see, for example, Bonneuil and Fressoz 2016.

45. Allochronic time occurs in a different geologic time. Anthropology itself has struggled with such allochronicities, namely the mistranslation of space into time. As Johannes Fabian (1983) has famously pointed out, the discipline has crafted reports that deny the coevalness between the ethnographic subject and her ethnographer. “Savages” could be temporally displaced, cast back in time as primitives, their worlds made static, largely because of their remoteness from “civilization.” Fabian’s formulation of allochronic, asynchronous time in the context of the Anthropocene may be worth revisiting as a way of recalibrating human time into geologic sync with nonhuman materials and beings.

46. See, for example, Kolbert’s *The Sixth Great Extinction* (2014).

47. An emphasis upon periodizations of the Anthropocene also speaks to Chakrabarty’s (2009) theses where historical time frames, or periodizations, that separate human from natural history come under critique. Or we can think about Tim Morton’s admonition that while the Anthropocene time line may be “fuzzy” (Was it the advent of agriculture? Was it the industrial revolution? Was it the Great Acceleration?), we can nevertheless find an operative set of coordinates, for it is clear that it did not start 1.3 million years ago (2013; 2016).

48. Yusoff (2013a, 781) writes that in the Anthropocene, with humans as geomorphic agents, “new understandings of time, matter, and agency” accrue for the human as “a collective being.” Through the immersion of humanity in geologic time, she suggests a move away from (simply) biological life courses to instead “a remineralisation of the origins of the human” as well as a shift in human time scales to stretch toward the horizons of the epochal and species lifescapes.

49. See, for example, LeMenager 2014; Zalasiewicz 2012.

50. Povinelli 2016, 8–9. In *Geontologies*, Beth Povinelli makes the argument that “geontologies” have long been here with (and of) “us” but that the conditions of the Anthropocene may be surfacing that fact to some human beings (often settler-colonialist societies), whereas many indigenous peoples, like those who have become Karrabing, have in fact recognized this ontological reality all along (see especially chapter 2). The separation of life and nonlife, she goes on to state, is also a technique of settler colonialism that has historically been used to debase indigenous ontologies and cosmologies that take nonlife beings as sentient. See also de la Cadena 2015.

51. The term “Plantationocene” emerged from conversations at the University of Aarhus in October 2014—in the AURA program (Aarhus University Research on the Anthropocene)—where participants collectively generated the concept for the traumatic changes seen in human-tended farms, pastures, forests, and finally, enclosed plantations predicated on private property and reliant on slave labor and other forms of exploited, alienated, and usually spatially transported labor. See “Publications,”

AURA: Aarhus University Research on the Anthropocene, <http://anthropocene.au.dk/publications/>, updated October 26, 2010.

52. “Capitalocene” is a term attributed to Andreas Malm (2015) and Jason W. Moore (2016, 2017), who locate the rise of capitalist society in the year 1450, corresponding with the European formation of capitalism. This dating also places the Capitalocene in historical parallel with Anthropocene theories that emphasize colonial expansion as fundamental to the epoch’s formation. The designation Capitalocene is meant to dislodge the industrial revolution as the primary impetus for anthropogenic changes. However, it is also important to note that the industrial revolution initiates a new “means of production” (in a Marxist sense), which takes place within a capitalist “mode of production,” and thus represents a specific form of capitalist accumulation. To eschew the importance of that late nineteenth-century moment (the rise of industrialism) and how it convened capitalism and the environment in very specific ways would be a mistake. In other words, the operations of capital and industrialism cannot, at this point in time, be analytically separate. However, I do agree with Moore, and with Isabelle Stengers (2015) as well, that Anthropocene discourse, and perhaps intervention, risks becoming neo-Malthusianism (often as depopulation rhetoric), too technophilic (as in, “we can engineer our way out of this”), and can become a set of tropes that overlook inequalities. Finally, while Capitalocene proponents find capitalism as the primary force driving toward ecological degradation, it is also true that we continue to live with emissions from the (former) noncapitalist world (e.g., the USSR and China under actually existing socialism).

53. Alternatively, the Anthropocene can be seen as crystallizing capitalism with nature. See Swyngedouw 2010.

54. I thank Kalyanakrishnan Sivaramakrishnan for the phrasing “velocities of change,” which he proposed during our seminar in the Yale MacMillan Agrarian Studies program. See Steffen et al. 2015 on the Great Acceleration.

1. WIND

1. See Barad 2007 on intrarelations; Ingold 2007 on touching “in” wind.

2. Both “aeolian” and “eólica” draw their etymology from Aeolis. I want to signal that link and also underscore the linguistic relationship between the terms used in Mexico and “the aeolian” as a concept. *Los eólicos* is the Spanish term commonly used in Oaxaca to designate wind park developments (or the turbines themselves), and wind-generated electricity is *energía eólica*. Resistance to the proliferation of wind parks is commonly known as the *antieólico* struggle.

3. See the introduction to “Life above Earth” (Howe 2015a).

4. See Harvey and Knox 2015, 6–15, on how roads (or in this case, roads transformed into streets) are spaces of projection and material transformation where we can observe a negotiation between generic and specific forms of knowledge. Copaving by government and corporate entities in La Ventosa reflects a similar concentration of specialized knowledges and expert intervention. See also Dalakoglou and Harvey 2012; Masquelier 2002.