



AARHUS UNIVERSITY



Cover sheet

This is the publisher's PDF (Version of Record) of the article.

This is the final published version of the article.

How to cite this publication:

Tsing, A. L., Mathews, A. S., & Bubandt, N. (2019). Patchy anthropocene: Landscape structure, multispecies history, and the retooling of anthropology: An introduction to supplement 20. *Current Anthropology*, 60(S20), S186-S197. <https://doi.org/10.1086/703391>

Publication metadata

Title:	Patchy anthropocene: Landscape structure, multispecies history, and the retooling of anthropology: An introduction to supplement 20
Author(s):	Anna Lowenhaupt Tsing, Andrew S. Mathews & Nils Bubandt
Journal:	Current Anthropology
DOI/Link:	https://doi.org/10.1086/703391
Document version:	Publisher's PDF (Version of Record)

General Rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognize and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

If the document is published under a Creative Commons license, this applies instead of the general rights.

Patchy Anthropocene: Landscape Structure, Multispecies History, and the Retooling of Anthropology

An Introduction to Supplement 20

by Anna Lowenhaupt Tsing, Andrew S. Mathews, and Nils Bubandt

The Anthropocene deserves spatial as well as temporal analysis. “Patchy Anthropocene” is a conceptual tool for noticing landscape structure, with special attention to what we call “modular simplifications” and “feral proliferations.” This introduction suggests guidelines for thinking structurally about more-than-human social relations; “structure” here emerges from phenomenological attunements to specific multispecies histories, rather than being system characteristics. Indeed, we discuss “systems” as thought experiments, that is, imagined holisms that help make sense of structure. Ecological modeling, political economy, and alternative cosmologies are systems experiments that should rub up against each other in learning about the Anthropocene. We address the misleading claim that studies of nonhumans ignore social justice concerns as well as suggesting ways that ethnographers might address “hope” without rose-colored glasses. This introduction offers frames for appreciating the distinguished contributions to this supplement, and it traces key changes in anthropological thinking from the time of this supplement’s predecessor, the Wenner-Gren Foundation–sponsored 1956 volume, *Man’s Role in Changing the Face of the Earth*. Rather than interrogating philosophies of the Anthropocene, the supplement shows how anthropologists and allies, including historians, ecologists, and biologists, might best offer a critical description.

Coffee rust (*Hemileia vastatrix*) is a fungus that grows on coffee leaves, weakening and sometimes killing the bushes and reducing coffee production. The rust evolved in East Africa along with coffee. But research suggests that the global spread of coffee rust as a pest is marked by its special affinity for plants grown in unshaded monocrop production—that is, industrial plantations. Rust spores probably crossed the Atlantic Ocean from Africa to Central America in high stratospheric winds, and by the mid-1980s rust was reported sporadically from most of the coffee-growing Americas. However, it did not cause an epidemic until 2012. From trees in industrial plantations, it spread to smallholder farms, where coffee is grown with other plants and under shade. Although shady polyculture reduces wind and therefore slows the spread of the fungus, once coffee rust began

its mighty spread, that was not enough. Rust proliferated across the landscape (see the paper in this issue by Ivette Perfecto, M. Estelí Jiménez-Soto, and John Vandermeer [2019]).

The story of how coffee rust spread globally is a story of “patchy Anthropocene,” that is, the uneven conditions of more-than-human livability in landscapes increasingly dominated by industrial forms. The contributions to this special issue seek to recalibrate the tools of anthropology to equip ourselves to study these uneven landscapes. We suggest that by broadening our notions of social relations into more-than-human space and time, anthropology may recapture what it does best: attending to specificity without being parochial. The multi-dimensional crises of our times call for an anthropology, we propose, that takes landscapes as its starting point and that attunes itself to the structural synchronicities between ecology, capital, and the human and more-than-human histories through which uneven landscapes are made and remade. Coffee rust offers an example of what we mean here, for coffee rust only became a serious pest—like so many of the plagues and predicaments of our time—in the affordances of specific landscape forms. The coffee rust fungus has been around for a long time. It took the plantation form, with its perilous ecological simplifications, to allow the fungus to become an epidemic and to proliferate outside the plantation. The rust spread across coffee-growing land-

Anna Lowenhaupt Tsing is Professor and **Andrew S. Mathews** is Associate Professor in the Department of Anthropology of the University of California, Santa Cruz (1156 High Street, Santa Cruz, California 95064 [atsing@ucsc.edu, amathews@ucsc.edu]). **Nils Bubandt** is Professor in the Department of Anthropology of Aarhus University (Moesgaard Alle 20, DK-8270 Højbjerg, Denmark [bubandt@cas.au.dk]). This paper was submitted 27 V 18, accepted 13 II 19, and electronically published 13 VI 19.

scapes around the world, finding traction wherever there are unshaded monoculture plantations. This specification marks the unevenness to which patchiness alerts us. Plantations are elements of a topography of difference: inside are scenes of modular discipline; outside life—human and nonhuman—continues in its unruly riot, but now swept by plantation-encouraged plagues. Tracing the multispecies socialities and histories that both shape and become shaped by such landscape differences, we argue, is the best starting point for an anthropology of the frenzied, accelerated conditions of anthropogenic life sometimes called the Anthropocene.

Despite criticisms of the term “Anthropocene,” it seems likely that the concept—in all its unruly polysemy—will continue to inspire interdisciplinary conversation for some time (Swanson, Tsing, and Bubandt 2015). Celebratory, homogenizing and essentializing portrayals of the Anthropocene (and of the *anthropos* that is imagined as its sole agent) have caused many critics within the human sciences to argue against the concept (Demos 2017; Malm and Hornborg 2014; Moore 2015). Our approach is different. It is one of critical and curious engagement rather than either celebration or rejection. It is one of attention to specific landscape histories and structures rather than a study that begins and ends with the planet as its unit of analysis. We believe that anthropology has much to offer to the study of phenomena glossed under the term “Anthropocene.” The Anthropocene debate, in turn, pushes anthropology in new directions, challenging us to look at our object of study and at the lives of those with whom we study anew. We humans are suspended in many webs that go far beyond those of signification, in webs that human animals are far from alone in weaving (pace Geertz 1977:5). Studying the structures and histories of such multispecies webs in a time of global environmental frenzy means thinking about the suspension of human life in more-than-human landscape histories in new methodological and transdisciplinary ways. It means learning to think structures and systems differently, and it means being willing to reconsider whether anthropology is and should only be a “minor science” (Marcus and Pizarro 2008), a science content to deconstruct hegemonic forms of knowledge and study the world “otherwise.” Such deconstructions of hegemonic universal claims about the world are a critical and crucial dimension of anthropology. But we claim that dispatches from specific sites, which conclude that “just-here-where-I-did-my-fieldwork,” everything is different, are no longer enough. Everything is arguably different in every place now. How are we to understand this radical difference when it happens both site specifically and on a planetary scale? When radical difference is simultaneously a matter of human ontology and multispecies survival? In the face of the challenges of the Anthropocene, anthropology must dare to be more than the voice of parochial alterity; dare to allow anthropological stories of the “otherwise” into concrete transdisciplinary conversations about planetary structures that “change everything” (Klein 2015). We need to reclaim, in a new register, anthropology’s heritage of daring to make big claims about humans and about the worlds that hu-

mans coinhabit with others instead of being content to deconstruct such claims. But we have to make such claims with all the circumspection that also is the trademark of anthropology. The Anthropocene is a gift to anthropology, but without careful anthropological reflexivity, it is, as Bruno Latour (2014) suggests, a poisoned gift. How, then, to go about it? If this is the question that lies at the heart of the current conjuncture between anthropology and Anthropocene, “patchy Anthropocene” is the beginning of our answer.

This special issue is a collection of stories from a patchy Anthropocene, ethnographies of contemporary forms of simplification and proliferation that are reshaping human and nonhuman life in radically new ways. It assembles a selection of anthropologists, historians, biologists, and ecologists who bring both critical distance and empirical curiosity to their study of the state of the world, in its uneven patches and its dynamics of more-than-human livability.

In this introduction, we outline five ways to make “patchy Anthropocene” come to life as an analytic tool:

1. *Noticing landscapes shows us Anthropocene patches.* We introduce the term “landscape structure” for observations of the patterns of human and nonhuman assemblages as these emerge historically. While the history of anthropological theory has taught anthropologists to think of structures as components of systems (and in recent decades to be suspicious of both as a result), we separate them analytically. While we are cautious about systems-thinking (see below), structures are for us phenomenological markers of heightened field sensibility. Landscape structures catch our attention as form coming into being. A phenomenological attunement to landscape forms as well as to beings-in-landscapes allows multispecies histories to come into view.

2. *Two kinds of landscape structures are key to the anthropogenic disturbances we call Anthropocene: “modular simplifications” and “feral proliferations.”* Plantations are an example of modular simplifications; plantation-encouraged diseases are an example of feral proliferations. Anthropocene patches emerge in the relationship between simplifications and proliferations. Tracing these relations can show us just how and why Anthropocene landscapes are so proliferous and so treacherous.

3. *Systems are thought experiments with which to make sense of structures.* Patchy Anthropocene juggles multiple kinds of systems-making as well as multiple kinds of landscapes. Earth systems scientists gave us the concept of the Anthropocene as a system (Rockström et al. 2009). The social sciences have responded with alternative kinds of systems-thinking, such as political economy (Moore 2015). In either case, analysts tend to pick one kind of systems-thinking and argue that it is fully adequate to know the world. In contrast, we approach systems through what Eduardo Viveiros de Castro (2019) calls “ontological anarchy.” Many kinds of systems deserve to rub up against each other in understanding the patchy Anthropocene—not only ecological models and theories of political economy but also what we might call, for want of a better word, nonsecular cosmologies.

4. *Can we acknowledge catastrophe while also imagining possibility?* Jonathan Lear (2006) calls such imagining “radical hope.” Thought work of this kind gains traction through the specificity of cosmology and circumstance. The Anthropocene may be planetary, but our grip on collaborative survival is always situated—and thus patchy.

5. *“Patches” are sites for knowing intersectional inequalities among humans.* An anthropology of a patchy Anthropocene needs to be “people-focused” and, at the same time, engaged with multispecies relations. Throughout history, humanitarian calamities and global inequalities have been enacted through nonhuman agency that reacts to human design. Consider, for instance, the environmental justice crisis from radioactivity to toxic wastes (Bullard and Wright 2012; Johnston and Barker 2008). Patchy Anthropocene brings the legacies and tools of social justice-based analysis into Anthropocene studies. Yet this double focus requires a broadening of what “politics” and “critique” is in anthropology. It requires rethinking anthropology’s anthropocentrism while insisting that people matter, still.

The rest of our introduction explains these points. The papers in the special issue are organized to speak to these issues; however, in recognition that each paper addresses many issues, the discussion that follows draws from papers outside their table-of-contents organization.

Noticing Landscapes Shows Us Anthropocene Patches

“Patch” is a term we borrow, and modify, from landscape ecology; there, “landscapes” are units of heterogeneity whose components—at any scale—are patches (White and Pickett 1985; Wu and Loucks 1995). Patches show us landscape structure, that is, morphological patterns in which humans and nonhumans are arranged. A forest, a city, or a plantation: each of these is a landscape structure. We recognize these landscape structures through observations, comparisons, and attunements; landscape structures may be analyzed as part of systems, whether cosmologies, ecological models, or political economies, but they need not be.

Humans have shaped landscape structure since the origin of our species (e.g., Redman et al. 2004); however, the great ecological shifts of the Anthropocene require special attention to the landscape disturbances of imperialism and industry. European colonialism depended on landscape structures such as deepwater harbors and resource plantations. Global capitalism spreads fossil fuel-burning factories and container shipping. The post-World War II Great Acceleration has intensified the making of imperial and industrial landscape projects, which brings on the Anthropocene.

Noticing landscape structure is not new to anthropology. Think, for instance, of E. E. Evans-Pritchard’s (1940) classical study of the way ecological difference shaped the Nuer cow complex or of Clifford Geertz’s (1963) study of colonial history and “patchy” agricultural intensification in Indonesia. Yet in

recent years, however, many anthropologists have become so wrapped up in our interlocutors’ cosmologies and concepts that we have stopped looking at the landscape for ourselves. We have lost the habit of noticing through our own observations of the world in addition to conversations with human interlocutors (Mathews 2018). The Anthropocene is a wake-up call urging us to reinvent observational, analytical attention to intertwined human-and-nonhuman histories.

Several papers in this special issue show us how to better “read” the landscape. Kate Brown (2019) takes us to the Chernobyl exclusion zone. How shall we assess the effects of radioactivity? Brown proceeds not only through conversations with residents but also by teaching herself “landscape literacy.” She leads us not only to hear human stories but also to see the sickly curved needles of a pine growing out of a bomb crater. The morphologies of plants and the toxic burdens of diseased bodies are amenable to our senses, propelling our capacity to imagine landscape structures, histories, and large-scale transformations (Mathews 2018).

Such literacy involves conversations with other committed observers, including natural scientists. This direction is pursued in the extraordinary dialogue between biologist Michael Hadfield and science studies theorist Donna Haraway (2019). Hadfield explains how his attention was drawn to the disappearing *Achatinella* tree snails of Hawaii and what he did over the next 40 years to learn about them and to train a new generation of Pacific scholars to that noticing. Haraway weaves an analysis of the importance of this kind of work for the ways humanists and social scientists know the world. In these accounts, one mirrored in the other, the scholarship of documenting and understanding the ecology of *Achatinella* is inseparable from political protest, interwoven with the teaching of biology to indigenous youths across Polynesia, and developed from a symbiogenetic relationship with feminist science studies. Noticing matters in all these ways.

Our use of the term “structure” can perhaps be clarified in cautious dialogue with an anthropological pioneer of the study of social structure, A. R. Radcliffe-Brown. Radcliffe-Brown’s use of “structure” is both an inspiration and a caution to us. Like Radcliffe-Brown, but in contrast to the use of structures in the French tradition, we are interested in structures as accessible to the senses. But structures are, for us, forms in which histories of social relation reveal themselves. In this sense, our use of “structure” works against one of the analytical postulates for which Radcliffe-Brown is most famous: the distinction between structure and change. Radcliffe-Brown introduced structure as a tool for building transhistorical natural law. In contrast, the landscape structures we urge anthropologists to notice are always coming into being. “Structures” is our analytical word for the form in the world that catches the eye, begs for attention in a phenomenological sense, but also points to longer trajectories. Like the morphologies of trees, which show us historical growth patterns (Mathews 2017a), the structures we identify are signs of landscape-making, a historical process. Landscape structure shows history rather than opposing it.

This foreshadows our second gripe with the “structures” of structural-functionalism: we are strongly opposed to the anthropocentrism of Radcliffe-Brown’s social structures. Ironically, Radcliffe-Brown uses examples from the nonhuman world to define “social structure”—only then to quickly dismiss these examples as irrelevant to anthropological inquiry:

In a hive of bees there are the relations of association of the queen, the workers and the drones. There is the association of animals in a herd, of a mother-cat and her kittens. These are social phenomena; I do not suppose that any one will call them cultural phenomena. In anthropology, of course, we are only concerned with human beings, and in social anthropology, as I define it, what we have to investigate are the forms of association to be found amongst humans. (Radcliffe-Brown 1940:2)

In our use of the term “landscape structure,” we bring back what Radcliffe-Brown tossed away, namely, the notion of more-than-human social structure.

“Modular Simplifications” and “Feral Proliferations” Make Anthropocene Landscapes

More-than-human social structures reveal themselves, so we argue, in at least two dominant landscape forms in the contemporary world: in modular simplified forms and in feral proliferations. Each of these is entangled in the history of the other, histories that are at once human and more-than-human.

The term “modular” in “modular simplifications” is borrowed from Hannah Appel’s work on oil company enclaves in Equatorial Guinea (2012), which in turn draws from James Ferguson’s (2006) analysis of the uneven landscape of private security and mineral extraction in Africa. Appel uses the term “modularity” to discuss the social discipline of oil company enclaves, produced by imaginaries of industry and investor “risk.” In this kind of leaping globalization, uneven topographies are key to understanding both connections and disconnections. Appel’s concept can be useful to understand non-human as well as human landscapes in their mutual historical formation. To think about ecological simplifications, beginning with the modularity of the plantation is helpful. However, at least in landscapes, modular simplifications never fully wall themselves off; feral proliferations mix insides and outsides.

Plantations create monocrops to make it possible for coerced and alienated labor—and more recently, machines—to tend crops without the care that farming otherwise requires. Contemporary plantations thus continue to carry histories of slavery and the displacement of indigenous communities. This “modular” simplification has spread around the world together with human coercion as plantation labor; this regimentation of human and nonhuman life must be thought together. Plantations attempt to reduce the number of living things in an area to just one kind; everything but that which is required for the reproduction of the economic product should be eliminated.

This is not just an issue for plants; feedlots are essentially animal plantations. Such simplifications have social and ecological effects beyond alienation: diseases are nurtured and spread around the world. These latter are our “feral proliferations.”

We have already introduced coffee plantations as a modular simplification with feral effects—the coffee rust fungus (Perfecto, Jiménez-Soto, and Vandermeer 2019). Coffee plantations are not so different from industrial chickens, as introduced in this issue by Frédéric Keck (2019). In Hong Kong and southern China, chickens are raised in uniform lots whose massive size defies the imagination. Such ecological simplifications, as with coffee plantations, have consequences, including the emergence of avian viruses capable of infecting humans as well as birds. The uniformity and crowding of the chickens in effect constitutes a natural laboratory for viruses that produce new and virulent forms. The viruses bred under such conditions spread far beyond the chicken farms, potentially infecting humans around the world. Large-scale ecological simplifications, then, invite “feral proliferations” that end up rippling through the entire landscape mosaic.

Consider, too, the spread of toxins, another form of “feral proliferation.” Brown’s (2019) exploration of the radioactive landscapes of the Ukraine and Belarus, mentioned above, offers an important reminder that industrial infrastructures have effects far beyond their designs. Radioactivity mutates the metabolisms of living things, which spread not only through wind and water but also through food chains. Or consider the hormone-disrupting pesticides used in Martinique to kill borer beetles in the island’s banana plantations, as described by Vanessa Agard-Jones in her contribution to the symposium that gave rise to this special issue (see also Agard-Jones 2013). Seeping across boundaries of land, water, and skin, toxins permeate living things, human and not human.

Ecological simplifications clear out species diversity to create increased densities of some kinds of individuals. Such increased densities may stimulate feral effects, of nuclear, toxic, viral, bacterial, fungal, or animal kinds. High populations of hatchery-produced salmon in the US Pacific Northwest, for example, outcompete wild salmon, reducing wild salmon populations (Swanson 2018, 2019). The hatchery salmon themselves become a feral proliferation and dangerous competitors for wild salmon. Heather Anne Swanson’s study (2019) shows how attempts to increase food for humans can have wide-reaching feral effects for the ecological health of surrounding organisms.

Ecological simplifications have been historically tied to colonial conquest, as Rosa Ficek (2019) argues in her consideration of the cattle complex in Latin America. Making the landscape safe for cattle went hand in hand with the destruction of indigenous communities and native ecologies. Yet just because the colonizers emptied landscapes for cattle does not mean they were in control. As Ficek shows, sometimes cattle destroyed the ecological relations that were meant to nurture them. Sometimes feral cattle supported rebellious human subjects as they spread beyond and before advancing empires.

And sometimes they gave rise to far-reaching developments in governance and political economy that no colonizer could have predicted. Cattle in the Americas offer a model of this: Anthropocene landscapes emerge in the relation of ecological simplification and feral proliferation. Colonial and capitalist planning take part in this emergence but do not fully determine the results.

Cattle, like coffee rust, show us that feral effects are not exterior to the modular landscape patches that afford their proliferation. The modular and the feral are messily entangled in landscape structures.

Systems Are Thought Experiments with Which to Make Sense of Structures

In embracing an analysis of landscape structure as a way to understand patch dynamics, this special issue offers a more awkward, nuanced story about systems, the most common way in which ecologists and planetary scientists discuss the Anthropocene. Systems, of course, have also been a common theoretical concept through which anthropologists have sought to understand cultures and societies. Systems are imagined holisms through which structures fit together (Otto and Bubandt 2010). Perhaps that is why contemporary anthropologists are so suspicious of systems. Systems, we realize, offer a snapshot of history, not an account of unpredictable change. They reify categories for the sake of the analysis. And yet they do important and necessary work for us.

In this special issue, we argue that three kinds of systems-thinking come into play for their importance to understanding “patchy Anthropocene”: ecological models, nonsecular cosmologies, and political economies. We argue that these three kinds of system building have things in common, and that there are important things to be gained from each. Each offers interpretive frameworks for moving from observations of landscape structures to ways of understanding the Anthropocene. Papers in this special issue show the importance of each: Heather Swanson (2019) defends “carrying capacity” models as a component in struggles for more-than-human livability; Frédéric Keck (2019) discusses Buddhist versus scientific cosmologies for working with birds and their illnesses; Yen-Ling Tsai (2019) shows intersections of kinship and capitalism in transforming landscapes. We argue that a key contribution that anthropologists can make to Anthropocene studies is to juxtapose these alternate kinds of systems-thinking—thus opening attention to multiple ways of gaining traction on observations of landscape structure. In addressing the spatial and historical unevenness that hides in plain sight in the Anthropocene, we need to find a way of addressing empirically the planetary scale of the Anthropocene without remaining naively beholden to its unitary pretensions. Holding in critical tension the diverse kinds of systems-thinking in ecological models, nonsecular cosmologies, and political economies offers such a way.

First, ecological models: Earth systems and climate models have been the gateway to the Anthropocene (e.g., Steffen et al.

2015). In most such discussions, the Anthropocene is a condition known through modeling of mass aggregated data. This is what Timothy Morton calls a hyperobject (Morton 2013). And it is as a hyperobject, a phenomenon that can be computed and thought (as a future event) but not directly experienced (in the present), that the Anthropocene, like global warming, is making a difference in politics, media, and public perception. But a hyperobject is also made. In the Earth systems approach to the Anthropocene, the heterogeneity of landscape structure is erased in this making because global data collection is imagined as necessary to build a planetary totality. We respect this project, and we support important uses of it—including recognition of the phenomenon of global climate change. In the process of building systems models supported by data infrastructures, however, researchers necessarily simplify and provisionally freeze what entities they will notice and count, the “state variables” such as sea level, carbon dioxide concentration, or population. Systems models create a world by projecting and extrapolating from such provisionally frozen entities, both illuminating what is in that world and excluding other ways of seeing (Mathews 2017*b*). Once we are committed to a model, it is very hard to change the way we identify data. How might anthropologists both use models and yet refuse to conflate them with the fullness of the world (Edwards 2010)?

In their account, Atsuro Morita and Wakana Suzuki (2019) describe efforts to model river deltas, but also how transformations within patches have potential landscape-transforming effects whose possibilities are silenced by systems models. Hydrologists who have studied the Chao Phraya delta of Bangkok in Thailand are taken aback by a flood produced by a relatively modest rain event. Local people (and perhaps anthropologists) are much less surprised, because they recount histories of infrastructure building and urbanization and notice new relationships among dams, roads, dikes, and rivers. These are the patches that matter for a structural account of landscape history. Hydrological modeling fails to handle the contingent histories that have produced these new entities and processes. These mundane empirical details are something that anthropologists can notice (with and without their human interlocutors) and that might be critical to modelers who notice cross-scale effects, nonlinear effects, and instabilities. A different kind of instability emerges in the experiences of complex adaptive systems modelers who learn to sense the global-scale vulnerability of deltas to human practices of dam building, irrigation, and urbanization. Modelers reason analogically so as to imagine a hybrid socioecological collective that is affected by the liveliness and surprises produced by changing deltas. Models enable a kind of literary imagination, a sensing of new social collectives and relations, even as they may silence attention to landscape structures.

Swanson (2019) reflects on another kind of modeling endeavor: carrying-capacity models. In the US Pacific Northwest, Swanson discovered that carrying-capacity models were introduced at a critical point in the struggle for livable landscapes. Carrying-capacity models helped reveal that fixing dams

alone would not be enough to restore salmon-rich watersheds. Salmon were being defeated by a multitude of destructive forces, from toxin-filled agricultural irrigation to sediment-releasing logging. Because political battles over dams and fishing had produced baseline numbers for salmon, modeling these numbers as “carrying capacity” could play a crucial role in arguing for salmon-healthy rivers. Anthropologists who are prejudiced against quantitative analysis, Swanson argues, fail to note the importance of ecological models in more-than-human politics. When we have the numbers, she suggests, we should use them.

Model thinking introduces necessary simplifications. As Viveiros de Castro (2019) points out in his discussion of thinking with models and examples, simplifications have both pleasures and dangers. We need such simplifications, he argues, to make sense of the world of “critters and processes, qualities and quantities.” This is what he calls, following Geertz (1977), “models of” (Viveiros de Castro 2019). Both model thinking through simplification and thinking by example have their place. But Viveiros de Castro reminds us of the dangers when “models of” become normative “models for” that inspire authoritative simplifications—sponsored by states and corporations—that destroy landscapes and silence other visions of the world (Law 2015). Model thinking is genealogically linked to the modular landscapes we discussed above. If modular landscapes work by banishing unruly forms of more-than-human sociality, model thinking works by banishing the power of the example, the exception, and the otherwise. The routines of data gathering and model building undermine modelers’ capacities to notice change, transformation, and historical specificity in the world. Models are data infrastructures (Edwards 2010) that both enable and deaden observation. As anthropologists come into conversation with Earth systems modelers, then, it seems important to hang on to our capacity to remember what Viveiros de Castro calls “ontological anarchy.” Models can coexist with other modes of systems-thinking, including cosmological alternatives.

Second, then, nonsecular cosmologies: If cosmologies are a form of systems-thinking, spirits are a kind of model, too. Like models, spirits anticipate results and modify “the state of the world according to a certain intention” (Viveiros de Castro 2019). In his paper on chickens, mentioned above, Keck (2019) shows us spirits as well as viruses emerging from the industrial chicken farms of Hong Kong. Hong Kong’s bird-watchers know spirits as well as birds, and they show us the intertwined histories of secular and nonsecular understandings of risk, care, and death in the midst of industrial simplifications. “Risk,” as understood by chicken farmers, emerges in new light: a firmly secular category takes on nonsecular overtones when cooked up in the fevered mix of spirits and viruses (see Szerszynski 2017). In the uncanny valleys of the Anthropocene, spirits, ghosts, and monsters of many kinds proliferate (Bubandt 2018). What unites these spirits, ghosts, and monsters—regardless of whether they emerge in villages, media, chicken farms, or scientific laboratories—is their disregard for boundaries, whether these boundaries are spatial, conceptual, or corporeal.

Thinking of geological science as a cosmology, for instance, alerts us to the role of imaginative extrapolation in linking landscape observations with deep time. This alternative is explored in Naveeda Khan’s contribution to this issue (2019), in which she explores the romantic roots of geology. This genealogy matters, because it was, after all, primarily the science of geology that gave us the Anthropocene, a term that may or may not yet still become a formal geological unit of time (Zalasiewicz et al. 2017). Khan argues that the nonsecularity of the unruly world of more-than-human agency in the Anthropocene is revealed to us in the romantic roots of the science of geology itself. Khan’s article follows the processes that make both humans and deltas vulnerable to the eventfulness of the earth’s mantle. In the delta of the Brahmaputra/Jamuna River, *char* inhabitants and hydrologists alike come to sense that delta islands and river morphologies are the outcome of earthquakes. Shifting tectonic plates, irrigation infrastructures, and dams can shift rivers or starve deltas of sediments. Khan uses the concept of discordance to draw attention to the ways that people come to be “tormented” by this subterranean deep time of rocks and tectonic plates.

Spirits might be models that have a habit of escaping the systems out of which they emerge. They invite us to unpredict these systems in surprising ways. Spirits may close high-tech airports, affect democratic elections, or aid scientific discovery (Bubandt 2006, 2019; Bubandt and van Beek 2011). But spirits are not the only models that do this work of unpredictation (see Viveiros de Castro 2019). Indeed, is it not central to the contested appeal of the scientific models of the Anthropocene that they allow us to “unpredict the world” in new ways? A key part of the interest of many anthropologists in the natural science models of the Anthropocene is, arguably, that the “unprediction” of the Anthropocene feels—in both promising and uncanny ways—like a homecoming of sorts, namely, a return to a world of unseen forces that might just possibly also include spirits: a return to the doubt that lingers in witchcraft as much as in climate science (Bubandt 2014; Oreskes and Conway 2010), and a return to the unpredictability of a world that was not modern after all (Latour 1993). The uncanniness of the Anthropocene grows from the way this model-made reality has added new verisimilitude, new truth-likeness, to spirits, monsters, and ghosts (Bubandt 2017, 2019; Tsing et al. 2017). At the very historical juncture where modern reason declared spirits and monsters to be dead, the graphs of the Great Acceleration (Steffen et al. 2015) have helped draw the contours of the uncanny valleys of the Anthropocene in which the spirits and monster dwell . . . after all (Bubandt 2018).

Ontological anarchy is therefore not exterior to systems-thinking. It is the ghost that stirs within and between systems. In this sense, anthropologists need to take natural science models as seriously as spirits. Doing so means neither taking them naively for granted nor dismissing them out of hand as cultural constructions. At the right epistemological and ontological distance, working with the simplifications of systems can clarify our understanding of the modular simplification of the world.

We even might propose alternative and more productive simplifications that bring life, in all its historical patchiness, into model-thinking, as in Latour's recent collaboration with critical zone scientists (Arènes, Latour, and Gaillardet 2018). Engaging anthropologically with systems is not by necessity to enslave our analyses to the rational and reductive reasoning of the imagined world of "models-for." On the contrary, it may well help open the door to a more unruly, nonsecular Anthropocene.

Third, political economies: Consider the Green Revolution, a recent historical event of social and ecological simplification with massive consequences for both Earth systems and landscape structures across Asia. What allowed the event to sponsor such systemic and structural changes? In at least some places, including Taiwan, Green Revolution advocacy for a particular family form cemented a package in which chemicals, machines, and international markets could come together in what appeared to be a project for everyone's wellbeing. "Families" as a unit of farming erased the implications of toxins, debt, and plantation-bred pathogens. A charismatic package was created in which modularity appeared glamorous and forward looking. Such modular simplifications, however, left out the nets of kinship, both human and not human, that had allowed farming to thrive over the *longue durée* (Tsai 2019). In Taiwan, some of these "odd kin" are plants and animals; others are spirits and ghosts. Together they create a queer more-than-human kinship that challenges agricultural simplifications, offering alternatives.

In contrast to Tsai's analysis, Michael Dove (2019) argues for the generativity of family farming and its *longue durée* legacies. Smallholders, Dove argues, create ecologically diverse landscape patches; plantation agriculture has always been parasitic upon this smallholder creativity. Dove links plantation landscape structure with events and systems in Southeast Asia across five centuries. Colonial and postcolonial rulers have defined commodity crops as having fixed properties that are amenable to control and simplification, as they seek to produce simplified commodity-producing landscapes. In contrast, smallholders and natives cultivate rubber, pepper, and *Imperata* grass in a variety of ways. They note the political histories that brought these crops into their landscapes, and they are wary of the dangers of over-reliance on one crop. Through their attention to economic crises and the alternative morphologies that emerge from human-plant-landscape relations, smallholders imagine critiques of dominant political economies. It is precisely this possibility of alternative ontological relations and plant morphologies that plantation simplifications seek to deny. This is "epistemicide," the insistence on one form of knowledge and on a one-world world ontology (Law 2015). Epistemicide flattens human worlds, identifying particular arrangements as functionally necessary rather than historically contingent. An anthropology of a patchy Anthropocene requires attention to a diversity of modes of knowing as well as modes of living.

Here we suggest that varied modes of systems-thinking, from ecological modeling to nonsecular cosmologies to political economies, might sit side by side in building our knowledge of patchy

Anthropocene. Our willingness to rub these kinds of systems together contrasts with most Anthropocene theorists who pick one of these and dismiss the others. Our position here resonates with Donna Haraway's claim that the Anthropocene needs many names (Haraway 2015). To "Anthropocene," with its global Earth systems models, Haraway adds not just Capitalocene (Moore 2015) to point to the power of capital but also Chthulucene, in which animal and spirit beings cavort together. By allowing all three purchase, we too show how planetary and patchy work together.

Can We Acknowledge Catastrophe While Also Imagining Possibility?

What is the place of hope in the Anthropocene? Is it possible to hope, when it was the millenarian hope of modernity that got us into the mess of the Anthropocene in the first place (Buck-Morss 2002)? Michael Hadfield's essay on his research on tree snails in Hawaii (Hadfield and Haraway 2019) offers a place to begin to address this question. Hawaii is one of the premier extinction capitals of the world. In the last thousand years, two-thirds of Hawaii's more than 100 endemic bird species and more than 700 species of snails have gone extinct (van Dooren 2017). Hadfield's study of *Achatinella* tree snails takes place in the midst of their own extinction crisis. Thirty-two out of Hawaii's 42 endemic species of tree snails have been pushed into extinction by a combination of habitat loss, shell collection, and the introduction of rats and other predators. All 10 surviving species of Hawaiian tree snails are now critically endangered. Amid this unfolding catastrophe—the end of the world for tree snails, as it were—Hadfield's contribution to this issue, a tree snail manifesto cowritten with life-long friend and collaborator Haraway, is testimony to the impossibility of doing nothing. "The Tree Snail Manifesto" is a love story tied by the biological poetics and devastating politics of the holobiont snail (Hadfield and Haraway 2019); it is also an intimate account of the pleasures and difficulties of collaboration across the human-natural science divide.

Too often the Anthropocene forces upon us an imagination of the future that, as Haraway has put it elsewhere, is infected by an impossible choice between "technoocratic geoengineering fixes and wallowing in despair" (Haraway 2016:56). Hope in the Anthropocene, if it is not the desperate hope of isolating oneself behind trade barriers, border walls, and immigration laws, tends to take the shape of a hopeful politics of technological transcendence, the zombie version of modernist hope. Transhumanism, "green capitalism," the Singularity University in Silicon Valley, and the ecomodernist movement are all versions of this revived modernist hope for capitalism and humanity to reinvent itself in a "greener" and "better" form in the face of crisis and disruption. The Anthropocene, the ecomodernists suggest, for instance, can be "good, even great" if we put "humankind's extraordinary powers" in its service (Breakthrough Institute 2015). The "good Anthropocene" of ecomodernism is a big, universal, and scalable dream world

(Hamilton 2015). No such grand and scalable hope is possible if one follows the slime trails of the Hawaiian tree snail. For those tied by the history of the tree snail, hope is necessarily troubled by extinction. Hope rests on staying with the trouble: the troubled pleasures of co-species collaboration and cross-disciplinary learning. As Hadfield and Haraway's manifesto (2019) demonstrates, there is nothing simple or straightforward about aligning natural science, activism, feminism, and indigenous politics. Nothing is given, except the impossibility of doing nothing. This is a more humble and troubled hope, a hope "by example" (to speak in the terms offered by Viveiros de Castro [2019]). In learning to hope against hope in the Anthropocene, anthropologists have much to offer by way of those with whom we study.

After all, as Déborah Danowski and Eduardo Viveiros de Castro (2016) point out, denizens of the Anthropocene are not the first humans who have been forced to contemplate the end of their world. Indigenous people across the globe have experienced the end of the world multiple times over in colonial history. In his study of indigenous memories of the devastation visited upon the Crow Nation by North American settler colonialism, Jonathan Lear identifies in the prophetic dreams of Chief Plenty Coup what he calls "radical hope" (Lear 2006). As opposed to the ontological certainty of the scalable hope of modernist or monotheistic optimism, "radical hope" is deeply pragmatic, epistemologically ambivalent, and under-articulated, because it is "directed towards a future goodness that transcends the current ability to understand what it is" (Lear 2006:103). Radical hope, Lear continues, "anticipates a good for which those who have the hope as yet lack the appropriate concepts with which to understand it." Collaboration—open and curious—across multiple registers of knowledge and being are needed for anticipatory action in the face of this Real Unknown. Radical hope, one might say, is what is required in a tree snail world.

Take the marabou storks that in recent years have begun to multiply in Kampala, the sprawling capital of Uganda (Doherty 2019). The storks have given up their seasonal migration routes and have instead begun to permanently occupy trees across the city. From their treetop perches, the storks make daily trips to the municipal landfill, where they pick through organic waste side by side with the human salvage workers who make a living collecting metal and plastic from the site for sale as recycling material. Marabou storks and destitute salvagers do not figure in official plans for waste management in Kampala, and yet they are critical to the city's infrastructural ability to handle its escalating garbage crisis. Ungainly and associated with dark rumors of rotting corpses during the days of Idi Amin, the marabou storks are disliked by most in the Ugandan capital except by the salvage workers who know them most intimately. On a patch of wasteland in an East African mosaic of the Anthropocene, co-species toleration exists precariously and for the time being between marabou storks and salvage workers: beings that most in Kampala choose to ignore or despise. Doherty offers a patchy, exemplary hope that is neither scalable

nor unequivocal. The marabou storks accumulate in their bodies the mercury, chemicals, and pathogens of the waste they consume—as do the salvage workers. Both are para-sites: bodies that exceed the state simplifications that also shape them, bodies that do critical but criminalized work, bodies that are linked in their shared exposure to the poisonous hazards of the Anthropocene. This is not much by way of hope. But it is not nothing either.

Like Jacob Doherty, Vanessa Agard-Jones's contribution to our symposium invited us to see the kinds of contagious politics that may grow from common exposure. Plantation workers exposed to toxic chlordecone developed a "kin/esthesia," a political aesthetics of movement and connection, and a form of queer kinship that begins at the molecular level but—in all its contradictions—seeps into both activism and everyday life. Chemical contamination, like marabou storks, reminds us that a politics of exposure in the ruined landscapes of the Anthropocene is a more-than-human politics.

Dove's (2019) attention to "epistemicide" is also, ironically, a form of radical hope. It is obvious from Dove's treatment that alternative modes of knowledge continue a lively existence, even as they are flattened by hegemonic projects of colonial governance. No single standard of knowledge has been able to exist alone over the 500 years of his account. Every plant carries with it multiple modes of human knowledge and practice. Despite the power of plantation science, smallholder alternatives continue to make their way in the world.

In unexpected ways, Ficek's (2019) cattle also point us to the patchiness of multispecies politics. "Unexpected" because cattle, after all, are quintessential creatures of the Anthropocene: central contributors to global warming, water shortage, deforestation, and territorial dispossession and land grabbing. Yet, in twentieth-century eastern Panama, the risk of foot-and-mouth disease allowed environmental NGOs to lobby against the construction of a highway into vulnerable forest land, and national parks have been created along the border to Colombia as a buffer zone against the disease. Ficek argues that such unexpected effects of cattle complicate conventional accounts of cattle as creatures who by their nature are always complicit in colonization and dispossession. Like Dove's (2019) warning against a facile demonization of oil palm trees (*Elaeis guineensis*) or *Imperata* grass, Ficek's account shows that bovines are more than methane-belching colonial creatures and that livestock proliferation works to produce patchy landscapes of riotous ferality as well as simplification. From the feral and unexpected encounters between bovines and humans in Panama, as from those between marabou storks and salvagers in Uganda, the illegitimate hope of a kind of co-species collaboration in ruins emerges for which we do not have a language.

Unlike modernist utopias or mere optimism, the patchy hope that emerges from these stories is not scalable; it exists in specific patches of the Anthropocene that resist easy globalization. Hope is patchy because capitalist and ecological structures themselves are patchy (Bear et al. 2015; Tsing 2015) and because the Anthropocene itself is ontologically patchy (Vi-

viros de Castro 2019). Scalable dreams ignore this at their own peril. Patchiness is hope's condition of possibility and its limit at the same time. Patchy hope operates on the acute awareness of its own limitation. Indeed, it operates on the acute likelihood of its own failure: tree snail love amid extinction; marabou proliferation amid the internalization of pollution. Patchy hope works with the dilemma of staying with the trouble (Haraway 2016): the impossibility of doing nothing compounded by the acute awareness of the politically fraught nature of collaboration across multispecies, disciplinary, and multiperspective difference. Patchy hope works within a register of internal failure rather than heroic action.

Patchy landscapes reverberate with the patchy hope of multiple histories (Mathews 2018). Natasha Myers, who was present at this symposium, reminded us of the kind of patchy hope that can be cultivated in the oak savannahs of Ontario. Oak savannahs are the result of thousands of years of fire-regime hunting practices by the Haudenosaunee, the Anishinaabe, and other First Nations who lived in the Ontario region until the lands were sold to the British Crown in the late eighteenth century. The First Nations dispossessed from their lands, oak savannas were increasingly turned into farmland and parks. Only in the last 2 decades have restoration efforts sought to bring back fires that could maintain an oak savannah that would otherwise disappear. Following these restoration efforts in Toronto's High Park, Myers (2017) reminds us of the limitations of ecological science and asks whether one might do "ecology otherwise" by becoming attuned to plant sensing. Demonstrating how middle-class urban recreational areas may hide colonial histories as effectively as plantations (see Dove 2019), Myers highlights the need for an affective ecology that recovers the now erased landscape ties to the dispossessed First Nation peoples of the Toronto oak savannahs.

"Patches" Are Sites for Knowing Intersectional Inequalities among Humans

The concept of a unified and homogeneous Anthropocene makes it difficult to incorporate anthropological insights about differences and inequalities among humans. In contrast, such insights are key to the conceptualization of "patchy Anthropocene." Patches show us histories of genocide, displacement, exploitation, and oppression—together with the ecological consequences of these programs. All the papers in this special issue address human inequalities: cattle push forward Anthropocene colonization, with its genocidal practices (Ficek 2019); smallholders' perspectives on plant life are systematically erased in Southeast Asia (Dove 2019); Ugandan garbage pickers work alongside birds to find their livelihoods in the ruins (Doherty 2019). Several papers address how scholars might get enough distance from still-hegemonic frameworks of progress, modernization, and growth to avoid their unjust exclusions. Khan (2019) argues that the Romantic tradition for knowing nature offers promises for drawing us into the hugeness of a geological scale without the alienated simplifications of big-data models.

Tsai (2019) shows how Green Revolution ecological simplifications are also kinship and gender simplifications that matter. By excluding "odd kin" in favor of idealized nuclear families, the Green Revolution ensured its own nonsustainability—both in controlling landscapes and in controlling human social arrangements. The "good Anthropocene" of design, she shows, is always coming undone.

Patchy Anthropocene is an analytical program for including social inequalities in attention to environmental degradation, but this is not a simple matter of "add and stir." Indeed, we argue, "attention to social inequalities" and "Anthropocene" have an awkward relationship in the Strathernian sense of the term (Strathern 1987), that is, as oppositions without synthesis. Anthropocene works through an appeal to Enlightenment universals; attention to social inequalities requires an acknowledgment of the "much more" out there. Enlightenment categories authorize our search for knowledge. But they also betray and exclude us over and over. Patchy Anthropocene takes hold of this contradiction to grapple within it, rather than to imagine it away. One way to illustrate this, and to move toward a conclusion, is to acknowledge and examine the relationship between this special issue and the 1955 conference that inspired the Wenner-Gren Foundation to sponsor it.

This special issue grew from an invitation by the Wenner-Gren Foundation to commemorate the sixtieth anniversary of the 1955 conference and the subsequent publication *Man's Role in Changing the Face of the Earth* (Thomas 1956). The magisterial 1956 volume conjured up an image of a planet reshaped by human industry, but it was an image that is a very different one from the patchy Anthropocene that the contributions to this special issue outline. The categories "Man," "Change," and "Earth" are unsatisfactory for our work, even as they make it possible. Indeed, the changing shape of more-than-American anthropology since the 1950s provides a guided tour through continuing struggles with these stubborn categories.

Earth

Man's Role in Changing the Face of the Earth (Thomas 1956) is a sprawling compendium that stretches across space, time, and disciplinary knowledge. Such ambitions formed within the post-World War II burst of big, synthetic science that emerged from US confidence in its world leadership. One place to begin in thinking about the world that gave rise to the 1956 volume is the Great Acceleration, that candidate for Anthropocene status that begins with the radioactive signature of the first atomic bombs at the end of World War II (McNeill and Engelke 2016). As Steffen et al. (2015) argue, this period can be characterized by the rapid uptick of anthropogenic changes to both human and nonhuman Earth systems. This was also the period shaped by the rise of American hegemony. The global leadership of the United States and the Great Acceleration developed together through the US export of Anthropocene-stimulating Earth-modification technologies (Ebron and Tsing 2017; Tsing 2019). Race, gender, and class inequalities peculiar

to the United States at that period were built into Great Acceleration aspirations (Brown 2013). Patchy Anthropocene landscapes are also landscapes of American hegemony—such as those made by the Green Revolution in Taiwan as described in this issue by Tsai (2019).

US hegemony shaped the anthropology of the 1950s. American anthropologists imagined themselves at the helm of a global ship of knowledge, taken over from European empires. Enlightenment universals were important for claiming that mantle. But the American innovation was Big Science. American anthropology tried out group research—think Puerto Rico (Julian Steward; see Silverman 2011), Zinacantan (Evan Vogt; see Vogt 2004), or Modjokuto (Douglas Oliver; see Geertz 2000)—as well as outsized ambitions to manage modernization. The grand epic of *Man's Role in Changing the Face of the Earth* was possible only in that context.

Only a decade later, “big anthropology” collapsed. Amid popular protest against US aggression in Indochina, American anthropologists began reading social theory with a vengeance, making up for lost time. European theorists reassumed importance in guiding the discipline (e.g., Bourdieu 2013 [1977]; Foucault 1977). Americans scaled back, transforming the discipline within critical discussion of difference and alternatives to hegemonic common sense. Anthropological holism was no longer what it used to be (Otto and Bubandt 2010).

Man

This process of self-conscious scaling back lasted through the end of the twentieth century and into the twenty-first. Michelle Rosaldo's contribution to feminist anthropology offers an exemplary case. In their pioneering contribution, *Woman, Culture, and Society*, Rosaldo and Lamphere (1974) asked what they imagined as universal questions about women's subordination to men. By 1980, however, Rosaldo was ready to scale back, using critical social theory: She argued that anthropologists needed to begin, instead, with questions of what counts as male and female in a given cultural setting (Rosaldo 1980). Feminist anthropology moved into the ethnographic study of gender in places and, then, further specified, in situations (Butler 1990). Intersectionality brought race and other social inequalities into the heart of feminist studies (Crenshaw 1989). This kind of move characterized most of American anthropology, which became known by the 1980s for its exemplary ethnographies rather than its ambitions to manage the world. Indeed, it was this strategic retreat that allowed important critical work in anthropology on Enlightenment concepts of Man—and its corollaries freedom (e.g., Mahmood 2004), political agency (e.g., Abu-Lughod 1990), personhood (e.g., Strathern 1988), and nature (e.g., Haraway 1990).

Change

The 1990s and the first decade of the twenty-first century offered a new challenge for anthropologists: the rising tide of

capital expansion and labor mobility that went under the name “globalization.” European and American social theorists jumped at the chance to describe and analyze these new developments (e.g., Hardt and Negri 2001). At the same time, these developments toppled the leadership of northern scholars, who now were reduced to one of many global players—even as theorists (Ribeiro and Escobar 2006). As anthropology gained diversity, so too did attention to alternative temporalities, epistemologies, and ontologies. New scholarly developments challenged the importance of those Enlightenment categories that supported colonial rule (e.g., Chakrabarty 2000), on the one hand, and indigenous murder and displacement (e.g., Mignolo 2018), on the other. An emerging cosmopolitan anthropology quickly found a foothold in globalization studies: anthropologists showed that travel and traction were interdependent in the making of both widely spreading and parochial social forms (Inda and Rosaldo 2008). The concept of “change” itself was thus transformed from a uniform Enlightenment progress to an appreciation of historical trajectories that shifted through articulation (Tsing 2005). But these shifts also led anthropologists back to big claims. Informed by the particularistic knowledge and knowledge-making perspectives the discipline had spent the last 20 years acquiring, description of big social processes was back. In contrast to the world-engulfing “big anthropology” of the 1950s, however, this time description aimed to incorporate radical difference within understandings of worlds-in-the-making.

Political ecology—an interdisciplinary mix of political economy and environmental studies—took root in anthropology as a part of this turn, revitalizing environmental anthropology with thinking about spatial scales and social difference in the 1990s (Blaikie 1985; Bryant 1992). A decade into the 2000s, political ecology was joined by multispecies ethnography (Kirksey and Helmreich 2010), which added cross-species relations to discussions of radical difference. Anthropological studies of globalization are one source of inspiration for new work on the Anthropocene. So, too, is the “ontological turn,” which rejects cosmopolitanism to point out that not everyone is connected by colonial hybridities. Some kinds of differences are sustained—and despite centuries of colonial occupation (de la Cadena 2015; Escobar 2018). This observation only raises the stakes to bring tools for understanding radical difference inside world description. Meanwhile, US hegemony declines and other forms of geopolitical organization emerge. It is within this set of legacies and critical frameworks that anthropologists in this special issue approach the challenges of the Anthropocene.

The contributions of our special issue revitalize discussions of landscape structure and system to draw this legacy into interdisciplinary conversation about the Anthropocene. Holding on to insights that have brought us into productive tension with Man/Change/Earth, we argue for a mode of Anthropocene studies that draws attention to human and nonhuman heterogeneity. Our contributors use anthropology's strength as a deconstructive minor science to inform a critical engagement

with planetary structures and systems. We both contribute to new knowledge and retain a critical edge. To describe a patchy Anthropocene that is politically made, ecologically remade, and uncannily unreal, we need both observations and thought experiments. This is bold research on planetary conditions of livability that addresses the challenges of the Anthropocene by retooling anthropology's critical attention to specificity, context, and difference. It is not enough to discuss the concept of Anthropocene, a self-limiting "common sense" in our field today. Critical and empirical research into what we have called the patchy Anthropocene is urgently needed.

Acknowledgments

The Wenner-Gren Foundation sponsored the conference from which this special issue draws. Leslie Aiello, Danilyn Rutherford, and Laurie Obbink offered both intellectual and logistical support. Zahirah Suhaimi was a wonderful conference rapporteur. Fatima Pinto was our local liaison. Vanessa Agard-Jones and Natasha Myers wrote exciting papers for the conference but were unfortunately unable to contribute to this special issue. We are grateful to all the participants, as well as to the anonymous reviewers, for engaged and encouraging critique.

References Cited

- Abu-Lughod, Lila. 1990. The romance of resistance: tracing transformations of power through Bedouin women. *American Ethnologist* 17(1):43–55.
- Agard-Jones, Vanessa. 2013. Bodies in the system. *small axe* 42:182–192.
- Appel, Hannah. 2012. Offshore work: oil, modularity, and the how of capitalism in Equatorial Guinea. *American Ethnologist* 39(4):692–709.
- Arènes, Alexandra, Bruno Latour, and Jérôme Gaillardet. 2018. Giving depth to the surface—an exercise in the Gaia-graphy of critical zones. *Anthropocene Review* 5(2):120–135.
- Bear, Laura, Karen Ho, Anna Tsing, and Sylvia Yanagisako. 2015. Gens: a feminist manifesto for the study of capitalism. Theorizing the Contemporary, *Cultural Anthropology* website. <https://culanth.org/fieldsights/652-gens-a-feminist-manifesto-for-the-study-of-capitalism>.
- Blaikie, Piers. 1985. *The political economy of soil erosion in developing countries*. London: Longman.
- Bourdieu, Pierre. 2013 (1977). *Outline of a theory of practice*. Richard Nice, trans. Cambridge: Cambridge University Press.
- Breakthrough Institute. 2015. *An ecomodernist manifesto*. <http://www.ecomodernism.org/>.
- Brown, Kate. 2013. *Plutopia: nuclear families, atomic cities, and the great Soviet and American plutonium disasters*. Oxford: Oxford University Press.
- . 2019. Learning to read the great Chernobyl acceleration: literacy in the more-than-human landscapes. *Current Anthropology* 60(suppl. 20):S198–S208.
- Bryant, Raymond L. 1992. Political ecology: an emerging research agenda in Third-World studies. *Political Geography* 11(1):12–36.
- Bubandt, Nils. 2006. Sorcery, corruption and the dangers of democracy in Indonesia. *Journal of the Royal Anthropological Institute* 12(3):413–431.
- . 2014. *The empty seashell: witchcraft and doubt on an Indonesian island*. Ithaca, NY: Cornell University Press.
- . 2017. From head-hunter to organ-thief: verisimilitude, doubt, and plausible worlds in Indonesia and beyond. *Oceania* 87(1):38–57.
- . 2018. Anthropocene uncanny: nonsecular approaches to environmental change. In *A non-secular Anthropocene: spirits, specters and other nonhumans in a time of environmental change*. Nils Bubandt, ed. Pp. 2–15. More-than-Human Working Papers, vol. 3. Aarhus: Aarhus University Research on the Anthropocene (AURA). <http://anthropocene.au.dk/working-papers-series/>.
- . 2019. Of wildmen and white men: cryptozoology and inappropriate/d monsters at the cusp of the Anthropocene. *Journal of the Royal Anthropological Institute* 25(2):223–240.
- Bubandt, Nils, and Martijn van Beek. 2011. Varieties of secularism—in Asia and in theory. In *Varieties of secularism in Asia: anthropological explorations of religion, politics, and the spiritual*. Nils Bubandt and Martijn van Beek, eds. Pp. 1–27. London: Routledge.
- Buck-Morss, Susan. 2002. *Dreamworld and catastrophe: the passing of mass utopia in East and West*. Cambridge, MA: MIT Press.
- Bullard, Robert, and Beverly Wright. 2012. *The wrong complexion for protection: how the government response to disaster endangers African American communities*. New York: NYU Press.
- Butler, Judith. 1990. *Gender trouble*. New York: Routledge.
- Chakrabarty, Dipesh. 2000. *Provincializing Europe: postcolonial thought and historical difference*. Princeton, NJ: Princeton University Press.
- Crenshaw, Kimberly. 1989. Demarginalizing the intersection of race and sex: a black feminist critique of antidiscrimination doctrine, feminist theory and antiracist politics. *University of Chicago Legal Forum* 1:139–167.
- Danowski, Déborah, and Eduardo Batalha Viveiros de Castro. 2016. *The ends of the world*. Cambridge: Polity.
- de la Cadena, Marisol. 2015. *Earth beings: ecologies of practice across Andean worlds*. Durham, NC: Duke University Press.
- Demos, T. J. 2017. *Against the Anthropocene: visual culture and environment today*. Berlin: Sternberg.
- Doherty, Jacob. 2019. Filthy flourishing: para-sites, animal infrastructure, and the waste frontier in Kampala. *Current Anthropology* 60(suppl. 20):S321–S332.
- Dove, Michael R. 2019. Plants, politics, and the imagination over the past 500 years in the Indo-Malay region. *Current Anthropology* 60(suppl. 20):S309–S320.
- Ebron, Paulla, and Anna Tsing. 2017. Feminism and the Anthropocene: assessing the field through recent books. *Feminist Studies* 43(3):658–683.
- Edwards, Paul N. 2010. *A vast machine: computer models, climate data, and the politics of global warming*. Cambridge, MA: MIT Press.
- Escobar, Arturo. 2018. *Designs for the pluriverse: radical interdependence, autonomy, and the making of worlds*. Durham, NC: Duke University Press.
- Evans-Pritchard, E. E. 1940. The Nuer: a description of the modes of livelihood and political institutions of a Nilotic people. Oxford: Clarendon.
- Ferguson, James. 2006. *Global shadows: Africa in the neoliberal world order*. Durham, NC: Duke University Press.
- Ficek, Rosa E. 2019. Cattle, capital, colonization: tracking creatures of the Anthropocene in and out of human projects. *Current Anthropology* 60(suppl. 20):S260–S271.
- Foucault, Michel. 1977. *Discipline and punish: the birth of the prison*. Alan Sheridan, trans. London: Allen Lane.
- Geertz, Clifford. 1963. Agricultural involution: the process of ecological change in Indonesia. Berkeley: University of California Press.
- . 1977. Religion as a cultural system. In *The interpretation of cultures: selected essays*. Pp. 87–125. New York: Basic Books.
- . 2000. *Available light: anthropological reflections on philosophical topics*. Princeton, NJ: Princeton University Press.
- Hadfield, Michael G., and Donna J. Haraway. 2019. The tree snail manifesto. *Current Anthropology* 60(suppl. 20):S209–S235.
- Hamilton, Clive. 2015. The theodicy of the “good Anthropocene.” *Environmental Humanities* 7:233–238.
- Haraway, Donna. 1990. *Primate visions: gender, race, and nature in the world of modern science*. New York: Routledge.
- . 2015. Anthropocene, Capitalocene, Plantationocene, Chthulucene: making kin. *Environmental Humanities* 6:159–165.
- . 2016. *Staying with the trouble: making kin in the Chthulucene*. Durham, NC: Duke University Press.
- Hardt, Michael, and Antonio Negri. 2001. *Empire*. Cambridge, MA: Harvard University Press.
- Inda, Jonathan Xavier, and Renato Rosaldo, eds. 2008. *The anthropology of globalization: a reader*. 2nd edition. Malden, MA: Blackwell.
- Johnston, Barbara Rose, and Holly Barker. 2008. *Consequential damages of nuclear war: the Rongelap Report*. New York: Routledge.
- Keck, Frédéric. 2019. Livestock revolution and ghostly apparitions: South China as a sentinel territory for influenza pandemics. *Current Anthropology* 60(suppl. 20):S251–S259.
- Khan, Naveeda. 2019. At play with the giants: between the patchy Anthropocene and romantic geology. *Current Anthropology* 60(suppl. 20):S333–S341.

- Kirksey, S. Eben, and Stefan Helmreich. 2010. The emergence of multispecies ethnography. *Cultural Anthropology* 25(4):545–576.
- Klein, Naomi. 2015. *This changes everything: capitalism vs. climate*. New York: Penguin.
- Latour, Bruno. 1993. *We have never been modern*. New York: Harvester Wheatsheaf.
- . 2014. Anthropology at the time of the Anthropocene: a personal view of what is to be studied. Distinguished lecture at the American Anthropological Association annual meeting, Washington, DC, December 2014. Available at <http://www.bruno-latour.fr>.
- Law, John. 2015. What's wrong with a one-world world? *Distinktion: Journal of Social Theory* 16(1):126–139.
- Lear, Jonathan. 2006. *Radical hope: ethics in the face of cultural devastation*. Cambridge, MA: Harvard University Press.
- Mahmood, Saba. 2004. *Politics of piety: the Islamic revival and the feminist subject*. Princeton, NJ: Princeton University Press.
- Malm, Andreas, and Alf Hornborg. 2014. The geology of mankind? a critique of the Anthropocene narrative. *Anthropocene Review* 1(1):62–69.
- Marcus, George E., and Marcelo Pizarro. 2008. The end(s) of ethnography: social/cultural anthropology's signature form of producing knowledge in transition. *Cultural Anthropology* 23(1):1–14.
- Mathews, Andrew S. 2017a. Ghostly forms and forest histories. In *Arts of living on a damaged planet: ghosts and monsters of the Anthropocene*. Anna Lowenhaupt Tsing, Elaine Gan, and Heather Anne Swanson, eds. Pp. G145–G156. Minneapolis: University of Minnesota Press.
- . 2017b. Sensing disaster and transformation: modeling Italian forest futures. Presented at the Volatile Futures/Earthly Matters workshop, Center for the Advancement of Public Action, Bennington College, Vermont, May 25–26.
- . 2018. Landscapes and throughscapes in Italian forest worlds: thinking dramatically about the Anthropocene. *Cultural Anthropology* 33(3):386–414.
- McNeill, John, and Peter Engelke. 2016. *The great acceleration: an environmental history of the Anthropocene since 1945*. Cambridge, MA: Harvard University Press.
- Mignolo, Walter. 2018. *On decoloniality*. Durham, NC: Duke University Press.
- Moore, Jason W. 2015. *Capitalism in the web of life: ecology and the accumulation of capital*. London: Verso.
- Morita, Atsuro, and Wakana Suzuki. 2019. Being affected by sinking deltas: changing landscapes, resilience, and complex adaptive systems in the scientific story of the Anthropocene. *Current Anthropology* 60(suppl. 20): S286–S295.
- Morton, Timothy. 2013. *Hyperobjects: philosophy and ecology after the end of the world*. Minneapolis: University of Minnesota Press.
- Myers, Natasha. 2017. Becoming sensor in sentient worlds: a more-than-natural history of a black oak savannah. In *Between matter and method: encounters in anthropology and art*. Gretchen Bakke and Marina Peterson, eds. Pp. 73–96. London: Bloomsbury Academic.
- Oreskes, Naomi, and Erik Conway. 2010. *Merchants of doubt: how a handful of scientists obscured the truth on issues from tobacco smoke to global warming*. New York: Bloomsbury.
- Otto, Ton, and Nils Bubandt, eds. 2010. *Experiments in holism: theory and practice in contemporary anthropology*. Oxford: Wiley-Blackwell.
- Perfecto, Ivette, M. Esteli Jiménez-Soto, and John Vandermeer. 2019. Coffee landscapes shaping the Anthropocene: forced simplification on a complex agroecological landscape. *Current Anthropology* 60(suppl. 20):S236–S250.
- Radcliffe-Brown, A. R. 1940. On social structure. *Journal of the Royal Anthropological Institute of Great Britain and Ireland* 70(1):1–12.
- Redman, Charles L., Steven James, Paul Fish, and J. Daniel Rogers, eds. 2004. *The archaeology of global change: the impact of humans on their environment*. Washington, DC: Smithsonian.
- Ribeiro, Gustavo, and Arturo Escobar. 2006. *World anthropologies: disciplinary transitions within systems of power*. Oxford: Berg.
- Rockström, Johan, Will Steffen, Kevin Noone, Åsa Persson, F. Stuart Chapin, Eric Lambin, Timothy M. Lenton, et al. 2009. Planetary boundaries: exploring the safe operating space for humanity. *Ecology and Society* 14(2):32.
- Rosaldo, Michelle Zimbalist. 1980. *Knowledge and passion: Ilongot notions of self and social life*. Cambridge: Cambridge University Press.
- Rosaldo, Michelle Zimbalist, and Louise Lamphere, eds. 1974. *Woman, culture, and society*. Stanford, CA: Stanford University Press.
- Silverman, Sydel. 2011. Introduction: the Puerto Rico project: reflections sixty years later. *Identities: Global Studies in Culture and Power* 18(3):179–184.
- Steffen, Will, Wendy Broadgate, Lisa Deutsch, Owen Gaffney, and Cornelia Ludwig. 2015. The trajectory of the Anthropocene: the great acceleration. *Anthropocene Review* 2(1):81–98.
- Strathern, Marilyn. 1987. An awkward relationship: the case of feminism and anthropology. *Signs* 12(2):276–292.
- . 1988. *The gender of the gift: problems with women and problems with society in Melanesia*. Berkeley: University of California Press.
- Swanson, Heather Anne. 2018. Domestication gone wild: Pacific salmon and the disruption of the domus. In *Domestication gone wild: politics and practices of multispecies relations*. Heather Anne Swanson, Marianne Lien, and Gro Ween, eds. Pp. 141–158. Durham, NC: Duke University Press.
- . 2019. An unexpected politics of population: salmon counting, science, and advocacy in the Columbia River Basin. *Current Anthropology* 60(suppl. 20):S272–S285.
- Swanson, Heather, Anna Tsing, and Nils Bubandt. 2015. Less than one but more than many: Anthropocene as science fiction and scholarship-in-the-making. *Environment and Society: Advances in Research* 6(1):149–166.
- Szerszynski, Bronislaw. 2017. Gods of the Anthropocene: geo-spiritual formations in the earth's new epoch. *Theory, Culture and Society* 34(2–3):253–275.
- Thomas, William L., Jr., ed. 1956. *Man's role in changing the face of the earth*. Chicago: University of Chicago Press.
- Tsai, Yen-Ling. 2019. Farming odd kin in patchy Anthropocenes. *Current Anthropology* 60(suppl. 20):S342–S353.
- Tsing, Anna Lowenhaupt. 2005. *Friction: an ethnography of global connections*. Princeton, NJ: Princeton University Press.
- . 2015. *The mushroom at the end of the world: on the possibility of life in capitalist ruins*. Princeton, NJ: Princeton University Press.
- . 2019. The political economy of the Great Acceleration, or, how I learned to stop worrying and love the bomb. In *Climate, capitalism, and communities: an anthropology of environmental overheating*. Thomas Hylland Eriksen and Astrid Stensrud, eds. London: Pluto.
- Tsing, Anna, Heather Swanson, Elaine Gan, and Nils Bubandt. 2017. *Arts of living on a damaged planet*. Minneapolis: University of Minnesota Press.
- van Dooren, Thom. 2017. The last snail: loss, hope and care for the future. In *Curating the future: museums, communities and climate change*. J. Newell, L. Robin, and K. Wehner, eds. Pp. 145–152. London: Routledge.
- Viveiros de Castro, Eduardo. 2019. On models and examples: engineers and bricoleurs in the Anthropocene. *Current Anthropology* 60(suppl. 20): S296–S308.
- Vogt, Evon. 2004. *Bibliography of the Harvard Chiapas Project: the first twenty years, 1957–1977*. Cambridge, MA: Peabody Museum.
- White, Peter S., and S. T. A. Pickett. 1985. Natural disturbance and patch dynamics: an introduction. In *The ecology of natural disturbance and patch dynamics*. S. T. A. Pickett and P. S. White, eds. Pp. 3–13. San Diego, CA: Academic Press.
- Wu, Jianguo, and Orie L. Loucks. 1995. From balance of nature to hierarchical patch dynamics: a paradigm shift in ecology. *Quarterly Review of Biology* 70(4):439–466.
- Zalasiewicz, Jan A., Colin N. Waters, Alexander P. Wolfe, Anthony D. Barnosky, Alejandro Cearreta, Matt Edgeworth, Erle C. Ellis, et al. 2017. Making the case for a formal Anthropocene epoch: an analysis of ongoing critiques. *Newsletters on Stratigraphy* 50(2):205–226.