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Interspecies Relations and Agrarian Worlds

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environmental anthropology, multispecies ethnography, domestication, biopower, human–animal relations, human–plant relations

Abstract

Recent years have witnessed burgeoning interest in interspecies relations and multispecies ethnography. This review explores what such perspectives bring to long-standing anthropological attention to agrarian worlds. Considering why so much recent scholarship only minimally engages with longer disciplinary traditions found within ecological and environmental anthropology and ethnobotany, the review examines continuities and discontinuities across these different modes of attending to interspecies relationships. From here, it explores how contemporary scholarship renews anthropological attention to questions of domestication, relatedness, agency, and personhood and how it charts new ground by engaging theories of biopolitics, biocapital, biosemiotics, and plant ontologies. While noting that recent work has distinctive theoretical preoccupations, the review concludes by suggesting that fruitful possibilities lie in working with, and across, established and emergent anthropologies of the agrarian.

INTRODUCTION

The relationships that humans have with plants, animals, and other life forms, forged through practices of pastoralism, animal husbandry, swidden cultivation, horticulture, gardening, fishing and aquaculture, and settled permanent agriculture, rank among our most abiding and intimate forms of interspecies connection. They have been enduring concerns for anthropology from the earliest years of the discipline. Engaging with this history, this review examines how interspecies and multispecies perspectives inform the ways that sociocultural anthropologists study the agrarian.

Recent review articles focused on the species turn (Kirksey & Helmreich 2010, Ogden et al. 2013) have foregrounded how the careful study of situated encounters, in an array of contexts, between humans and a vast range of living beings—from animals and insects to microbes and plants—may constitute an important analytic core of anthropological work. Yet, much recent scholarship on interspecies relations emerges largely independently of a long history of such inquiry within ecological and environmental anthropology (Orlove 1980, Orr et al. 2015). Its sources of theoretical inspiration lie elsewhere, often beyond the bounds of the discipline. If earlier sociocultural research approached interspecies relations as something of a window onto human culture and social organization (Mullin 1999), more recent work takes such relations as a fruitful site from which to query many deep-rooted assumptions about being human (Agamben 2004, Fuentes & Kohn 2012, Haraway 2008) as well as to reconceptualize the category of the social to include nonhumans as well as humans (Deleuze & Guattari 1988, Latour 2005). Yet, to the extent that multispecies and interspecies "perspectives conceptualize nonhumans as an essential part of the material terrain in which humans constitute their lives and understandings" (Koenig 2016, p. 354), they share important common, but often unacknowledged, ground with earlier work. Part of this review, therefore, attends to some of the continuities and discontinuities between established traditions of environmental and ecological anthropology, on the one hand, and contemporary scholarship on the other, probing the possible reasons why the former receives so little attention within the latter.

This review also deliberately shifts focus to where species meet, adapting Haraway's evocative title (2008) in order to attend more closely to agrarian worlds and encounters. If, as Haraway (2008) suggests, "meetings make us who and what we are in the avid contact zones that are the world" (p. 287), a key premise of this review is that the manifold worlds of agriculture—from the swidden fallow to the slaughterhouse—are formative meeting places. I use the term "agrarian worlds" for two reasons: first, and most simply, to attend to a broader set of practices and activities than a term like agriculture allows; and second, to more fully capture what much scholarship, old and new, of agrarian societies and practices tells us—that the agrarian composes, and is composed by, complex spatial and temporal assemblages as well as social and cultural relations, which are fundamentally human and nonhuman and which also draw together much more (capital and finance; science and technology; infrastructure and regulation; gendered, racial, ethnic, class, and other identities; affect and moral sensibility, and so on). The agrarian is formative because, as Franklin (2007) has so eloquently shown with respect to questions of genealogy and reproduction in the cloning of Dolly the sheep, through the networks and relations from which it emerges, and in turn brings together, it thoroughly makes and remakes who we are.

This review, then, endeavors to do three things. First, it considers how interspecies relations have been studied and understood within classic anthropological work on agriculture, animal husbandry, and ethnobotany, alongside a growing body of scholarship in broadly agrarian settings that traces a different genealogy in science and technology studies, biopolitics, and ontological theory. Second, it examines the directions in which these new theoretical and methodological orientations push anthropological understandings of the agrarian—toward renewed attention to

processes of domestication, kinship, and affect; emergent forms and expressions of biopolitics and biocapital; and more fulsome attention to human–plant relations. Third, revisiting earlier literature in light of the species turn also makes apparent the ways in which animals and microbes populate recent multispecies ethnography. Indeed, while human–animal relations are a domain of study in their own right (see the special theme on Human–Animal Interaction in volume 46 of the *Annual Review of Anthropology*), this review asks why, in the current moment, plants and botanical worlds receive less attention in efforts to move anthropology beyond the human. Finally, by taking up these themes, the article concludes with a reflection on the limits and possibilities of the species frame and how thinking with and about agrarian worlds offers generative possibilities for working with, and across, established and emergent anthropologies of the agrarian.

TOUCHSTONES: CONTINUITIES AND DISCONTINUITIES

The roots of anthropological interest in animals and other living beings run deep in the discipline's history. Early direct interest in animals, "their habits, their mode of life, and their mutual relations" is exemplified by Morgan's (1868, p. vi) *The American Beaver and His Works*. For other founders of the discipline, interest in nonhuman life was more indirect, arising through studies of animism and totemism that were central to a nascent anthropological interest in the study of religion and steeped in evolutionary schema (Frazer 1887, Tylor 1871). Mauss brought these interests in human–animal and human–plant relations to advance a broader, though still evolutionarily minded, analysis of social organization [Mauss 2007 (1967), Mauss & Beuchat 1979 (1950)]. In the middle of the twentieth century, structuralism came to displace evolutionary thinking, redefining anthropological inquiries into totemism and focusing attention on totemic animals [Lévi-Strauss 1966, 1969 (1962)].

Recent reviews of multispecies ethnography have distinguished it from prior anthropological attention to interspecies relations in several ways. Earlier scholarship is described as taking a rather singular, human-centered view of agency, reflecting an anthropocentric privileging of human impacts on nonhuman worlds (Faier & Rofel 2014, p. 372). To the extent that interspecies relations do enter the analytic frameworks of these forerunners, the interest is understood as being largely instrumental to the study of religious life, social order and organization, kinship, exchange, and so on (Ogden et al. 2013; see, for example, Goody 1993). Certainly, these descriptions accurately capture broad characteristics of the discipline, and they are also invoked to mark clearly a turn, or a break, from earlier scholarship. But revisiting the disciplinary precursors to multispecies ethnography, which were rooted importantly in the study of agrarian and pastoral societies, suggests that such a break may be less easily sustained and reveals early recognition and analysis of mutual dependencies, nonhuman agencies, and the entanglements of human and nonhuman lives.

In anthropological studies of human–animal relations, Evans-Pritchard's (1940) *The Nuer* remains a touchstone. His account renders in extraordinary detail the intimate connections between the Nuer and their cattle (Dove & Carpenter 2008), ranging from the daily uses of their milk, dung, urine, and hides, to the affinities between cattle and people marked in part through naming practices and the thorough intertwining of cattle in Nuer kinship, as well as a vocabulary for cattle amounting to a "galaxy of words" (Evans-Pritchard 1940, p. 48). So close are these relations that Evans-Pritchard wrote, "It has been remarked that the Nuer might be called parasites of the cow, but it might be said with equal force that the cow is a parasite of the Nuer, whose lives are spent ensuring its welfare" (p. 36). For Evans-Pritchard, cattle were taken to be integral to Nuer material culture, conceived of as "chains along which social relationships run" (p. 89).

The materialist threads within *The Nuer* were picked up and developed to a far greater extent through cultural ecology in the mid-twentieth century (Frake 1962). In a landmark work that

helped to establish this tradition, Roy Rappaport's (1967a) *Pigs for the Ancestors* argued for an ecological understanding of ritual. Drawing heavily on insights from animal behavior and biology, an engagement that is also notable in contemporary work, Rappaport invoked concepts such as carrying capacity, transducers, and homeostasis to argue that the ritual slaughter of pigs among the horticultural Tsembaga served to regulate social relations not only with human communities but also with the wider ecosystem (Dove & Carpenter 2008; Rappaport 1967a,b). Though Rappaport's work, and that of Marvin Harris (1966, 1973) along with others, was viscerally critiqued by Sahlins (1976) for its functionalism and materialism, it remains an early example of anthropological efforts to take seriously interspecies relations by demonstrating the interdependent, dynamic relation between people and pigs. In this regard, both Evans-Pritchard and Rappaport, among others, may be seen to offer early ethnographic signposts to the "world-making entanglements" (Haraway 2008, p. 4) of human and animal lives.

While Rappaport, Harris, and their contemporaries worked to establish the functional, material basis of human cultural practices (Orlove 1980), those developing the traditions of ethnoecology and ethnobotany attended to "human cognition of environmental components such as plants, animals, water, and soils" (Hunn 2007; Nazarea 1999, p. 92; Nazarea 2006) in a manner that in certain instances bears affinity with ontological (Kohn 2013) and perspectivist (Viveiros de Castro 1998) approaches. Conklin (1954, 1957) implicitly provincialized Western forms of "naturalism" (Descola 2013) through pioneering linguistic study that created unprecedented epistemological symmetry between indigenous and Western scientific plant names and knowledge. This view is exemplified in his seminal *Hanunóo Agriculture* (Conklin 1957), which presents a six-page table listing adjacently Hanunóo, English, and Latin botanical names for 87 crops planted in *Hanunóo* swiddens. Hunn observes that this was no mere exercise in translation; alluding to what might now be described as ontological multiplicities, he writes that Conklin was keenly aware that "the two systems of classification were grounded in distinctly different cultural principles and that a juxtaposition of the categories of the two systems will produce not a neat matching of edges but a complex mosaic" (Hunn 2007, p. 193). Conklin conceived botanical landscapes as composed of intricate mosaics or "assemblages" (Dove 2007, p. 418) in a manner that calls forth similar contemporary inquiry into complexity, multiplicity, and connection through the conceptual use of terms such as assemblage, patches, or "unruly edges" (Tsing 2012, 2015).

Yet, what also stands out in Conklin's *Hanunóo Agriculture* is the consummately managed and controlled nature of swiddens. This emphasis on control and management betrays no ill-considered anthropocentric assumption of human exceptionalism. "Swidden farming," Conklin wrote, "is still only inadequately understood and ignorance of the fundamentals of this type of economy is often displayed even by responsible agriculturalists" [Conklin 2007 (1954), p. 208]. An extended description of the meticulous labor involved in preparing swiddens for burning dismantles, with its painstaking detail, the widespread view of shifting cultivation as a destructive and primitive practice. All too aware that for many agriculturalists recognition of one's labor and livelihood as agentive, purposeful, and skilled is elusive, Conklin's work remains a testament to the exceptionalism of human agricultural knowledge and endeavor even as it attends carefully to human–plant relations and interdependence within the spatial and temporal mosaics of botanically rich landscapes.

Why, one might ask, is it that recent work pays so little heed to a rich disciplinary legacy that has attended to interspecies relations in agriculture? At the surface, compared to more contemporary engagement with multispecies relations, this older scholarship appears resolutely empirical and less overtly motivated by theoretical ideas. Notwithstanding their many significant differences, however, older and newer scholarship converge in at least two ways. First, both have developed in conversation with concepts and methods from the natural sciences. Rappaport's notion of

homeostasis, Barth's (1956) concept of niches, and Conklin's botanical classifications all offer ways of conceiving and describing various dimensions of interspecies relations in a manner not dissimilar to the recent metaphorical and analytical borrowing of broad terms such as "ecologies" and more specific ones such as "mycorrhizal" (Choy et al. 2009) or even "bioturbation" (Bertoni 2013). Second, both earlier and newer work emerge from, and develop, distinct kinds of politics. Dove & Carpenter (2008) remind us that the scholarship of anthropologists such as Rappaport and Conklin worked to contest, and to displace, notions of primitivity and backwardness ascribed to people then still seen within the discipline as "other." Theirs was an epistemological politics, a challenge to radically rethink anthropological ways of knowing, which, in so doing, yielded insight into multiple ways of being. In this sense, it differs from more contemporary work that, grappling at so many levels with the Anthropocene, inquires searchingly into the ways and natures of being and, in so doing, must necessarily contend with diverse ways of knowing.

Contemporary explorations of interspecies relations in agrarian worlds trace, and often draw together, different theoretical lineages that significantly rethink relations between humans and nonhumans. Strathern's early work on gender and personhood paved the way within anthropology for subsequent ontological and perspectivist querying of the human and nonhuman (Strathern 1988, 1999) and of the analytical status of nature-culture concepts within the discipline (Strathern 1980). Her reflexive attention to relations and relationality, as well as her "defamiliarizing" approach to comparison and connection (Holbraad & Pedersen 2017, Strathern 1991), hold generative conceptual and methodological possibilities for contemporary scholars studying interspecies relations (Kohn 2007, Tsing 2014). Tracing a different path, the inclusion of nonhuman actants in actor–networks has been theorized by Latour (1988, 2005) and Callon (1999) and is pushed further through Bennett's (2010) notions of vitality and vibrant materiality. Philosophically, these perspectives often also draw inspiration from Deleuze & Guattari (1988), particularly their influential invocation of rhizomatic assemblages and becomings. Ontological perspectives (Descola 2013, Kohn 2013, Viveiros de Castro 1998), on the other hand, locate their analysis of nonhuman agency within an effort to take seriously ontological multiplicities and differences. Here, exploration of the semiosis of life opens up further questions about concepts of the self, person, and human (Kohn 2007, 2013).

These broad perspectives, at the core of posthumanism, are important touchstones for recent multi- and interspecies scholarship. But they have been subject to important critiques. Bessire & Bond (2014) find ontological anthropology crucially lacking critical and historical sensibilities, seemingly disengaging the rich intellectual legacies of late-twentieth-century anthropology and critical social theory. By privileging a "rarefied materiality," they argue that a preoccupation with ontology neglects complex economic, political, and historical relations while working to "purify the concerns of ethnography and philosophy so they can more perfectly coincide" (Bessire & Bond 2014, p. 448). Graeber (2015) expands this critique of the essentializing and dehistoricizing tendencies of the ontological turn, contending that much of it is dedicated to understanding and describing forms of "radical alterity." This approach, he argues, moves the discipline in fundamentally conservative directions, not least because it effectively protects more structurally powerful and authoritative ontological positions from challenge (Graeber 2015, p. 7). DiNovelli-Lang (2013) develops a critical perspective of multispecies ethnography more explicitly by inquiring into how the nonhuman animal serves as the latest extension of anthropology's long and fraught relationship with otherness and difference and by noting the significant absence of indigenous peoples as interlocutors within multispecies scholarship.

These critiques mount important challenges with which subsequent generations of ethnographic inquiry on multi- and interspecies relations will necessarily grapple. Yet, a shared feature of the politics generated, in part, through contemporary work on interspecies relations in agrarian

worlds is also its notable effort to query human exceptionalism. Tsing (2015) suggests that "[a]s progress tales lose traction. . .it becomes possible to look differently" (p. 22; see also Viveiros de Castro 2015). Here, the creative and forward-looking work of Tsing and Haraway, themselves mindful of the manifold entanglements of histories and politics, has proved tremendously influential. Tsing's work, emerging from earlier attention to questions of power and marginality (Tsing 1993), informed importantly by feminist theory, has more recently turned to interspecies connection (Tsing 2015) through her research and involvement with the Matsutake Worlds Research Group (Choy et al. 2009). Foregrounding more than species, her approach directs attention to assemblages, frictions, and connections as a way of thinking about capitalism (Tsing 2015), globalization (Tsing 2005), and marginality (Tsing 1993). Haraway's scholarship has been similarly founded, in part, on feminist theory and methodologies. Whereas Haraway's conceptualization of companion species (2003, 2008) is a recent touchstone for multispecies ethnography, her earlier work on primatology (1989), gender, and cyborgs (1991) are equally germane for contemporary debates about nature and culture, agency, and the human. Both scholars have also been incisive commentators on the possibilities and limitations of the Anthropocene with respect to questions of interspecies relations, as well as human and other agencies (Haraway et al. 2016). Sounding a clarion call for multispecies politics with the observation that becoming is always "becoming with" (p. 3), Haraway (2008) writes, "There is only the chance of getting on together with some grace" (p. 15). These theoretical perspectives represent some, though by no means all, the ways in which contemporary scholarship broadly approaches the study of interspecies relations. The next two sections explore how interspecies relations inform recent critical attention to processes of domestication and to biopolitics and biocapital.

REVISITING DOMESTICATION

Recent scholarship on interspecies relations, pertinent but not limited to agrarian worlds and practices, reworks notions of domestication and breaks new ground in exploring forms of interspecies relatedness. These works unseat long-held views in anthropology and archaeology that narrate the history of domestication as human exceptionalism *par excellence*, a linear tale of uniquely human progress (Boyd 2017, Cassidy & Mullin 2007).

Since Engels [1902 (1884)] published *The Origin of the Family, Private Property and the State*, bringing together Marx's historical materialism with Morgan's evolutionism, domestication has also been understood as a process through which animals and plants become repositories of wealth and property in agrarian settings. Long associated with efforts to tame other beings and make them useful to humans through relations that are utilitarian, economically motivated, and frequently extractive and exploitative (Cassidy 2007, p. 6), these accounts of domestication narrate the ways that animals and plants come to be placed within human social and economic systems.

Such views of domestication have been subject to challenge. Boyd's (2017) recent excellent review of human–animal relations in archaeology takes up these questions. From this field, O'Connor (1997) argued that animal domestication is not a process unique to humans nor is it likely to be solely directed or determined by them; he instead put forth an alternative view of domestication as a relation of "behavioral coevolution" (p. 152). Other scholars working on plant domestication have suggested that the process of human–plant domestication is rather more symbiotic and have called into question the implicit criteria of conscious human intention or agency (Cassidy 2007, Leach 2007, Posey 2002). Relations of domestication, then, are more multifaceted than they initially appear; some have argued further that humans themselves are domesticated through their relationships with other living things (Scott 2009, Tsing 2012). These ways of understanding domestication are substantially reworked in Haraway's (2008) *Where Species Meet*. Rejecting

what she suggests is Deleuze & Guattari's misogynistic "scorn for the homely and the ordinary" (Haraway 2008, p. 29), Haraway makes domestic animals her focus. In doing so, she somewhat eschews coevolution in favor of "coconstitutive relationships" that are nowhere more evident than in human relationships with various companion species (Haraway 2003, p. 32).

Of Mutuality, Kinship, and Pathogenesis: Rethinking Relatedness

Reworking notions of domestication widens the scope for reconceiving agrarian and pastoral relations as ones of mutuality, coconstitution, and cobecomings (Despret & Meuret 2016). Paxson (2013), for example, describes a "postpastoral" ethos in which artisanal cheesemakers understand their enterprise as one that brings together their own skill and labor "with the natural agencies of bacteria, yeasts, and molds to transform a fluid made by ruminant animals" (p. 18). Others have taken domestication as a process to rethink kinship, reproduction, and relatedness (Franklin 2007, Russell 2007). Govindrajan (2018) draws on feminist scholars' attention to difference, and their questioning of the naturalization of kinship, and pushes anthropocentric understandings of kinship and relatedness to take account of interspecies relations. "[K]in-making is a multispecies affair," she writes (Govindrajan 2018, p. 6), following the convictions and practices of her interlocutors through their daily care of domestic animals and in rituals of sacrifice to theorize how personhood and kinship are also constituted through interspecies relations (Govindrajan 2015).

Yet, as much as forms of multispecies and interspecies relatedness may be infused with, and constituted by, care, sympathy, and love, such intimacies and mutualities have a different side. A number of recent ethnographies have focused on pathogenesis, zoonoses, and pandemic threats that arise in industrial slaughter and confined animal operations (Blanchette 2015, Dunn 2007, Lowe 2010, Porter 2013). In these environments, abiding ideologies of domestication as human control and management parse human–animal intimacies with drastic consequences. Lowe (2010), for example, shows how mass culls of poultry in Indonesia in response to the pandemic threat of H5N1 targeted backyard poultry farmers, rather than larger commercial operators, because interspecies arrangements in the former were seen to be less biosecure. In exploring the world of raw milk cheese, Paxson (2008) demonstrates how Pasteurian regulation and the will to control come into conflict with more open-ended, "post-Pasteurian" understandings that view microorganisms as allies and agents in cheesemaking.

Pathogens are part of the processes of domestication and interspecies relatedness, and these works show that while pathogens are biological, they are also configured in the social, economic, and political assemblages of agrarian worlds. Paradoxically, then, pathogens—enabled and facilitated through the pathways created in domestic arrangements—are also emblematic of vibrancy (Bennett 2010) or, what Graef (2016) terms, wildness. Building on Cronon (1991), Graef (2016) suggests that "wildness," unlike wilderness, "need not reject the human." Indeed, as H5N1, SARS (severe acute respiratory syndrome), foot and mouth disease, *Escherichia coli*, and other forms of pathogenesis attest, wildness is often produced in the very places that appear to be domestic and even rigorously managed, surveilled, and controlled.

(Re)figuring the Wild and the Domestic

Paradoxes and tensions of wildness and domestication are brought into relief by recent work on pathogenesis in agrarian settings, but these tensions themselves are not new to the discipline or to the study of agrarian systems (Agrawal & Sivaramakrishnan 2000, Sivaramakrishnan 1999). Indeed, the boundary of wild and domestic has long been of interest to those who study agriculture and agrarian practices. But "the opposition between the wild and the domesticated is not so patent

everywhere or at all times," writes Descola (2013, p. 56), asserting the historical particularity of this relation in ontological naturalism, which he suggests may have its origins less in modernity than in the Neolithic. Metonymic for larger debates about the relation of nature and culture, notions of wild and domestic may index points of ontological difference, as these concepts remain "culturally variable" (Cassidy 2007, p. 3). This view has been borne out in ethnobotanical research (Dove 2007, p. 412; Posey 2002, p. 78). Conklin (1957) distinguished plant domesticates, cultivates, cultigens, semidomesticates, and nondomesticates not along spatial lines (as in a forest/field distinction) but in terms of planting, protection, and preservation. In these ethnobotanical works, then, wildness and domesticity are not properties of landscapes or places per se but rather qualities that come to be present or absent in the particular relations between people and (often individual) plants. These and other perspectives are developed in later work that more explicitly questioned notions of pristine nature, showing the anthropogenic shaping of apparently wild places (Fairhead & Leach 1996, Raffles 2002).

The boundary between the wild and domestic is often determined by where human agency is presumed and recognized to be located (Seshia Galvin 2014). In agrarian settings, such distinctions become salient in a context where foods are increasingly qualified (Callon et al. 2002) according to attributes such as wild, natural, or organic. Aquatic environments offer a medium in which to think more fluidly about wildness and domestication (Lien 2015). Exploring the debate about whether wild fish could be certified as organic under US Department of Agriculture regulations, Mansfield (2004, p. 230) demonstrates that organic reproduces, rather than undoes, modernist ideas of human control and management, revealing less about nature than about "the ways that the world is classified, sorted, and categorized." Examining the commodification and qualification of wild salmon, Hébert (2010, p. 555) draws attention to the reworked labors of handling, bleeding, and chilling fish to show how, paradoxically, "for wild salmon to be made distinctive, and set apart from farmed salmon in particular, it must be remade to mirror a model largely established by the farmed salmon industry." Emerging forms of agrarian practice and husbandry seek further to "breed" wildness (Fearnley 2015) or to rewild domestic animals (Lorimer & Driessen 2013). But even if these projects are never fully human controlled, Graef (2016) points out "the irony is that rewilding projects are human-driven."

BIOPOLITICS AND BIOCAPITAL: RECASTING INTERSPECIES RELATIONS

Biopolitics, as applied to human populations, relies in part on the parsing of life, which "cannot be defined, yet, precisely for this reason, must be ceaselessly articulated and divided" (Agamben 1998; 2004, p. 13). This view represents a way of conceiving interspecies relations distinct from perspectives considered above, which emphasize if not the unity of life then the mutuality and coconstitution of life forms. Pandian (2008, 2009) extends these ideas to show how the colonial attribution of an "animal nature" to the Kallars of South India enabled them to be classified and governed as "criminal" and, paradoxically, targeted for reform through the promotion of the pastoral care of domestic animals and the cultivating labors of sedentary agriculture. The exploration of biosecurity and pathogenesis on factory farms has also drawn on biopolitics as a generative theoretical rubric (Lowe 2010, Porter 2013). Bringing multispecies and biopolitical perspectives together, Porter (2013) shows how forms of biopower operate simultaneously, and relationally, on humans and animals in efforts to manage avian influenza in Việt Nam.

The state, in its various guises and as part of wider institutional assemblages (with nongovernmental organizations, philanthropic foundations, and international organizations, for example), is of course not the only locus of biopower in agrarian settings. Human and nonhuman beings, and

interspecies relations, are also interpellated in agrarian biocapital. Helmreich (2008, p. 464) suggests that biocapital is found within "economic enterprises that take as their object the creation, from biotic material and information, of value, markets, wealth, and profit." The research lab, factory farm, and slaughterhouse are prime sites in which multispecies agrarian biocapital takes shape through industrial agriculture (see Blanchette 2018, in this volume). Critically reappraising the notion of the factory farm as an exemplar of anthropocentric domination, Blanchette (2015) reworks understandings of biosecurity by analyzing the "forms of species-level managerial work that allow the industrial pig's vitality to gradually mediate a region's ecology, class relations, and laboring subjectivities" (p. 662).

The framework of biocapital calls forth broader questions about how to situate nonhuman creatures and their vitalities in relation to capitalist processes in agrarian settings. In *Where Species Meet*, Haraway (2008, p. 46, emphasis in original) asks, "What, however, if *human* labor power turns out to be only part of the story of lively capital?" She further suggests that more responsible relations with animals might be forged through "plumbing the category of labor" (p. 73). A forthcoming edited volume (Besky & Blanchette 2018) promises to yield new insights on this question, working toward a critical more-than-human labor studies, by reconceptualizing labor through the relations forged between humans and nonhuman natures in settings that include the plantation, the monocultured field, and the factory farm. The editors remain, however, circumspect about taking the further step of unambiguously casting living nonhuman energies and vitalities as labor. Advancing the idea of metabolic labor in his study of the broiler chicken, Beldo (2017, p. 119) makes this move, suggesting that "metabolism is a process yoked by capital that creates surplus value."

Conceiving of animals as laboring subjects of biocapital through biological processes such as digestion, reproduction, lactation, etc. offers inroads into analyzing the agrarian in industrial settings while also, perhaps, moving toward a more politically charged conceptual and ethical framework for contesting the brutalization of animal life within agroindustrial regimes (Wolfe 2012).[1] However, might extending the reach of biocapital over the totality of life itself have the effect of reifying the very thing that is contested? What is the relation, analytically speaking, of vital nonhuman labor to the often invisible and marginal human laborers within these worlds (Garcia 2001, Pachirat 2011)? To what extent does the inclusion of nonhuman vitalities in the category of labor rework what labor means, and how might it engage with the considerable scholarship on unfree labor (Calvão 2016)? Finally, how does the concept of nonhuman labor engage older notions of domestication that similarly wrestle with the contingencies and ambiguities of human and other agencies?

Through the notion of salvage accumulation, Tsing (2015) offers a different path to theorizing the relations among ecological and biological processes with capitalism. Ecologies, she suggests, are integral but not internal to or isomorphic with capitalism (Tsing 2015, p. 63). Instead of labor, Tsing directs attention toward how ecological or biological processes and matter become useful to capitalism. She calls this "salvage": That is, "taking advantage of value produced without capitalist control. . .is a feature of how capitalism works" (Tsing 2015, p. 63). Perhaps in part because she and her collaborators in the Matsutake Worlds Research Group work in the midst of "landscapes and practices which thrive in the 'gap' between what is taken as wild and what is taken as domesticated—the 'seam' between supposed nature and culture" (Choy et al. 2009, p. 385), they understand the relations among ecological, biological, and capitalist processes differently from those preeminent sites of biocapital. In the rendering of this collaborative, and in Tsing's own

[1]With some exceptions (Besky & Blanchette 2018), however, this literature does not pay as much heed as it might to earlier feminist scholarship theorizing reproduction and labor.

work, ecologies of capitalism are patchy and forever incomplete. Tsing, in some sense, reverses the ordering of biocapital; rather than drawing biologies and biological processes within the realm of capital, she looks beyond the species to suggest that "assemblages drag political economy inside them; they are sites for watching how political economy works" (Tsing 2015, p. 23).

Tsing's approach charts a way of theorizing capitalism that does not require adopting and applying its frameworks and concepts. Rather, it relies on the "arts of noticing" and nuanced attention to what she terms "polyphonic assemblages" (Tsing 2015, p. 24), drawing from the complex rhythms and temporalities she finds evident in worlds as different as music and swidden agriculture. In this sense, Tsing also offers a response to a question Helmreich (2008, p. 474) poses: "[W]hat if we asked not what happens to biology when it is capitalized, but asked rather whether capital must be the sign under which all of today's encounters of the economic with the biological must travel?" Research produced across diverse agrarian settings about precisely such encounters speaks to both the fertility of biopolitics and biocapital as theoretical rubrics and to the promise of a multitude of other possibilities.

BOTANICAL WORLDS

As is evident from the two foregoing sections, much multispecies ethnography to date, including that which is focused on the agrarian, directs its attention to our "contact zones" with animals and, more recently, microbes. If multispecies ethnography represents, in part, a way of rethinking human exceptionalism (Tsing 2015, p. 162), drawing inspiration from Latour's (1988, 2005) notions of networks and nonhuman agency, Deleuze & Guattari's (1988) rhizomatic assemblages and becomings, Haraway's (2008) contact zones, and Stengers (2010) cosmopolitics, among others, the relatively greater inclusion of animals and microbes within the multispecies fold is perhaps not difficult to see. Plants, for a start, have long been understood to have a more distant connection to humans than do animals. Agamben (2004, p. 14) argues that it is the isolation of vegetative life, what Aristotle in *De Anima* termed "nutritive power," that marks a foundational division of life in Western science, "from which the life of the higher animals gets separated." Plants, indeed, have been widely regarded as inert and passive, making them somewhat less likely companions than animals and microbes in theoretical alliances that foreground nonhuman agencies and vitalities. The prominence of animals vis-à-vis plants in multispecies ethnography may also, therefore, reflect a hierarchy that exists in other realms as well (see McElwee 2007). Yet, plant life is ubiquitous in agrarian societies of all kinds. Sometimes this ubiquity is prominent, as Conklin (1957, p. 44) noted that the Hanunóo had more than 1,600 names for plant types, compared with just 450 for animals; at other times, it is less visible, but no less significant, as in the maize and soy that maintain animal life in the factory farm.

A rich body of scholarship within anthropology, and allied disciplines, speaks to the affective and political ecologies bound up in human–plant relations (Osterhoudt 2016, 2017) and to their world historical significance in the making of empires and states (McCann 2005; Scott 2009, 2017), in the founding of colonies (Carney 2001), in the emergence of capitalism (Mintz 1985), in the relation of labor and justice (Besky 2014), and in long histories of globalization and trade (Dove 2011, West 2012). The material properties of plants themselves, their legibility to state and other authorities, and the ways in which they enroll humans in their care, while long overlooked, have been politically consequential; Scott (2009) argues that wet rice is the "ultimate in state-space crops" (p. 41) the world over, whereas "escape crops" such as tubers enabled highlanders and swidden farmers in Southeast Asia to avoid or elude state-making projects (p. 199). In a recent volume of *Environment and Society: Advances in Research* on the theme of People and Plants, Besky & Padwe (2016) offer a wide-ranging review of the place of plants in making territory, and Sheridan (2016) considers

plants as boundary objects (see also Blomley 2007). Plants, indeed, have been recognized as a locus of property in themselves, but they have also been used in very different ways to make claims to territory in land. In this manner, ethnographies that address human–plant relations offer some of the most compelling examples of historically and politically nuanced scholarship on interspecies relations. Braverman (2008, 2009), for example, examines the role of pine and olive trees in the material and political construction and contestation of Israeli/Palestinian landscapes, while Dove (2000; 2011, pp. 90–91) shows how the adoption of parà rubber or *Hevea*, originally introduced in Indonesian Borneo from the Amazon Basin as an exotic plantation crop, enabled smallholder rubber tappers to make claims to land that would have otherwise been impossible.

Although these studies place plants within decidedly human worlds and frameworks, they nonetheless also demonstrate the many consequences that flow from botanical vitalities. Plants, in these analyses, do things: Pine trees, for example, render the soil acidic, making it unusable for agricultural purposes (Braverman 2009). Pepper, too, is lively, draining fertility from soil, spurring grassland succession in swidden systems, demanding substantial time and attention from those who cultivate it, and imposing temporal disciplines and orders on human labor and economic activity through its physiological processes of development and maturation (Dove 2011).

As boundary objects (Sheridan 2016), plants have also offered entry points for thinking about questions of nativity, indigeneity, boundaries, and belonging. Robbins (2001) and Gold (2003) and Comaroff & Comaroff (2005) offer early ethnographic accounts of now virulent debates on native and invasive species (Martin & Trigger 2015), whereas more recently Hartigan (2017) turns his attention to *razas de maíz*, races of corn, to re-examine ideas of race and relations of domestication. Ives (2014, 2017) has taken rooibos tea in South African landscapes as a way to think about claims of indigeneity and belonging, leading her to a more circumspect engagement with multispecies ethnography by cautioning that "celebrations of multispecies belonging remain tied to complicated, contested, and sometimes violent biopolitics" (Ives 2014, p. 710). These studies, rather than drawing plants within the conceptual rubric of state or capital, also pay heed to the reverse: the kinds of politics that particular crops, plant vitalities, and botanical worlds help bring into being (Hetherington 2013, 2014).

Gathering interest connecting anthropology to the natural sciences clusters around plant ontologies in ways that both connect with, and depart from, the field of ethnobotany (Daly et al. 2016). Bateson's (1979, 2000) exploration of ways of conceiving other-than-human forms of mind, cognition, and communication is an important early touchstone and is, of course, not limited to plants. Kohn's (2007) work to develop an anthropology of life extends this perspective considerably further; Kohn draws not only on the work of Charles Peirce, but also on that of biochemist Jesper Hoffmeyer (2008), who was among those to develop the concept of biosemiotics, the perspective that "life is fundamentally grounded in semiotic processes" (p. 3). Thus far, perspectives on plant ontologies move broadly in two distinct directions. The first approach, linked with the anthropology of science, extends ideas of biosemiotics that are central to Kohn's (2007) anthropology of life through explorations of plant sensing, intelligence, and communication (Hustak & Myers 2012; Myers 2017, 2015; Trewavas 2002). Philosopher Matthew Hall (2011), for example, suggests that scientific research into the complex sensory and responsive capacities of plants has made it possible to claim that plants and humans are more ontologically similar than has previously been assumed. Broad affinities are thus emerging between plant scientists and scholars of animism (Rose 2013), who have long understood plants as "volitional, intelligent, relational, perceptive, and communicative beings" (Hall 2011, p. 100). This view, indeed, represents a second approach and attends to the ways that plants may be conceived of as persons. These perspectives move from seeing plants in the making of self (Ohnuki-Tierney 1993) to understanding plants as selves and persons in their own right.

INTERSPECIES RELATIONS AND ETHNOGRAPHIES OF THE AGRARIAN

What kind of rubric, theoretical and methodological, does attention to interspecies relations offer the study of agrarian worlds? With respect to the multispecies frame, Tsing (2015, p. 162) reminds us that "what units one uses depends on the story one wants to tell." Indeed, throughout the history of our discipline, anthropologists have told stories of interspecies entanglements by drawing on different units, concepts, and frames of reference: Ecologies, systems, mosaics, and assemblages are just a few. To put the emphasis somewhat differently then, the stories we tell, and how we tell them, are shaped by the units and concepts we use.

Contemporary scholarship on interspecies relations in agrarian settings tells different stories about some of our deepest and most abiding entanglements with the nonhuman world. It renews attention to well-hewn anthropological concepts, including those of domestication, relatedness, agency, and personhood, and pushes out in new directions via more recently introduced theories of biopolitics, biocapital, biosemiotics, and nonhuman ontologies. But, it has done so, thus far, with relatively scant attention to a long scholarly, and anthropological, engagement with agrarian worlds. We can tell other stories with species. In swidden farming across Indonesia's archipelago, a perennial grass (*Imperata cylindrica*) and a perennial shrub (*Chromolaena odorata*) have long been viewed as scourges by state and development planners but are viewed and valued differently by swidden cultivators; the extent to which the same species is valued, or maligned, varies over time and according to its place within a larger botanical landscape and repertoire of agricultural activities (Dove 1986). Species, here, is a site from which to study unfolding historical, social, political, and economic connections among plants, animals, swidden cultivators, state officials, and a diversity of agricultural practices and livelihoods.

These more established traditions, grounded in our discipline by political and moral economy, political ecology, and feminist, postcolonial, and critical theory, continue to interrogate directly the relations of power, inequality, and dispossession that cut through agrarian worlds. Among their many other contributions, they show that grasping the conditions and contingencies of interspecies relations and connections need not depend on the categories of human, species, and nonhuman or other-than-human. In this respect, they remain vital for drawing attention to that which may escape or elude a species frame or methodological approach.

Contemporary multi- and interspecies perspectives, however, depart from these antecedents in their unique attention to the Anthropocene and the politics and possibilities that it generates and forecloses, not least the reification of human agency and its validation in projects such as geoengineering and negative emissions technologies (Myers 2017). Productive and novel as this departure is, these perspectives must attend carefully to the risk that their conceptual and methodological terms of engagement may flatten and evacuate the rich and varied complexities of human life-worlds or, worse, may render some human lives yet more unseen (de la Cadena 2014). The Anthropocene, then, brings a new dimension to the stakes and scales of ethnographies of the agrarian and, arguably, to anthropology more broadly (Latour 2014). And so it is here that there remains considerable scope to pursue, and further link, posthuman and interspecies approaches to the agrarian with environmental anthropology, as well as postcolonial studies and critical theory. For as they contribute to a politics, critical and hopeful, of moving beyond unmarked human exceptionalism, emerging ethnographies of agrarian worlds, in all their diversity, call on us also to parse relentlessly its ongoing and many-faceted everyday force.

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