Multispecies Studies

Cultivating Arts of Attentiveness

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Abstract Scholars in the humanities and social sciences are experimenting with novel ways of engaging with worlds around us. Passionate immersion in the lives of fungi, microorganisms, animals, and plants is opening up new understandings, relationships, and accountabilities. This introduction to the special issue offers an overview of the emerging field of multispecies studies. Unsettling given notions of species, it explores a broad terrain of possible modes of classifying, categorizing, and paying attention to the diverse ways of life that constitute worlds. From detailed attention to particular entities, a multiplicity of possible connection and understanding opens up: species are always multiple, multiplying their forms and associations. It is this coming together of questions of kinds and their multiplicities that characterizes multispecies studies. A range of approaches to knowing and understanding others—modes of immersion—ground and guide this research: engagements and collaborations with scientists, farmers, hunters, indigenous peoples, activists, and artists are catalyzing new forms of ethnographic and ethological inquiry. This article also explores the broader theoretical context of multispecies studies, asking what is at stake—epistemologically, politically, ethically—in learning to be attentive to diverse ways of life. Are all lively entities biological, or might a tornado, a stone, or a volcano be amenable to similar forms of immersion? What does it mean to live with others in entangled worlds of contingency and uncertainty? More fundamentally, how can we do the work of inhabiting and coconstituting worlds *well*? In taking up these questions, this article explores the cultivation of "arts of attentiveness": modes of both paying attention to others and crafting meaningful response.

Keywords multispecies, immersive methods, attentiveness, more-than-human ethics, worldmaking, cobecoming, responsibility, liveliness

Environmental Humanities 8:1 (May 2016)
DOI 10.1215/22011919-3527695

All living beings emerge from and make their lives within multispecies communities. As Gregory Bateson put it, the fundamental unit of survival is the "organism-in-its-environment."[1] Life cannot arise and be sustained in isolation. But relationships also have histories. Beyond a static ecological exchange, like the energy circuits mapped by early ecologists,[2] organisms are situated within deep, entangled histories. And so, beyond mere survival, particular lifeways in all their resplendent diversity emerge from interwoven patterns of living and dying, of being and becoming, in a larger world. The intimate relationship between a flower and its pollinating bee is one in which both forms of life are shaped and made possible through a shared heritage, an entanglement that Isabelle Stengers characterizes as "reciprocal capture."[3] As such, they do not just happen to meet each other, this bee and this flower; rather, their relationship emerges from coevolutionary histories, from rich processes of cobecoming. This cobecoming involves the exchange and emergence of meanings, immersion in webs of signification that might be linguistic, gestural, biochemical, and more.[4] From the directed visual and scent markers with which a flower calls out to its pollinators, to canid play invitations with their complex modes of responsive etiquette, the world is a lively communicative matrix woven through with "signs and wonders."[5] Multispecies relationality tuned to the temporal and semiotic registers makes evident a lively world in which being is always becoming, becoming is always becoming-with.[6]

Multispecies studies takes up this understanding of our world, drawing inspiration from the natural sciences and beyond, bringing diverse bodies of knowledge into conversation and pushing them in new directions. Multispecies scholars are asking how human lives, lifeways, and accountabilities are folded into these entanglements. In taking up these questions scholars are also engaging with long histories of relational, agentic thinking from indigenous peoples.[7] As with all living organisms, human lives and ways of life cannot take place and be described in isolation. As Anna Tsing notes, "Human nature [in all its myriad forms] is an interspecies relation."[8] Only-human

1. Bateson, *Steps to an Ecology of Mind*, 457.

2. Odum, *Fundamentals of Ecology*. See also the discussion of energy circuits in Murphy, *Sick Building Syndrome*.

3. Stengers, *Cosmopolitics I*, 35–36.

4. Buchanan, *Onto-ethologies*; von Uexküll, "Stroll through the Worlds of Animals and Men"; Hoffmeyer and Haveland, *Signs of Meaning in the Universe*.

5. Haraway, *Modest_Witness*, 8.

6. In recent years these insights have refigured and broken down a long-assumed divide between the sciences of evolution and ontogeny, requiring scientists and allies to rethink inheritances (genetic, epigenetic, behavioral, and cultural) as part of larger developmental processes. See, for example, Oyama, Griffiths, and Gray, *Cycles of Contingency*; Jablonka and Lamb, *Evolution in Four Dimensions*; and Gilbert, *Developmental Biology*. This new thinking about inheritance is integral to our understandings of what life is and can be, how we take up the past and are shaped by it.

7. Descola and Scott, *In the Society of Nature*; Ingold, *Perception of the Environment*; Rose, *Dingo Makes Us Human*; Graham, "Some Thoughts."

8. Tsing, "Unruly Edges," 141. Thinking the human in this way requires the kind of "indefinitely expandable trans-knowledging approach" that Donna Haraway has called "EcoEvoDevoHistoEthnoTechnoPsycho

stories will not serve anyone in a period shaped by escalating and mutually reinforcing processes of biosocial destruction—from mass extinction to climate change, from globalization to terrorism. There are many names for our current condition—Anthropocene, Capitalocene, Plantationocene, Chthulucene, White-supremacy-cene, and the list goes on[9]—but whatever it is called, what it seems to demand are detailed practices of attentiveness to the complex ways that we, all of us, become in consequential relationship with others. Taking this provocation seriously, multispecies scholars are exploring and reframing political questions: How do colonialism, capitalism, and their associated unequal power relations play out within a broader web of life?[10] What will count as conservation in our postnatural world?[11] How must we rethink "the human" after the anthropocentric bubble has burst? What forms of responsibility are required, and how might we learn to respond in other, perhaps better ways to the communities taking form in "blasted landscapes"?[12]

These complex and vital questions are explored by multispecies scholars in a particular way: through immersing themselves in the lives of fungi, microorganisms, animals, and plants. In this way, the field of multispecies studies aims to open up new spaces for interdisciplinary and collaborative research. While both "the animal" and "the environment" have in recent decades been the subject of new forms of scholarly inquiry in the humanities and social sciences, multispecies studies promises something a little bit different. In contrast to animal studies, multispecies scholarship takes up a broader taxonomic scope of inquiry. But it does not simply replace a focal animal with a plant or bacterium. Much, but by no means all, of the work in animal studies has focused on people's relationships with a given animal (a dialogic focus that is readily apparent in the term *human-animal studies*). Instead, a multispecies approach focuses on the multitudes of lively agents that bring one another into being through entangled relations that include, but always also exceed, dynamics of predator and prey, parasite and host, researcher and researched,[13] symbiotic partner, or indifferent neighbor. But these larger contexts are not mere environments in the sense of a homogeneous, static

(Ecological Evolutionary Developmental Historical Ethnographic Technological Psychological studies)" (*Staying with the Trouble*).

9. Moore, "Capitalocene"; Malm and Hornborg, "Geology of Mankind?"; Haraway, "Anthropocene, Capitalocene, Plantationocene, Chthulucene"; Mirzoeff, "It's Not the Anthropocene."

10. Capra, *Web of Life*; Moore, *Capitalism in the Web of Life*; Tsing, *Mushroom at the End of the World*.

11. Lorimer, *Wildlife in the Anthropocene*; Kirksey, *Emergent Ecologies*; van Dooren, *Flight Ways*; Reinert, "Care of Migrants"; Chrulew, "Managing Love and Death at the Zoo"; Collard, "Putting Animals Back Together"; Collard, Dempsey, and Sundberg, "Manifesto for Abundant Futures"; Dempsey, "Tracking Grizzly Bears"; Candea, "Habituating Meerkats"; Münster, "Working for the Forest."

12. Tsing, "Blasted Landscapes"; Kirksey, Shapiro, and Brodine, "Hope in Blasted Landscapes."

13. Incidentally, the "researcher" need not always be human. For a short discussion of ants conducting research on sleeping people, see the views of Steve Meredith (an Aboriginal Australian Ngiyampaa elder) in Rose, "Val Plumwood's Philosophical Animism," 99.

background for a focal subject. Rather, they are complex "ecologies of selves,"[14] dynamic milieus that are continually shaped and reshaped, actively—even if not always knowingly—crafted through the sharing of "meanings, interests and affects,"[15] as well as flesh, minerals, fluids, genetic materials, and much more. As is discussed further below, this multiplicity, this multiplying of perspectives and influences, is key to what multispecies studies is all about.

In addition, as this special issue illustrates, this immersive approach is now also increasingly being applied to forms of liveliness that many, but by no means all, of us would consider to be nonliving: from stones and weather systems to artificial intelligences and chemical species.[16] For example, in their contribution to this collection, Vinciane Despret and Michel Meuret articulate a cosmo-ecological approach that brings gods, ancestors, and spirits into our accounts of the forms of life, and thus the modes of rapport and connection, that constitute worlds.[17] In this way, a growing group of scholars is challenging the biotic prejudices of multispecies work.[18] From this perspective, biocentrism is often no longer viewed as an important corrective to previously anthropocentric approaches but, rather, as itself an unjustifiable bias. Grounded in important insights from a range of fields—including new materialisms,[19] political geology,[20] and indigenous metaphysics[21]—the liveliness of the abiotic is being brought to the fore. Many entities, from geologic formations and rivers to glaciers, might themselves be thought to have distinctive ways of life, histories, and patterns of becoming and entanglement, that is, ways of affecting and being affected, and so they too might become subjects of ethologies in the Deleuzian sense of the term.[22] Whether and in what ways these multispecies approaches might be useful for thinking abiotic

14. Kohn, *How Forests Think*, 134.

15. Lestel, Brunois, and Gaunet, "Etho-ethnology and Ethno-ethology," 155.

16. The Multispecies Salon has lately begun to consider "chemical species" as a frame for exploring the unexpected possibilities and uncanny haunting specters that emerge with encounters between organic matter and inorganic matter—between rock and water, among biological organisms, metabolites, and toxins. Imperceptible forces work around, against, or despite our attempts to control and catalogue them. Chemical species, as measured by technical and scientific apparatuses, are ephemeral: they change quickly. See www.multispecies-salon.org/events.

17. In particular, in this issue also see contributions by Reinert, by van Dooren and Rose, and by Wolfe and Whiteman.

18. TallBear, "Beyond the Life/Not Life Binary." Also see contributions by Reinert and by van Dooren and Rose in this issue.

19. Bennet, *Vibrant Matter*; Barad, *Meeting the Universe Halfway*; Dolphijn and van der Tuin, *New Materialism*; Ingold, "Toward an Ecology of Materials."

20. Clark, *Inhuman Nature*; Clark and Yusoff, "Combustion and Society"; Yusoff, "Geologic Life."

21. TallBear, "Beyond the Life/Not Life Binary." Scholars are increasingly pointing out the tremendous debt that posthumanist and related work owes to indigenous thought, a debt that is all too often unacknowledged. See Todd, "Indigenous Feminist's Take on the Ontological Turn"; and Sundberg, "Decolonizing Posthumanist Geographies."

22. See the contribution by Despret and Meuret in this issue.

liveliness and how they might shed light on the consequential work done by various forms of boundary making between the alive and the not remain open questions at this stage.

The term *species* in multispecies studies gestures to particular ways of life and to any relevant gathering together of kin and/or kind (as Donna Haraway has argued, pointing to the historically much broader meanings of the term *species*).[23] *Species* here is in no way intended to imply that kinds are fixed or homogeneous, nor should the term be taken to assume a specifically Western, scientific mode of taxonomy (discussed further below).[24] While some cultural critics have suggested that the notion of species is an anthropocentric imposition on the world,[25] close attention to other kinds of life reveals that humans are not exceptional in our ability to classify and categorize. To our ears, the notion of species holds open key questions: How do entangled agents torque one another with their own practices of classification, recognition, and differentiation? How are different kinds of being enacted and sensed in the ongoing ebb and flow of agency in multispecies worlds?

As an umbrella term, *multispecies studies* draws together diverse disciplinary and interdisciplinary approaches that have emerged in recent years. These include multispecies ethnography,[26] etho-ethnology,[27] anthropology of life,[28] anthropology beyond humanity,[29] extinction studies,[30] and more-than-human geographies.[31] Despite their differences, we see all of these approaches as united by a common interest in better understanding what is at stake—ethically, politically, epistemologically—for different forms of life caught up in diverse relationships of knowing and living together. In other words, each of them is an example of the new science studies that Tsing has pointed to, one that is grounded in "passionate immersion in the lives of the nonhumans being studied."[32]

There are two main sections to this article. The first offers an overview, a miscellany of sorts, of what we take to be some of the dominant modes of immersion that ground and guide research in the broad area of multispecies studies. Each of these approaches might be understood as one method of cultivating what Tsing has called the "arts of noticing":[33] from engagements and collaborations with scientists, farmers, hunters, indigenous peoples, activists, and artists to the development of new forms of

23. Haraway, *Companion Species Manifesto*.
24. Kirksey, "Species"; Rose and van Dooren, "Encountering a More-than-Human World."
25. Ingold, "Anthropology beyond Humanity," 19.
26. Kirksey and Helmreich, "Emergence of Multispecies Ethnography."
27. Lestel, Brunois, and Gaunet, "Etho-ethnology and Ethno-ethology."
28. Kohn, *How Forests Think*.
29. Ingold, "Anthropology beyond Humanity."
30. Rose and van Dooren, "Unloved Others"; Rose, van Dooren, and Chrulew, *Extinction Studies*.
31. Lorimer and Driessen, "Wild Experiments at the Oostvaardersplassen"; Whatmore, "Introduction."
32. Tsing, "Arts of Inclusion," 19.
33. Ibid.

ethnographic and ethological inquiry. The second section explores the broader theoretical context of multispecies inquiries, the kinds of questions and topics that these approaches aim to open up and redo. Transforming noticing into attentiveness—into the cultivation of skills for both paying attention to others and meaningfully responding—this section is concerned with the politics and ethics of how we might come to know others and so (re)craft modes of living and dying on a richly varied yet fundamentally shared world.

Passionate Immersion

Passionate immersion can take many forms. At its core it involves attentive interactions with diverse lifeways. Beyond viewing other creatures as mere symbols, resources, or background for the lives of humans, scholars in multispecies studies have aimed to provide "thick" accounts of the distinctive experiential worlds, modes of being, and biocultural attachments of other species.[34] Immersive ways of knowing and being with others involve careful attention to what matters to them—attention to how they craft shared lives and worlds. *Passion* does not here mean to practice an unqualified enthusiasm or support for another's flourishing. Immersion in the lives of the awkward, the unloved, or even the loathed is very possible.[35] As such, some of this scholarship runs against the grain of dominant norms and sentiments, cultivating attentiveness to such creatures as ticks,[36] pathogenic viruses,[37] and vultures.[38] Other work, such as Haraway's canine companions[39] and Heather Paxson's post-Pasteurian microbial cultures,[40] has orbited around critters that are good for humans to live with. Still others are studying multispecies assemblages in zones of wildness that proliferate beyond realms of human influence and control.[41] A diversity of foci is possible; not all of them are comfortable and life affirming (although the question of whose life is affirmed is itself one of central, critical interest). In short, passionate immersion means becoming curious and so entangled, "learning to be affected"[42] and so perhaps to understand and care a little differently.

In their efforts to better understand multispecies worlds, some scholars are reaching deep into the archives of the humanities and social sciences to engage sometimes

34. On thick accounts (of a somewhat different variety), see Geertz, "Thick Description." For a gentle reworking of Geertz on this topic, see van Dooren and Rose, this issue.

35. Beisel, Ginn, and Barua, "Living with Awkward Creatures"; Rose and van Dooren, "Unloved Others"; Raffles, *Insectopedia*.

36. Hatley, "Blood Intimacies and Biodicy."

37. Lowe, "Viral Clouds"; Berrigan, "Life Cycle of a Common Weed."

38. van Dooren, "Pain of Extinction."

39. Haraway, *When Species Meet*.

40. Paxson, "Post-Pasteurian Cultures."

41. Kirksey, *Emergent Ecologies*; Collard, "Putting Animals Back Together"; Lorimer, *Wildlife in the Anthropocene*.

42. Despret, "Body We Care For," 131.

unexpected intellectual allies, many of them writing in a period before the solidification of the "two cultures."[43] For example, Lewis Henry Morgan's 1868 *The American Beaver and His Works* was a study conducted before biology and anthropology were established as distinct disciplines.[44] Similarly, in the discipline that we now call philosophy, a range of early and foundational thinkers practiced forms of careful attention to the ways of life of other species, even if they didn't always get it right: we might think of Aristotle's *The History of Animals*. Goethe's 1790 *The Metamorphosis of Plants* stands out as an early example of observational rigor coming together with theoretical imagination. Goethe was a passionate gardener whose interest in plants blossomed in the spring of 1776 when he began planting and tending a garden given to him by Duke Charles Augustus at Weimar.[45] Michael Marder has worked through the archives of European philosophy, pulling out thinkers like Goethe that remain relevant to contemporary conversations on "plant thinking" and multispecies studies more generally.[46] Gary Steiner has done something similar for animal minds.[47]

Creative and critical readings of contemporary natural scientific literature have also enabled scholars to deconstruct and reconstruct truth claims toward a better understanding of the worlds of others. Haraway's work on primates stands out as an early example of this approach in the Anglophone literature.[48] Others, such as Belgian philosopher Despret, have developed extensive bodies of related work: from Arabian babblers to baboons and sheep, Despret has offered critical rereadings of ethological and biological literatures.[49] These rereadings are attentive to historical contexts and the complex ways in which scientific practices and knowledges are shaped by politics, gender, and the positionality of the observer.[50] In a similar vein, Carla Hustak and Natasha Myers have explored the intelligence and agency of plants, rethinking the centrality of competitive individualism in dominant biological accounts, from Darwin to the neo-Darwinians.[51] Beyond an engagement with the published scientific literatures, these scholars have also spent time in the field interviewing and observing scientists and the plants, animals, fungi, and microbes that interest them.[52] Despret calls her practice an "ethology of the ethologists," interrogating tools for observing animal behavior developed by

43. Snow, *Two Cultures*.

44. Feeley-Harnik, "Ethnography of Creation"; Kirksey and Helmreich, "Emergence of Multispecies Ethnography."

45. Miller, "Introduction," xvi.

46. Marder, *Plant-Thinking*.

47. Steiner, *Anthropocentrism and Its Discontents*.

48. Haraway, *Primate Visions*.

49. Buchanan, Chrulew, and Bussolini, "Vinciane Despret"; Despret, "Body We Care For"; Despret, "Sheep Do Have Opinions"; Despret, "Domesticating Practices."

50. Also see Barad, "Invertebrate Visions."

51. Hustak and Myers, "Involutionary Momentum."

52. Despret et al., "On Asking the Right Questions"; Despret, *What Would Animals Say?*

the likes of Konrad Lorenz (a complex and problematic figure)[53] and then turning mutated forms of them back on the scientists themselves. This space of critical intervention is also alive and well within a fundamentally heterodox scientific community. Behavioral biologists such as Jane Goodall, Barbara Smuts, Thelma Rowell, Marc Bekoff, and Frans de Waal, among many others, have for many years been actively engaged in challenging and reinventing the practices of knowing and experimenting within their fields, acknowledging the subjectivity and individuality of their research partners as well as the researcher's own context, embodied situatedness, and implication in what is able to be known.[54]

These more creative and generous biologists, as well as trespassers from other disciplines who venture into the domain of the life sciences, have frequently been charged with anthropomorphism and the illegitimate use of anecdote (among other things). While taking seriously the danger of projecting human(?) norms and sensibilities onto others—every anthropocentrism is also an ethnocentrism, as Dominique Lestel reminds us—multispecies studies scholars have also highlighted the promise of writing narratives that are rich with anecdote, metaphor, and figuration. The charge of anthropomorphism shuts down discussion, according to Val Plumwood, rather than opening up critical inquiry about how elements of a given trait may or may not be shared by nonhumans.[55] At the same time, as Eileen Crist has argued, efforts to adopt neutral language have themselves often been mechanomorphic, projecting characteristics of machines onto forms of life, or exhibited entrenched forms of what de Waal has called "anthropodenial."[56] Similarly, while field observations, especially of single individuals or instances, lack the (supposed) repeatability of laboratory experiments, they also create new opportunities to appreciate personality, innovation, and improvisation. As some ethologists have noted, anecdote can be a remarkable resource,[57] allowing us to move outside a narrow space of species-typical behaviors to recognize individual or social diversity and creative capacity within other modes of life.

However, the natural sciences are far from being the only way to know and understand the lives of other species. While the knowledges and practices of the sciences have played a key role in multispecies studies, the field has also sought out a range of other approaches, aiming to decolonize[58] and more broadly challenge dominant assumptions about knowledge, expertise, and who is authorized to speak for Nature. All of us craft shared lives in multispecies communities, but we do so in diverse ways

53. Deichmann, *Biologists under Hitler*. As we were writing this introduction, the University of Salzburg announced its decision to strip Lorenz, a Nobel Prize winner, of his honorary doctorate for his ties to the National Socialist Party and its ideologies.

54. Rowell, "Concept of Social Dominance"; Bekoff, *Emotional Lives of Animals*; de Waal, "Anthropomorphism and Anthropodenial"; Goodall, *In the Shadow of Man*; Smuts, *Sex and Friendship in Baboons*.

55. Plumwood, "Nature in the Active Voice," 127.

56. Crist, *Images of Animals*; de Waal, "Anthropomorphism and Anthropodenial."

57. Bekoff, "Animal Passions and Beastly Virtues"; Fuentes, "Ethnoprimatology."

58. Apffel-Marglin and Marglin, *Decolonizing Knowledge*.

and more or less attentively. This biocultural diversity has itself become a central thread of multispecies studies. Drawing on both written materials and ethnographic research, scholars have explored the ways that indigenous communities, hunters, farmers, and many others understand and inhabit worlds. This work has, for example, focused on indigenous Australian dreamings that sing up relationships of pollination and mutual flourishing,[59] intimate ecological and animal knowledges of Amazonian and circumpolar hunters,[60] and chemical-laden cultures of lawn maintenance in the contemporary United States.[61] Multiplying perspectives, these approaches unsettle the hegemony of scientific accounts of Nature, highlighting the complex and often contradictory ways of knowing, valuing, and living that are always unavoidably at play and at stake in the shaping of worlds.

Artists have also become core participants in scholarly projects that question conventional approaches to speaking for Nature, exploring opportunities for immersion in the lives of others.[62] Rather than limiting themselves to producing the monograph or the essay, artists have long generated multimedia installations and performative interventions to bring attention to animals, plants, fungi, and others at the periphery of anthropocentric worlds.[63] In their contribution to this collection, Cary Wolfe and Maria Whiteman play with the conventions of academic scholarship, drawing us into the life-worlds and landscapes of mountain pine beetles through poetry, image, and sound.

Performative experiments are also being used by artists and ethnographers to probe speculative dimensions of multispecies worlds, as Eben Kirksey and colleagues illustrate in their contribution to this collection. Rather than simply describe what life is like at particular times and places, or what it once was like, scholars in the field of multispecies studies are engaging with people in their speculations about what life might or could be.[64] Performance art with other kinds of creatures often cites the work of Joseph Beuys, who lived with a coyote in a Manhattan art gallery for three days in 1974. Drawing on more than forty years of ecological art that has come since Beuys, contemporary artists are facilitating alternative ways of speaking and thinking about how our own survival is contingent on entanglements within multispecies assemblages.[65] Illustrating the uncomfortable material and semiotic connections linking her own flesh and blood with the domain of viruses and plants, Caitlin Berrigan performed what she called a "nurturing gesture" at the Multispecies Salon. Drawing her own blood, which is infected with the hepatitis C virus, Berrigan offered it as nitrogen-rich fertilizer to a dandelion plant. Enacting a relation of shared suffering, of mutual care and

59. Rose, "Flying Fox."
60. Kohn, *How Forests Think*; Ingold, *Perception of the Environment*; Descola, *Beyond Nature and Culture*.
61. Robbins, *Lawn People*.
62. da Costa and Philip, *Tactical Biopolitics*; Haraway, *When Species Meet*; Kirksey, *Multispecies Salon*.
63. See Kirksey et al. and Wolfe and Whiteman, this issue.
64. Ingold, *Making*.
65. Spaid, *Ecovention*; Broglio, *Surface Encounters*; Baker, *Artist/Animal*.

violence, Berrigan told audience members that she takes dandelion root as medicine to help her liver cope with the viral infection.[66] Other artists, such as Miriam Simun, Kathy High, and Natalie Jeremijenko, have augmented the human sensorium to reconfigure our engagements with multispecies worlds. Rather than pretend to stand apart and aloof from subjects of study, many scholars in multispecies studies are taking a cue from artists to more fully embrace the work of observation as part of an ongoing performance in the world.

Personal encounters with companion critters—some of which are commonly called pets and house plants—have also given rise to a rich corpus of empirical knowledge: Haraway's dogs, Sebastian Abrahamsson and Filippo Bertoni's arts of vermicomposting, Franklin Ginn's sticky engagement with garden slugs, Jennifer Hamilton's "bad flowers," and Tarsh Bates's slime molds, to name but a few.[67] In this work, practices of living with and observing have allowed scholars to rethink the lab and the field to create sites of para-ethnographic encounter, forming the basis of new knowledges about other species and our possibilities for crafting shared lives.[68] At the Centre for Feline Studies, Jeffrey Bussolini and Ananya Mukherjea have established a new kind of laboratory with six cats in their Manhattan apartment.[69] Playing with a traditional experimental ethos embodied by Lorenz and others (who lived with some of the animals they studied), Bussolini and Mukherjea's lab provides opportunities to make detailed etho-ethnographic observations of cats engaging in daily interactions that a formal laboratory could never provide.[70] At the same time, this informal experimental space means that not just one party (the scientists) decides what the interesting questions are and imposes them on the research subjects. Instead, more tactful and polite interactions emerge as the cats explore myriad opportunities to be inventive, to propose, to demonstrate their capabilities and interests.[71] Beyond the immediacy of our own encounters, viral videos on YouTube and social media outlets now deliver a nonstop stream of footage and commentary on interspecies relations. If television nature documentaries of the twentieth century helped shape how scientists think, emergent work in the field of multispecies studies is responding to these twenty-first-century media with projects that deploy critter cams or orbit around Facebook fan pages and Meetup groups.[72]

66. Berrigan, "Life Cycle of a Common Weed."

67. Haraway, *Companion Species Manifesto*; Abrahamsson and Bertoni, "Compost Politics"; Ginn, "Sticky Lives"; Hamilton, "Bad Flowers"; Bates, "Cutting Together-Apart the Mould."

68. Marcus, *Para-sites*; Kirksey, *Multispecies Salon*.

69. Bussolini, "Toward Cat Phenomenology"; Lestel, Bussolini, and Chrulew, "Phenomenology of Animal Life."

70. On etho-ethnology, see Lestel, Brunois, and Gaunet, "Etho-ethnology and Ethno-ethology."

71. On polite modes of research with others, see Despret, "Sheep Do Have Opinions"; and Despret, "Responding Bodies and Partial Affinities."

72. Despret, *What Would Animals Say?*; Haraway, *When Species Meet*; Mukherjea and Bussolini, "Lil Bub and Friendz."

Immersing oneself in multispecies worlds often necessitates forming collaborative teams to bring together complimentary skills and expertise. While fields like cultural anthropology, philosophy, and history have long privileged the solo-authored manuscript in academic knowledge production, multispecies scholars are exploring collaborative writing practices within single disciplines[73] while also forming new multidisciplinary associations.[74] Collaborative associations are starting to move beyond earlier approaches in science studies that put biologists themselves under the microscope, to create projects with scientists that might frame experiments addressing shared questions and concerns or recraft existing empirical methods.[75] Biologists and ecologists have become "critical friends" for multispecies scholars[76] as new modes of collaboration and engagement enable promiscuous movements over borders that had, during the Science Wars of the 1990s at least, seemed like fixed boundaries. It is not surprising, therefore, that many of the contributions to this collection are coauthored. Some of the teams comprise artists, philosophers, and ethnographers: in one case we learn how to use live frogs to experiment with the speculative gap that emerges with human pregnancy; in another we encounter devastated landscapes shaped by complex multispecies assemblages. Other teams include philosophers and biologists, for example, in the exploration of shepherding in France; yet another brings together ethnographers with experience in elephant and microbial worlds to explore their meetings and remakings in elephant virus outbreaks.

None of this empirical material—from scientific data to the work of artists—can simply be regarded as unmediated knowledge. Multispecies studies scholars are consequently exploring how these diverse approaches might be engaged responsibly. Often, multiplying perspectives leads to conflicting understandings, values, priorities, and ultimately worlds. In this context, it matters which questions we ask,[77] which modes of inquiry we adopt, which practices of mediation, performance,[78] making,[79] and translation[80] we employ—as well as which stories we tell. Multiplying perspectives is not simply about assembling diversity, nor is it about the adoption of an easy relativism; rather, it is about "staying with the trouble"[81] in an effort to meaningfully navigate

73. Matsutake Worlds Research Group, "New Form of Collaboration in Cultural Anthropology"; Helmreich, *Sounding the Limits of Life*.

74. Kirksey, *Multispecies Salon*.

75. Kelly and Lezaun, "Urban Mosquitoes, Situational Publics"; Swanson, "Methods for Multispecies Anthropology"; Kirksey, *Emergent Ecologies*.

76. The term *critical friends* comes from the collaborative work of Jenny Reardon and the Working Group of the Science and Justice Research Center at the University of California, Santa Cruz. See scijust.ucsc.edu/working-group/areas-of-inquiry-themes.

77. Despret, *What Would Animals Say?*

78. Abram and Lien, "Performing Nature at World's Ends."

79. Papadopoulos, "Generation M."

80. Callon, "Some Elements of a Sociology of Translation."

81. Haraway, *Staying with the Trouble*.

one's way through the complexity of worlds in process. This navigation is fundamentally a question of ethics and politics. It is to this question that we now turn: how do different knowledge practices—different modes of attentive immersion—bring different worlds into being?

Multispecies Worldings

Refusing the choice between unreconstructed realism and an easy relativism—between a singular world "out there" awaiting description and an idealist free-for-all—the notion of worlding insists on the coconstitution, the material-semiotic interplay, that shapes what is.[82] There is a particular variety of realism—what Karen Barad has called an "agential realism"[83]—at play here: while tables, atoms, and cauliflowers are very much real, they are also shaped by modes of understanding and engagement. From this perspective, any absolute division between epistemology and ontology breaks down as worlds emerge and are continually reshaped through dynamic intra-actions.[84] As such, ways of knowing and understanding have profound consequences: they shape worlds. Not single-handedly, not once and for all, but through the messy, collaborative work that some have referred to as social construction. As Latour reminds us, the social is not the stuff or material of this construction; rather, it names the process of assembly in which diverse agencies each exert their own force in the shaping of outcomes.[85] As Laura A. Ogden, Billy Hall, and Kimiko Tanita put it, work in multispecies studies "seeks to understand the world as materially real, partially knowable, multicultured and multinatured," emerging amid "contingent relations of multiple beings and entities."[86] In short, while worlds are made, they are not "made up";[87] they are crafted in the multiple: more than one but less than many.[88]

Grounded in these insights, careful and critical attention to the specificity of other species' lifeworlds offers an important avenue for scholarship in the humanities and social sciences during an era of escalating change. Departing from a previous, often relentless focus on *anthropos*, work in multispecies studies joins other scholarship—traveling under such names as nature-cultures and posthumanism—that aims to critically refigure the human while problematizing and working across nature/culture and nature/human dualisms.[89] This work is strongest where the impulse is not simply to

82. Haraway, *When Species Meet*.

83. Barad, *Meeting the Universe Halfway*, 225.

84. Ibid.

85. Latour, "Promise of Constructivism."

86. Ogden, Hall, and Tanita, "Animals, Plants, People, and Things," 6.

87. Haraway, *Modest_Witness*, 129.

88. Mol, *Body Multiple*. What is at stake here, among other things, are forms of accountability in which ways of knowing are never innocent—never simply the reporting of an "external reality"—but, rather, are situated, embodied, and historical practices. See Haraway, "Situated Knowledges."

89. Wolfe, *What Is Posthumanism?*; Haraway, *Modest_Witness*; Whatmore, *Hybrid Geographies*; Castree and Braun, *Social Nature*; Latour and Porter, *We Have Never Been Modern*; Papadopoulos, "Insurgent Posthumanism"; Plumwood, *Feminism and the Mastery of Nature*.

dissolve the distinctions between these categories and create an amorphous flatness. As Mick Smith notes, referencing Jacques Derrida, this scholarship "recognises 'the fragility and porosity of the limit between nature and culture' not so as to collapse these categories into each other (as, for example, sociobiology does) but to 'multiply attention to differences' at all levels"[90]—that is, to pay attention to differences of all kinds as well as to the powerful work that various modes of differentiating and distinguishing do in shaping worlds. With this in mind, multispecies approaches are precisely about multiplying differences and modes of attention, about the specificity of lived natural-cultural entanglements in thick contact zones, with their own very particular histories and possibilities.[91]

Eschewing generalization and abstraction, this kind of passionate immersion in the lives of others opens up a host of possibilities. Critically, attention to the particular requires us to ask how specific worldings come to matter, and to matter differently, for given beings.[92] To ask this question seriously, work in multispecies studies insists on the biosocial multiplicity that resides within various "kinds." Species involve intergenerational dances where entangled agents torque one another in ongoing loops of multispecies intra-action.[93] Emerging from the middle, a milieu from which it grows and overspills, a species never sits still.[94] This complexity is grappled with in the biological sciences and other taxonomic traditions in a range of ways, creating multiple, or what John Dupré calls promiscuous, species concepts that are more or less appropriate for different spheres of life.[95] Furthermore, modes of enacting distinctions between self and other, between like and different, extend well beyond the human: for example, wasps selectively pollinating and therefore constituting what might count as a particular fig species.[96] If some influential philosophers assume that nonhuman species are trapped in bubbles,[97] scholars in the field of multispecies studies are attending to the lives of "ontological amphibians" who are undoing the cage of misguided assumptions that lock organisms to environments.[98] If we pay attention, all around us emergent multispecies assemblages are undermining these visions of stasis and enclosure, as viral swarms, multitudes of feral animals, and other flighty agents coalesce to form new worlds[99] while performatively crafting and recrafting what will count as their kind.[100]

90. Smith, "Ecological Community," 27; see also Derrida, *Beast and the Sovereign*.
91. On contact zones see Pratt, *Imperial Eyes*; and Haraway, *When Species Meet*.
92. On coming to matter see Butler, *Bodies That Matter*; and Barad, "Posthumanist Performativity."
93. Kirksey, "Species"; van Dooren, *Flight Ways*, 21–43.
94. Deleuze and Guattari, *Thousand Plateaus*, 21.
95. Dupré, "Species."
96. Kirksey, "Species."
97. Sloterdijk, "Atmospheric Politics"; Sloterdijk, *Microspherology*.
98. Kirksey, *Emergent Ecologies*, 18–23.
99. Lowe, "Viral Clouds."
100. Chrulew, "Sacrificial Reintroduction"; Buchanan, "Bear Down"; van Dooren, "Authentic Crows."

At the same time, in paying attention to others we cannot help but gain a new understanding and appreciation of the human. At every level—from the individual organism, through diverse forms of community and collective life, to the species itself—humanity is coconstituted inside dense webs of lively exchange. For example, emerging findings about the microbiome reveal that, within our bodies and stretching out well beyond them, each of us is a species multiple: each of our bodies is crowded with diverse kinds of parasitic and symbiotic forms of life.[101] This work gives a new twist to Annemarie Mol's claim that a body is "an intricately coordinated crowd."[102] In the words of Gilles Deleuze and Félix Guattari, bodies have become "multiplicities of multiplicities forming a single *assemblage*, operating in the same *assemblage*: packs in masses and masses in packs."[103] Breaking down the separation between interior bodies and external environments, scholars are studying multispecies assemblages where organisms are copresent and heterogeneously connected to themselves, being pulled in different directions, always in the process of becoming multiple and parallel, beside themselves with dissolution, intermittently present to themselves, each of them a para-self.[104] In his contribution to this collection, Jamie Lorimer connects these internal ecologies and their emergent possibilities for microbial rewilding with larger processes of knowledge, community, and wealth making.

Beyond what we might call the biological functioning of bodies, the contours of human lived experience are shaped through diverse and consequential entanglements. There is no human in isolation, no form of human life that has not arisen in dialogue with a wider world. Along related lines, Lestel and Christine Rugemer have argued that we must understand "the animal origins of human culture." From this perspective, human cultures are not departures, or outgrowths, from a more fundamental biologic nature but are, rather, another expression of that nature: "Humans have not emerged from the state of nature but have explored an extreme niche of that nature."[105]

While this is all certainly true in the abstract—the human is not at all what many of us have been led to believe[106]—again, attention to the particular requires us to ask how this coforming relationality comes to matter differently. Having escaped the tunnel vision of *anthropos* to the great world beyond, multispecies studies scholars are also working to carefully avoid a reductive, homogenizing conceptualization of human life. While humans may all be connected to others, they are not all tangled up in the same ways: "The specificity and proximity of connections matter."[107] As such, much of this

101. Haraway, *When Species Meet*; Paxson, *Life of Cheese*; McFall-Ngai et al., "Animals in a Bacterial World." Also see Lorimer, this issue.

102. Mol, *Body Multiple*, viii.

103. Deleuze and Guattari, *Thousand Plateaus*, 34.

104. Rotman, *Becoming beside Ourselves*, 104.

105. Lestel and Rugemer, "Strategies of Life," 8.

106. Haraway and Gane, "When We Have Never Been Human."

107. van Dooren, *Flight Ways*, 60.

work has sought to explore, in rich historical and ethnographic detail, the unequal labor, risks, positionalities, and exposures, as well as ways of being and knowing, of different individuals and communities.[108] Histories of gender and race, of political economy and colonization are layered into multispecies worldings—how could they not be?—shaping possibilities for everyone.[109] We see this in the realities of neocolonial waste management for Inuit peoples and a range of "trash" animals in the Canadian north, and on the other side of the world in the unequal impacts on indigenous laborers and captive elephants who are, both in their own way, "working for the forest" in the Indian state of Kerala.[110]

These messy, uneasy, unsettling, and always uneven realities demand that multispecies studies be more than mere description and celebration of entangled communities and processes of cobecoming. Taking a cue from Haraway, "The point is to make a difference in the world, to cast our lot for some ways of life [death, being and becoming] and not others. To do that, one must be in the action, be finite and dirty, not transcendent and clean."[111] The phrase "in the world" matters here: work in multispecies studies begins from the proposition that there is no space outside the action from which to gain absolute or universal knowledge, and yet we must still act. But it also matters in the sense that participation in a world of cobecoming necessarily implicates us: insofar as we all help to shape worlds, we are accountable for how and what they become. As Barad puts it, "Ethics is therefore not about right response to a radically exterior/ized other, but about responsibility and accountability for the lively relationalities of becoming of which we are a part."[112] Or as Beth Carruthers maintains, we are "acting as if everything matters."[113]

Refusing the tired opposition between three incommensurable demands—social justice in a humanist vein, ethics focused on the well-being of individual entities (usually nonhuman animals but to a lesser extent plants, fungi, stones, and others), and an environmental ethics concerned primarily with the health of ecosystems and species—work in multispecies studies has embraced relational ethical approaches to grapple with diverse competing claims. This work draws inspiration from rich traditions of ethical thought in feminist science and technology studies, feminist and continental philosophies, and their intersections. Staying with the trouble, it aims to hold onto competing ethical obligations, multiplying perspectives on what counts as "the good." There are no neat and final answers here, nor are there any trump cards that shut down the

108. Münster, "Working for the Forest"; Parreñas, "Producing Affect"; Kirksey, "Living with Parasites"; Tsing, *Mushroom at the End of the World*.

109. Muñoz et al., "Theorizing Queer Inhumanisms"; TallBear, "Beyond the Life/Not Life Binary"; Goldberg-Hiller and Silva, "Sharks and Pigs"; Instone and Taylor, "Thinking about Inheritance"; Pacini-Ketchabaw and Nxumalo, "Unruly Raccoons and Troubled Educators"; Todd, "Fish Pluralities."

110. Zahara and Hird, "Raven, Dog, Human"; Münster, "Working for the Forest."

111. Haraway, *Modest_Witness*, 36.

112. Barad, *Meeting the Universe Halfway*, 393.

113. Carruthers, "Praxis: Acting as If Everything Matters."

political process through appeals to incontestable principles or expertise.[114] But nor are easy relativisms allowed. This kind of relativism—you have your truth and I will have mine; you inhabit your world and I will inhabit mine—is both lazy and dangerous. At the end of the day, decisions must be made about how we will get on inside a world that is, however multiple, also shared, finite, and (in many ways) struggling. Resources must be distributed; claims to rights and justice will be heard or ignored. The frames of meaning making, of valuation and verifiability, under which deliberations are made or routine responses executed, matter.

Contesting for better worlds requires learning to take others seriously in their otherness, finding modes of muddling through that eschew the fantasy of universal translation or a singular criterion—usually "ours"—of evaluation or verification. It also requires learning new modes of taking account of and with enigmatic others who cannot be—or perhaps do not want to be—represented or even rendered knowable or sensible within any available mode of understanding.[115] And so, as Hugo Reinert argues in his contribution to this collection, this work must also hold open "a question of who—and what—is taken to exist and of how certain modes of existence are (and are not) made to count." None of this is simple, and nor does it mean that there is no right or wrong; rather, it means that right and wrong must be carefully crafted, again and again, inside larger processes of contestation. This ethics requires an ongoing questioning, an effort to cultivate new modes of attentiveness—"innovating novel practices of listening as risky techniques of cosmopolitical care"[116]—that might help us to live well inside relationships that can rarely be settled to everyone's satisfaction and never once and for all.

From this perspective, ethics is at the core of multispecies accounts—not an addition, bolted onto the side. Embracing and reworking the Deleuzian notion that ethics is ethology,[117] multispecies approaches are grounded in the understanding that careful attention to diverse ways of being and becoming is inseparable from the work of ethics. As Thom van Dooren and Deborah Bird Rose argue in their contribution to this issue, ethology/ethography is an act of bearing witness: attention to others is vital to responding appropriately, while the telling of their stories also has the potential to draw others into new relationships and accountabilities. Like all other accounts, multispecies stories are active technologies of worlding: "Stories are means to ways of living."[118] In this way, rather than simply celebrating multispecies mingling—a basic fact of life—this work also engages with the more analytically interesting and politically charged questions that follow from asking cui bono: who benefits when species meet?[119] In so doing, work in multispecies studies is concerned with the cultivation of what we have called arts of

114. Latour and Porter, *Politics of Nature*.

115. Watson, "Cosmopolitics and the Subaltern." Also see Lowe and Münster, this issue.

116. Watson, "Derrida, Stengers, Latour," 91.

117. See Despret and Meuret, this issue.

118. Haraway, *Primate Visions*, 8.

119. Star, "Power, Technology, and the Phenomenology of Conventions"; Haraway, *When Species Meet*.

attentiveness. This attentiveness is a two-part proposition: both a practice of getting to know another in their intimate particularity—steadily applying one's observant faculties and energies, as the *Oxford English Dictionary* puts it—and, at the same time, a practice of learning how one might better respond to another, might work to cultivate worlds of mutual flourishing, that is, in the somewhat dated language of the *OED*, how one might be "assiduous in ministering to the comfort or pleasure of others, giving watchful heed to their wishes." In short, the arts of attentiveness remind us that knowing and living are deeply entangled and that paying attention can and should be the basis for crafting better possibilities for shared life.

This collection is an effort to draw together some of the diversity that we have outlined above. While cross-fertilization is already taking place among various multispecies approaches, in the spirit of this journal we are interested in what might be gained by bringing together scholars from distinct disciplinary perspectives. This collection primarily includes contributions from philosophers, anthropologists, geographers, and artists, but cultural studies, literary studies, and history are all drawn into the conversation, too. The collection takes us into the worlds of sheep and shepherds, of stones, worms, salmon, and forest-devouring beetles, of viruses and their elephants, of seals, crows, and lava flows in Hawai'i, and of frogs as pregnancy tests and possible agents of pathogenic fungal spread. Each contribution practices particular modes of immersion, arts of attentiveness, and in so doing invites us to understand the world a little differently, to see what difference a curious and careful attention to others might make.

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Acknowledgments

This article has benefited from generous feedback provided by Celia Lowe, Jamie Lorimer, Veit Braun, Jean Langford, and Deborah Bird Rose. The authors were able to meet to draft and revise the manuscript as a result of travel and fellowship grants provided by the Thomas A. Barron endowment to Princeton University, the Humboldt Foundation, and the Australian Research Council (DP150103232 and DE140100918).

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