



Intra-actions

BY ADAM KLEINMAN

We have always thought the world was made of discrete objects, and interactions happened between individuals that existed prior to the exchanges. But what would we think if our frames of reference were disrupted by a new, convincing theory that asserts the exact opposite, namely that individuals exist because of the existence of given interactions: and, furthermore, that even matter exists as a phenomenon, i.e. as the materialization of relationships? Karen Barad, physicist, scholar of the philosophy of science and feminism, is the thinker behind *Agential Realism*, a theory that ultimately undermines not just the substance of matter as we know it, but also the dichotomies between nature and culture, animal and human, female and male, even problematizing the social practice of science and the nature of ethics. In this interview with Adam Kleinman, the scientist explains extremely complex concepts in an elegant, simple way, helping us to understand something more about nature and raising fascinating questions.

There are many ways to introduce Karen Barad. She holds a PhD in theoretical particle physics and has held a tenured appointment in a physics department. So it would be fair to say that Barad thinks about, and with, the atom. Likewise, she is currently a professor of feminist studies, philosophy, and the history of consciousness at the University of California at Santa Cruz. There, she is engaged in various interdisciplinary endeavors that consider such queer things as asking what we can learn—ethically speaking—from such strange social organisms as giant slime colonies that ooze under the soil beneath our very feet. More on that below.

You may be familiar with her books, such as 2007's *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning*, which revisits the philosophical implications of Niels Bohr's theories of quantum indeterminacy in light of recent developments in science, philosophy, and political science.

But on the subject of introductions in the more colloquial sense, I was delighted to send Karen an email in early May to request the interview featured here. The reason for this invitation was quite simple, namely that her work has been such a key influence on us at dOCUMENTA (13). It has helped shape our thinking about the world, and our place in it and within it. I concluded my email by saying that it would seem amiss to not find some way to include her in this special issue of *Mousse* magazine. Fortunately she was kind enough to accept the invitation and joined with us to discuss her recent activities and forthcoming work.

adam kleinman: Karen, thank you for joining with us today. As you know, I am an “agent” of dOCUMENTA (13). It's a funny title, one that recalls exciting roles like that of a spy, or more banal functions like that of a retail clerk. An agent is also a member of a larger body—a coworker, so to speak. Your writings describe example after example of highly complex exchanges or co-workings, for instance a giant amoeba colony in Texas that sends and receives information across its various constituents that differentiate specialized roles within the colony, including even self-sacrifices, apparently. You use the neologism “intra-action” rather than simply “interaction” to explain this kind of phenomenon. What is “intra-action”?

karen barad: The usual notion of interaction assumes that there are individual independently existing entities or agents that preexist their acting upon one another. By contrast, the notion of “intra-action” queers the familiar sense of causality (where one or more causal agents precede and produce an effect), and more generally unsettles the metaphysics of individualism (the belief that there are individually constituted agents or entities, as well as times and places). According to my agential realist ontology, or rather ethico-onto-epistemology (an entanglement of what is usually taken to be the separate considerations of ethics, ontology, and epistemology), “individuals” do not preexist as such but rather materialize in intra-action. That is, intra-action goes to the question of the making of differences, of “individuals,” rather than assuming their independent or prior existence. “Individuals” do not not exist, but are not individually determinate. Rather, “individuals” only exist within phenomena (particular materialized/materializing relations) in their ongoing iteratively intra-active reconfiguring.

“Phenomena,” in an agential realist sense, are the entanglement—the ontological inseparability—of intra-acting agencies. (Where agency is an enactment, not something someone has, or something instantiated in the form of an individual agent.) It is through specific agential intra-actions that the boundaries and properties of “individuals” within the phenomenon become determinate and particular material articulations of the world become meaningful. A specific intra-action enacts an “agential cut” (in contrast to the Cartesian cut—an inherent distinction—between subject and object), effecting a separation between “subject” and “object” within the phenomenon. In particular, agential cuts enact a resolution *within* the phenomenon of some inherent ontological indeterminacies to the exclusion of others. That is, intra-actions enact “agential separability”—the condition of exteriority-within-phenomena. So it is not that there are no separations or differentiations, but that they only exist within relations. Putting the point another way, phenomena are differential patterns of “mattering”—diffraction patterns dispersed across differently entangled spaces and times, or rather *spacetime-matterings*. The notion of intra-action marks an important shift in many foundational philosophical notions such as causality, agency, space, time, matter, meaning, knowing, being, responsibility, accountability, and justice.

It is perhaps worth noting that while Cartesian epistemology is built on the given-ness of a distinction or a Cartesian cut between subject and object, the epistemology of agential realism, or rather its entangled ethico-onto-epistemology, goes to a set of prior questions. Agential realism does not start with a set of given or fixed differences, but rather makes inquiries into how differences are made and remade, stabilized and destabilized, as well as their materializing effects and constitutive exclusions. Since cuts are understood to be enacted rather than given (it is the cut that makes the individual and not the other way

around), all manner of questions regarding the nature of mattering come together here—that is, questions of matter in the multiple senses of meaning, being, and valuing.

About the amoeba colonies: Slime molds (of which so-called social amoebas are classified as one kind) are amazing critters. They have the ability to morph from a seemingly uncoordinated group of genetically identical single cells to an aggregate “slug” with an immune system, muscles and nerves with ganglia (that is, simple brains) and other organismic functionality characteristic of multicellular species with different roles played by identical cellular units.

So the very question of what is or isn't an “individual” is not a clear and distinct matter, and that seems to be precisely the scientific sticking point. The question of the nature of identity is ripe here; it's what's so spectacularly exciting from a scientific point of view. No wonder that social amoebas are taken to be model organisms in molecular biology and genetics for studying communication and cell differentiation. Social amoebas queer the nature of identity, calling into question the individual/group binary. In fact, when it comes to queering identity, the social amoeba enjoys multiple indeterminacies, and has managed to hoodwink scientists' ongoing attempts to nail down its taxonomy, its species-being defying not only classification by phylum but also by kingdom. To attempt an explanatory model on the basis of individuals interacting with one another and their “environment” seems to miss something fundamental about the very nature of the organism. How can we expect the notion of an organism understood as an individual that is situated in a container we call the environment to begin to speak to the complexity of the intra-active reconfiguring of bodily boundaries that defines the slime mold's astonishing material existence?

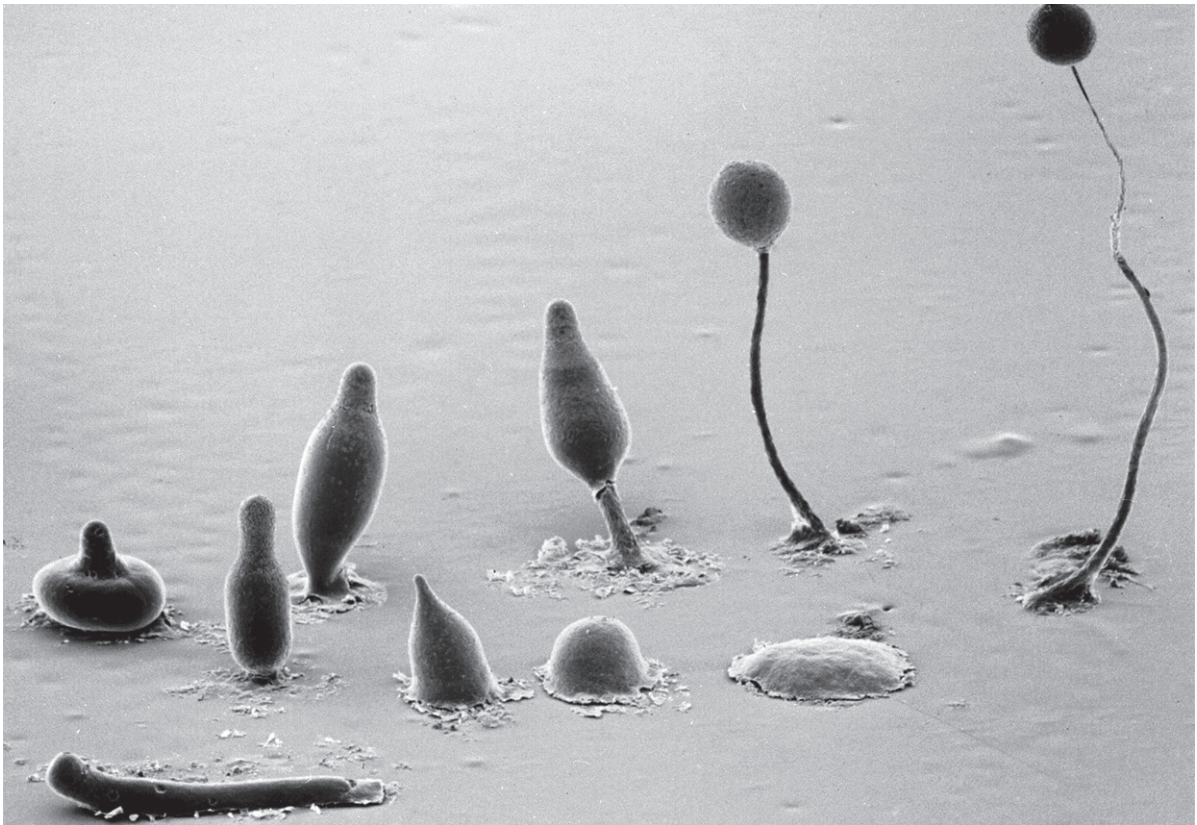
ak: One of the pleasures I find in reading your work is how you synthesize perspectives out of seeming paradoxes. For instance you question how the moralist can condemn an “unnatural act” such as sodomy and at the same time call a transgressing person a “beast,” even though a beast is part of nature. How do such dichotomies reveal frames of inclusion and exclusion in our knowledge and social structures? I believe you use the term “cut” to denote these anchor points.



kb: Before I address the core of your question, I just wanted to mention that I don't see my approach as one of synthesis. Rather than synthesizing different perspectives, I like to get in there and do diffraction experiments—that is, get my hands dirty and experiment with different differences, trying to get a feel for how differences are produced and how they matter. Reading insights through one another diffractively is about experimenting with different patterns of relationality, opening things up, turning them over and over again, to see how the patterns shift. This is not about solving paradoxes or synthesizing different points of view from the outside, as it were, but rather about the material intra-implication of putting “oneself” at risk, troubling “oneself,” one's ideas, one's dreams, all the different ways of touching and being in touch, and sensing the differences and entanglements from within. In fact, touch currently has me in its grip. I find it very fruitful to understand the history of physics as the history of an inquiry into the nature of touch. But now we are already feeling around the edge of the question you asked me.

Let's talk about cuts. The etymology of dichotomy (from the Greek *δichotomia*, a cutting in two) already speaks of the genealogical dimension of the very notion of difference—that is, the fact that differences are made, not found, and that dichotomies derive from particular cuts. In other words, dichotomy's genealogy asks after the genealogy of each specific dichotomy/cutting, thereby deconstructing the presumed given-ness of dichotomies, which is a fixture of our Cartesian inheritance. This is not to say that I want to reinforce the idea of





the binary. On the contrary, it's just that my diffractive methodology and ethical sensibility is not to reject things out of hand, to put the old out to pasture, but to renew ideas by turning them over and inside out, reading them deconstructively for aporias, and re-reading them through other ideas, queering their received meanings.

The larger question of differences interests me a great deal. Quantum physics as well as feminist, poststructuralist, and queer theories have been inspiring coworkers in my efforts to think about the nature of matter and how differences materialize. According to my agential realist account, matter is not mere stuff, an inanimate given-ness. Rather, matter is substance in its iterative intra-active becoming—not a thing, but a doing, a congealing of agency. It is morphologically active, responsive, generative, and articulate. Mattering is the ongoing intra-active differentiating of the world. Intra-actions enact agential cuts, which are a cutting together-apart (that is, entangling-differentiating), as one move (not sequential acts). That may seem paradoxical, but it goes to the very nature of the agential cut, which cross-cuts itself. That is, it cross-cuts not only the notion of “itself” but even the notion of the cut itself.

For example, while the ontology of classical physics divides everything into the mutually exclusive categories of particle and wave, contemporary experiments directly challenge this ontology. In fact, there is now mounting empirical evidence that there are no inherently bounded and propertied things that precede their intra-action with particular apparatuses. It is only in intra-action that bounded and properties “things-in-phenomena” materialize—where “phenomena” (in the case of measurement intra-actions) are the inseparability of “things” and “apparatuses.” That is, the larger apparatus in its particular material configuration enacts particular cuts that materialize determinately bounded and propertied “things” together with their “agencies of observation.”

Actually, it is not only matter in the sense of stuff that is materialized through intra-actions, but also matter in the sense of mattering or meaning. For example, a particular “apparatus”—that is, a particular set of material-discursive practices that materializes, say, particles, in this case—has the dual function of giving meaning to the notion of “particle” as well as participating in materializing “particles,” that is, determinately bounded things with determinate sets of particle properties (within the phenomenon). This is to the exclusion of resolving indeterminacies in a way that would make sense of and materialize “waves.” That is, in the materialization of any particular phenomenon, some particular aspects, some meanings-things, are nonetheless indeterminate; that is, the materialization of phenomena always entail constitutive exclusions. Different intra-actions iteratively constitute different phenomena, and exclude others. (It's not often that physicists probe how meaning comes into existence together with their usual objects of study, but this astonishing insight comes from the Nobel Prize-winning physicist Niels Bohr.)

With remarkable resonance, feminist, postcolonial, queer, and critical race theories have called the liberal humanist notion of the subject into question. For example, gender is no longer understood to be an inherent attribute of the individual subject, but rather a reiterative doing through which the subject is constituted. As Judith Butler explains in *Bodies That Matter*, “The ‘I’ neither precedes nor follows this process of gendering, but emerges only within and as the matrix of gender relations themselves.” (By the way, I don't see these theories as analogous but rather as always already intra-actively co-constituted, and so diffractively (re)reading insights from different theories through one another has the potential to materialize remarkably insightful and productive patterns that dynamically shift, not over time, but in the making of *spacetime mattering*.) So in an important sense there are no anchors here, not in the sense of fixity. No fixed ground or place or even time, space, or matter. Rather, agential cuts are perhaps more akin to touchstones, as in something solid and tangible in their particularity, rather than anything as immobile/immobilizing as an anchor.

ak: Before we forget our friend the unnatural-beast, would you mind sharing what this kind of setup might mean in light of the so-called nature/culture divide? Does it hold the potential to radically reconfigure this fault line?

kb: The nature/culture divide is the bedrock for an impressive array of allied dichotomies (for example female/male, animal/human, primitive/modern, natural/unnatural, real/constructed, substance/form, matter/spirit, physical/mental, stuff/meaning, innate/learned, given/made) and associated inequalities. I have explored some of the ways this dichotomy is enlisted in the naturalization of morality, and moralism's dependence on this divide.

As Harry Jaffa, who holds an endowed professorship at Claremont McKenna College, puts it, “Sodomy is to be condemned because the rational ground of all morality is nature, and sodomy is against nature.” Of course, the decision simply to set aside such a hateful discourse would be understandable, but it's illuminating to see just how the divide gets worked here. Where to begin? The woven set of associations—sodomy-condemnation-rationality-ground-morality-nature—is stunning. The ground trembles just contemplating the magni-

tude of this assertion and the questions it raises. Whatever Jaffa's proclamation means, it is surely underwritten by a belief in the nature/culture divide. But what is the nature of nature such that it has the capacity to serve as the “rational ground for all morality”? And for whom? What is required of it? Who is included in the “all,” in the universalizing aspect of this claim? Does it apply to all cultures? All natures, too? Or is nature excluded, so that the “all” is not really comprehensive? If nature is included, could it serve as its own ground for morality? Does nature have the capacity to be rational? Or is it simply the ground on which human pronouncements can be made? And if so, are these pronouncements not merely cultural creations, human fabrications, with at best some unspecified association with natural creations?

The ground is giving way, and we're just getting warmed up. Let's follow one fault line for a bit: What precisely constitutes the “nature” at issue in this moralizing assertion about the very grounds of morality? Surely when invoking the term “nature,” Jaffa can't mean (nonhuman) animals and their behaviors,



since there is scientific evidence that hundreds of species engage in one form of another of homosexual activity, which is the usual way the term “sodomy” is construed (illuminating conflations notwithstanding) in these moralizing (and oftentimes litigious) pronouncements concerning “crimes against nature.” What use will the ground be for the *sapien* descendent of *Homo erectus* if Mother Nature herself is queer? What if the ground is not made of bedrock but rather oozing slime molds and other protean forms that lack determinate identities? Slime molds or no slime molds, once the nature/culture divide makes plain its inherent instabilities, once it gives way, there's no stopping the aftershocks and subterranean shifts, the buildup of energy and the creation of new fault lines that disrupt, unsettle, and undermine even the most seemingly solid grounds. And once the very ground underfoot surges up, tsunamis and other forces of nature are unleashed in a radical reworking of its own ground. (Nature is far better at deconstruction than any cultural theorist!) What if instability, or rather the indeterminacy of in/stability, is the condition for the possibility of taking a stand? What if the very ground, the “foundation” for judging right from wrong, is a flaming queen, a faggot, a lesbo, a tranny, or gender-queer?

ak: On the topic of critters, you have included atoms as such. You even called them “ultraqueer” in your text “Nature's Queer Performativity,” which I have been referring to in the above questions. Recently I was happy to read the newly released and authorized version of that paper. Why do you consider atoms not only critters, but ultraqueer critters at that?

kb: Why do I consider atoms to be critters? I'm amused by fact that this question seems quite odd to me now. My gut response is, “Well, why wouldn't I?” If the very notion of identity has become unhinged, then what is the basis for taking the animate/inanimate divide as stable across all cultures and natures, or rather all *naturecultures* (a phrase that I am borrowing from my friend and colleague Donna Haraway)? While animal studies has been very effective in questioning human exceptionalism and troubling the (nonhuman) animal/human divide, for the most part it has left unexamined the animate/inanimate binary. Another popular approach these days are neovitalist theories that take every-thing to be living, without necessarily asking after the ways in which particular kinds of animate/inanimate distinctions come to matter for particular purposes of particular kinds of flourishing for particular beings. These are important political and ethical questions that need a place in our theories if those theories are indeed thinking companions with a chance for life.

Now, to turn to your question about the queerness, or even ultra-queerness, of the atom: Opening with the evolutionary biologist J. B. S. Haldane's famous quote, “The universe is not only queerer than we suppose, it is queerer than we can suppose,” Bruce Bagemihl, author of *Biological Exuberance*, writes that

the world is “teeming with homosexual, bisexual, and transgendered creatures of every stripe and feather.” Citing the scientific literature on mammals, birds, reptiles, amphibians, fishes, insects, and other invertebrates, he writes: “Homosexual behavior occurs in more than 450 different kinds of animals worldwide, and is found in every major geographical region and every major animal group.” But even this extraordinary zoological catalogue of queer animals covers only a small fraction of the universe. Even if we stick to the Earth, there are all kinds of critters that don’t make the list, including all manner of nonanimal life forms (amoebas, plants, viruses) and the multitudinous forms of existence we deem “inanimate.”

It is my contention that the world in its exuberance is far more queer than all the numerous citations to Haldane’s quote seem to intend. In “Nature’s Queer Performativity,” I entertain the possibility of the queerness of one of the most pervasive of all Earthlings: atoms. I dub them “ultraqueer” critters due to the fact that their quantum quotidian qualities queer queerness itself in their radically deconstructive ways of being. Indeed, given that “queer” is a radical questioning of identity and binaries, including the nature/culture binary, I explain, based on a detailed consideration of recent experimental findings, that all sorts of seeming impossibilities are indeed possible, including the queerness of causality, matter, space, and time. Politically speaking, it has been and continues to be important that “queer” is not a fixed, determinate term. It does not have a stable meaning or referential context, which is not to say that it means anything anyone wants it to. “Queer” is itself a lively, mutating organism, a desiring radical openness, an edgy protean differentiating multiplicity, an agential dis/continuity, an enfolded reiteratively materializing promiscuously inventive spatiotemporality.

ak: Ethically speaking, if phenomena are seen as queer, what would such an understanding add to our intra-actions with them? I am drawn to a sentence, which, in that same essay, you put entirely in italics: “*Responsibility entails providing opportunities for the organism to respond.*”

kb: Ultimately, the point is not the queerness of this or that critter, but the queerness of phenomena in their iterative intra-active becoming. The queerness of phenomena unsettles the presumed separateness of questions of being-knowing-responding. In other words, these various senses of mattering—ontology, epistemology, and ethics—are not separate/separable considerations. Given that you asked me about ethics, let’s focus on the way in which the fundamental notion of responsibility is queered. According to agential realism, “responsibility” is not about right response, but rather a matter of inviting, welcoming, and enabling the response of the Other. That is, what is at issue is response-ability—the ability to respond. The range of possible responses that are invited, the kinds of responses that are disinvited or ruled out as fitting responses, are constrained and conditioned by the questions asked, where questions are not simply innocent queries, but particular practices of engagement. So the conditions of possibility of response-ability include accountability for the specific histories of particular practices of engagement. Much like our friend the ultra-queer atom, who is open to reconfigurations of *spacetime mattering* that signal the undoing of the metaphysics of individualism (including assumptions that fall under the heading “the metaphysics of presence”), the temporality of responsibility is not one’s own. “Past” and “future” bleed into the “now” of the questioning. Presence is not a matter of a thin slice of now, but rather the hauntology of inheritance, inheriting the future as well as the past (a reference to Derrida). (See for example, my diffractive reading of the quantum eraser experiment in its possibilities for providing empirical evidence of hauntology and différance.¹) The im/possibilities of response are not only conditioned by the specific practices of materialization of time but also of space, or rather of the entanglements of *spacetime mattering*.

This queering of responsibility marks a disruption of the usual framings of ethics that take human exceptionalism to be the unquestioned bedrock of analysis. In my agential realist account of mattering, responsibility is not an obligation that the subject chooses, but rather an incarnate relation that precedes the intentionality of consciousness. Responsibility is not a calculation to be performed. It is a relation always already integral to the world’s ongoing intra-active becoming and not-becoming. That is, responsibility is an iterative (re)opening up to, an enabling of responsiveness. Not through the realization of some existing possibility, but through the iterative reworking of im/possibility. Responsibility does not follow from any set of distinctions or individualist conceptions of the nature of the subject. Rather, responsibility flows out of cuts that bind.

Since responsibility is not conditioned by any preordained determinate distinctions, such as that between human and nonhuman, the ethical response cannot be to merely widen the circle and allow in nonhumans as well as humans, or for that matter any other group of excluded Others. In fact, partly in an attempt to unsettle the recent a-bit-too-easy accommodations of the nonhuman into the usual human-centered stories, to get underneath the human/nonhuman animate/inanimate divides, as it were, I have been thinking more and more about

and with the inhuman.

The inhuman is not the same as the nonhuman. To my mind, these terms speak to very different questions and different differences. While the “nonhuman” is differentially (co)constituted (together with the “human”) through particular cuts, I think of the inhuman as an infinite intimacy that touches the very nature of touch, that which holds open the space of the liveliness of indeterminacies that bleed through the cuts and inhabit the between of particular entanglements. It is only very recently that I have dared to speak about this publicly. To come to a sufficiently robust understanding of the inhuman I found it necessary to give in to the gravitational pull, to let myself be drawn further into a deep exploration of the intricate details of quantum field theory. I have been swimming around in and breathing quantum field theory for many years now, decades even. (My doctorate field of specialization was theoretical particle physics, or more specifically, quantum field theory.) This theory is so fantastically queer that it makes quantum mechanics (which is the more familiar, but limited, theory that travels under the general label “quantum physics”) look utterly tame and unremarkable. Attending to the intricacies of quantum field theory takes an enormous labor, intense focus, patience, and humility. It is an awesome labor of love. I hope I am proceeding responsibly in a way that allows the response of the “between” that I am trying to gesture toward, even if it isn’t possible to really “do it justice.” (Doing justice is a profound yearning, a crucially important if inevitably unachievable activity, an always already inadequate attempt to respond to the ethical cry of the world.) Or, rather, perhaps I can put it this way: It is the very question of justice-to-come, not the search for a final answer or final solution to that question, that motivates me. The point is to live the questions and to help them flourish.

I’ll leave you with a taste of things-to-come in the provocation that it may well be the necessity of facing our inhumanness, the inhuman that we are—that is, this infinite alterity in its material and lively indeterminacy that lives in, around, and through us—that will help us face the depths of what responsibility entails.² For all our concerns with nonhumans as well as humans, there is nonetheless always something that drops out. But what if the point isn’t to widen the bounds of inclusion to let everyone and everything in? What if it takes sensing the abyss, the edges of the limits of “inclusion” and “exclusion” before the binary of inside/outside, inclusion/exclusion, mattering/not-mattering can be seriously troubled? What if it is only in facing the “inhuman”—the indeterminate non/being of mattering and not mattering—that an ethics committed to the rupture of indifference can arise? What if it is only in the encounter with the inhuman, in its liveliness, in its gifting life and death its conditions of im/possibility, that we can truly confront “our” inhumanity, that is, “our” actions lacking compassion? Perhaps it takes facing the inhuman within “us” before compassion—suffering together with, participating with, feeling with, being moved by—can be lived. How would we feel if it is by way of the inhuman that we come to feel, to care, to respond?

NOTES

1. For more details, see Karen Barad, “Quantum Entanglements and Hauntological Relations of Inheritance: Dis/continuities, SpaceTime Enfoldings, and Justice-to-Come,” *Derrida Today* vol. 3, no. 2 (Nov. 2010): 240–68.

2. This “infinite alterity” that is integral to the very nature of the “human” comes through in the intricacies of quantum field theory. I can’t go into all this here, but to give the reader’s imagination a bit more to play with for now, a touchstone perhaps, I can offer this: What comes into play is the liveliness of the quantum nothingness, the inhuman animacy of the nothingness exploring itself, the materiality of the virtual exploration of im/possibilities that are quantized indeterminacies-in-action. I explore some facets of the quantum nothingness in “What Is the Measure of Nothingness? Infinity, Virtuality, Justice / Was ist das Maß des Nichts? Unendlichkeit, Virtualität, Gerechtigkeit” in *DOCUMENTA* (13): 100 Notes—100 Thoughts / 100 Notizen—100 Gedanken | Book №099 (English & German edition, 2012). For more details on the inhuman, see Karen Barad, “On Touching: The Inhuman That Therefore I Am,” in *differences: A Journal of Feminist Cultural Studies* (forthcoming in 2012). The final paragraph of this interview is from this forthcoming paper.

Page 76 – © Scott Solomon

Page 77 – © Irene Reti

Page 78 – © Irene Reti

Page 79 – © M.J. Grimson & R.L. Blanton. Biological Sciences Electron Microscopy Laboratory, Texas Tech University

Page 80 – © Scott Solomon