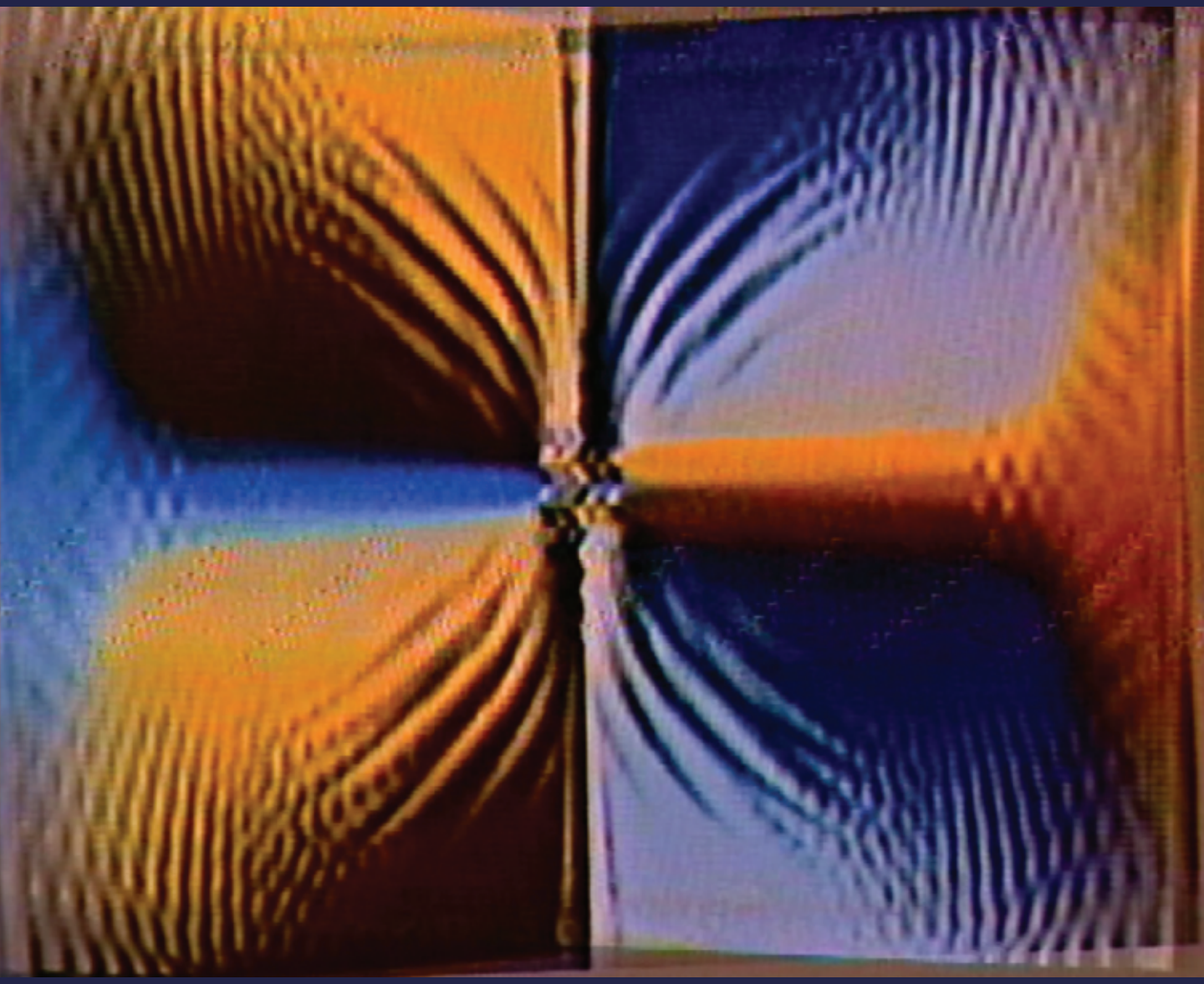
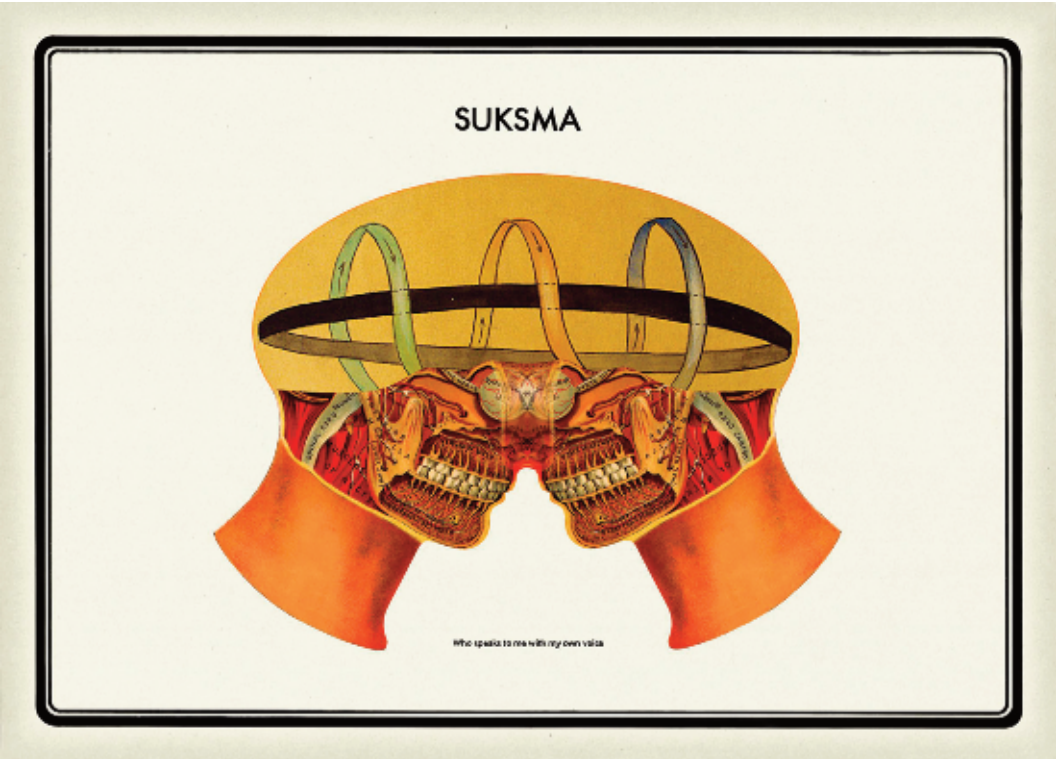


Andy Puls. *Analogue Video Feedback*, (2018). Courtesy of the artist.

— ALLISON LEIGH HOLT —

THE CONVERSATION

FEEDBACK STRUCTURES, WAYS OF KNOWING, AND NEURODIVERGENCE



Allison Leigh Holt, *Suksma*, (2012). Archival digital print on paper. 61 cm x 40.5 cm, from the installation *The Beginning Was The End.*

We move through a world in never-ending conversation with itself.

It begins with a spark: an event, a phenomenon, a signal. Trees, responding to an infestation, produce insecticidal chemicals and exchange them across a network of roots. A predator ignites a murmuration of starlings, and each bird is simultaneously attracted to, repelled by, and in alignment with its neighbour, creating a perpetuating, liquid swirl.

If we look at the sensing, processing, and exchanging of information happening in these situations, we can begin to see each as systems engaged in dialogue. While variables may differ,

in the perception/adjustment/responses that are occurring in the systems are similar: observing their own behaviours, each system then uses what it knows to modify its subsequent behaviours, and so on.

Any system that loops information from its output back to its input is known as a feedback system. The World Wide Web is a massive, nonlinear system of outputs affecting inputs, generating a multiverse of looping behaviour that mirrors that of the human brains creating, using, and being affected by it. Aiming a video camera at a monitor that also displays the camera's view similarly results in a self-sustaining, emergent phenomenon in 4D space. And, through ritual, humans align with and adjust the social, natural, and spiritual systems of which they themselves are an intrinsic part.

All living beings participate in a vast, astounding feedback system comprised of a community of feedback systems. This perceiving-sensing, adjusting-processing, and responding-exchanging *is* communication, beyond language; between humans and the not-quite-fixed world of all things that exist, with or without categorization, and between those things themselves. Meaningful communication between human and non-human species is contingent upon first reconsidering our understanding of human consciousness and cognition.

This dynamic of inter-action—between all living things—is central to my work as an artist, and is conceptualized by Francisco Varela, Evan Thompson, and Eleanor Rosch as "enactivism," a theory with roots in the phenomenological philosophy of Maurice Merleau-Ponty and J.J. Gibson's concept of environmental affordances. Enactivism describes living things as vital, vibrant assemblages of ongoing perceptual, cognitive, and emotional processes rather than as passive receivers responding to phenomena; they frame, interconnect, and enact one another as well as the world. Humans, through their interactions, recreate, maintain, and preserve a mental model of their environments and of themselves, transforming and being transformed, continuously.

Enactivism is part of a relatively new and growing field of interdisciplinary research that speaks to the "feedback-system-comprised-of-feedback-systems" mentioned earlier. In the face of an ever-changing environment, it acknowledges the efforts all organisms make to maintain an inner equilibrium, or "autopoiesis," contending with what works in concert with their internal systems and what does not, in a variety of ways. Much like the murmuration of starlings, this ongoing process of self-adjustment, this autopoiesis, is always unique.

Across different disciplines, an emphasis is being placed upon "4E" cognitive terminology—embodied, embedded, extended, and enacted mind—disassembling dominant culture's anthropocentric definitions of self, and describing humans as not only in constant conversation with other species already, but the structure of the human brain as in constant adjustment to its greater, living environment. Ideas like these are hardly new. Many Indigenous languages, for example, are encoded with specific ecological knowledge about understanding human interspecies relationships, resulting in non-anthropocentric ways of orienting oneself in reality. Developing vocabularies around this communication, this understanding of feedback systems in nature, through a Western framework, is important. It is essentially a struggle toward the decolonization of knowledge—a promising step toward integrating/ushering Western culture into this way of knowing.

While enactivism describes humans as already in conversation with both the entities we think of as other living species and with the world itself, interacting feedback systems provide a model for

conceptualizing the behaviour of those conversations. The feedback model is a helpful tool for imagining and beginning the necessary work of adjusting humanity's privileged role of central importance on this planet, and for bringing us into more reciprocal communication with other species. My own thinking on these matters emerged out of working with individuals who often attend and attune to their environment, without discrimination, from a non-anthropocentric frame—autistics. I will turn to these experiences in the second part of this article. But the "necessary work" is entangled with enticing possibilities, as demonstrated by the work of composers David Dunn and Ric Cupples.

In the mid-1970s, Dunn and Cupples created time-based media experiments that give stunning insights into interspecies communication. Exploring the way mockingbirds imitate sounds in their environments led to their piece, *Mimus Polyglottos* (1976), in which they recorded mockingbirds and ran their songs through a ring modulator, augmenting the birdsong with a bell-like distortion. When they played these recordings to a live mockingbird in the field, Dunn recalled that, "…it stopped singing… and started jumping up and down on the branch, making this loud squeak. It just completely fried its circuits. [The bird] was like, 'This thing is THE DEVIL…'"[1] Combining the natural mockingbird attributes with synthetic ones clearly added a disturbing dimension. Dunn and Cupples then decided to use synthetic sound only, emulating mockingbird song with a square wave (which is never found in nature) and playing *that* recording to a mockingbird. This time the bird was curious, excitedly studying and imitating different aspects of the electronic patterns, and, "like a jazz musician,"[2] attempted all kinds of dialogue with the perhaps strangely familiar sounds. The fascinated mockingbird saw possibilities for dialogue and launched right into a healthy game of matching.

Revisiting this work about a decade later on more technologically advanced tools, Dunn noticed something strange on his display: there was the stimulus—the synthetically emulated birdsong recording—and then the bird imitating it. But, in the bird's response, he saw that eventually "part of the waveform of the bird *is appearing in the next part of the stimulus*."[3] In other words, the bird seemed to have begun predicting the behaviour of the recording, its partner in communication. "That freaked me out," admitted Dunn, who felt as if the process occurring existed "outside of time in the way we understand it. Which is really what physics points to."[4] This attunement to patterns challenges conventional definitions of intelligence, what it means to think and act in the world, and the vocabularies commonly used to describe each.

Of course, humans love to play with patterns and dialogue, too. But the paradigm of anthropocentrism reserves the privilege of personhood for humans only. At best, what this closed loop holds in store for other species has uneasy parallels with an unhealthy love relationship: going into it excited about the different person you hope your partner will become once you enter the picture. In contrast, Dunn's *Mimus Polyglottos* exemplifies how willing other species are—birds especially, with neurological wirings completely different from those of humans but nearly as complex—to accommodate even electronic systems that appear to want to play an interesting game of dialogue. In such aural patterns, they are seeing themselves reflected. All humans need to do is listen, be curious, and respect non-human entities as equals in interaction.

THE CLOUD AND THE RAINBOW

Human survival depends upon our ability to cope with our perceptual awareness of the feedback-loopiness endemic to existence. From birth, most of us are conditioned to adopt sensory and cognitive filters; in adjusting to the norms of the social systems we are born into, we limit the information we exchange with our environment, minimizing inundation to resist becoming overwhelmed. While the evolving, interconnected matrix of feedback is still there, most people gradually come to diminish their unique attunement to it. For a certain percentage of people, however, the filters do not stick: the patterns are too persistent. An unavoidable, intimate—even bodily—experience of feedback-systems-within-feedback-systems can be both an extraordinary asset and, in the context of societies willfully unequipped to support it, a liability. In 1911, in his presentation to the Weimar Psychoanalytical Congress, Eugene Bleuler coined a term for this neurological variance: autism.[5]

Annie Torsiglieri, Associate Professor of Dance at UC Santa Barbara, said to me about her son, who I will refer to as "D", "I feel like D works on a perpetual feedback loop, meaning, he lives in a place of repetition, with slight echoes out, and as it echoes out, it changes."[6] She and D make the same jokes "a hundred times a day, sometimes," until one of them slightly alters the script. Like a DJ beat-matching between familiar and foreign tracks, they do the same routine, but with a variation, purposely introducing new elements to keep expanding the system. I described feedback systems as sensing and adjusting and repeating, and she said, "That's how he frames his world."

D's rhythms differ from those of non-autistic people mostly by degree. They are amplifications of that which all humans are capable: singular focus; obsessive interests; insistence on sameness; taking pleasure in repetition and rhythm; devotion to or contempt for rules; extreme expectations. Autism scholar Nick Walker writes, "current evidence indicates… that particularly high levels of synaptic connectivity and responsiveness" characterize autistic brains. Walker continues, "this tends to make the autistic individual's subjective experience more intense and chaotic than that of non-autistic individuals: on both the sensorimotor and cognitive levels, the autistic mind tends to register more information, and the impact of each bit of information tends to be both stronger and less predictable."[7] The genetic variants from which this results are part of the natural range of human biodiversity as held by the "neurodiversity model" introduced by Hans Asperger in 1938.[8] Once you know what to look for, autism seems to be everywhere. Often referred to as a "spectrum," it is anything but linear: with a complex of interrelated traits manifesting differently from person to person, it resembles the cloud a whole lot more than the rainbow.

The extreme fuzzy edge of that "cloud" represents a broad group often referred to as "nuanced" (and, until recently, as those with Asperger's Syndrome, now grouped in the autism category).[9] These people interest me the most, because this "small dose" of autism often results in exceptional abilities, even genius. The particular ability to distinguish patterns, to correlate disparate fields of knowledge and integrate them, has shepherded the evolution of technology, culture, and knowledge from the outset. However, in societies functioning without their ways of knowing in mind, nuanced individuals often struggle profoundly but invisibly. Bearing few outward signs of difference, these people may receive the least social tolerance of all autistics. While much remains unsettled, my gut feeling is that there may be no end to that cloud's fuzzy edge. Autism may be a key to what it means to be human.

Allison Leigh Holt, *Mythic Creatures and How to Eat Them,* (2017). Still from video.
In collaboration with *Neurodivergent Media.*

NEURODIVERGENT MEDIA

"Most people attend to voices, human voices, above all else; I attend to everything in the same way, with no discrimination, so that the caw of the crow in the tree is as clear and important as the voice of the person I'm walking with," theorist Erin Manning quotes autistic Dana Crummins as saying.[10] Manning defines "autistic perception" as "deep sensitivity to the coming-into-itself of form in experience," form itself being "a constellation of effects that body, here, now, in just this way."[11] This is similar to my concept, but I place more emphasis on the dynamic process of feedback in what Manning calls the "coming-into-itself of form."[12]

Since 2013, I have taught experimental video to autistic teens and adults both in groups and one-on-one, developing a pedagogy I call Neurodivergent Media. My students sense, process, and exchange information according to distinctive protocols that run counter to dominant societal norms (hence the term, *neurodivergent*), responding to their environment in astonishingly sophisticated and complex ways. Many students think of themselves as running a different "operating system." They acknowledge the personhood of nonhuman entities, enjoy seemingly superhuman sense perception, and many are drawn to mythological structures describing cycles and epicycles of time that reflect their own physical and psychic experiences. Experimental time-based mediums, which welcome the invention of new definitions of time, context, personhood, vibration, and frequency, are uniquely suited to articulating autistic ways of knowing, as film itself enacts a feedback system: we create it and—through its ability to, in a sense, hijack our gaze—it recreates us.

This pedagogy enacts an autonomous feedback system in and of itself. I approach my students' highly sensitized systems as if they were a kind of weather: by genuinely listening and attuning to them, I adjust my own system to match theirs, picking up clues and building fluency in their ways of

Allison Leigh Holt, *USH'R KEHPRI*, (2017). Still from video. In collaboration with *Neurodivergent Media*.

knowing while emphasizing our commonalities. I allow students to borrow from my more structured and experienced system, to "hook into my loop," maintaining focus as we navigate an experimental film project. Their neurodivergence informs how my methodology, our projects, and even class structures develop; by constantly innovating techniques and exploiting my interdisciplinary skills, we translate their visions together into cinematic reality.

Neurodivergent Media is for misfits. Anarchic humour, irreverent sci-fi plots, optical experiments, and supernatural cartographies: all are brainstormed, translated into storyboards, and broken down into roles. Costumes, prosthetic makeup, sets, and props; special effects and sound design; acting, directing, lighting, shooting, and editing—we do it all ourselves and as a unit. Our guiding principles are kindness, respect, curiosity, participation, and communication to the best of each person's ability. My job is to model these things, exercising extreme patience and assuming the best of everyone, consistently, until a genuine community of trust develops. For this to work, I have to embody the sense of interrelationship I want to see in the world, which, moment-by-moment, requires flexibility *and* solid boundaries, radical kindness *and* vulnerability; I cannot insist on my way. For my students, hard parameters defined by the equipment, limitations of the medium, and production goals are acceptable, because these things do not judge. In fact, they serve as a container for the more chaotic aspects of their experience. This process asks them to *trust* that experience, to see it as not just normal but honourable. Creating something that could not have been done alone is a means of making shared meaning, relinquishing control, and connecting deeply with others and the medium itself. Considering that the neurotypical power structures running through these students' lives offer little chance at belonging, this experience is often extraordinary.

NEW MODES OF KNOWING, IN THE CLOUD

Scholar Michelle Murphy writes, "Global biomonitoring studies have found industrially produced chemicals in the blood and breast milk of every single living subject, suggesting that all humans, and perhaps most life forms, have been materially altered by the absorption of such human-invented chemicals released over the last century."[13] Herein lies the most urgent feedback example of this paper: the one-way conversation Western culture imagines it has been having with our planet has also altered the most enduring systems we know: weather patterns. The consequences of this we have hardly begun to confront.

Back in 1911, Bleuler's conception of autism was "not as a pathology confined to a special group of children but as *a normal mode of thinking*, found among children and adults alike"[14] (emphasis mine.) That gradated autism cloud I suggested *does* encompass all humans; we are all in there and we have been all along.

The way dominant society has dealt with autism is in lock step with the conversation we have chosen with our environment. Both are aspects of a misguided order of interpretation that separates us from one another and from natural systems. The empirical, siloed epistemological framework in which we operate is untenable and failing. Paraphrasing James Baldwin, it weighs upon us too heavily to be born, and it is about to kill us. And yet, here is the collision, as Baldwin says: "People would like to be better than they are, but don't wish to see themselves revealed and don't wish to have their deepest intimations…concerning what they could be and what they could do…confirmed, because the effort is mighty."[15] This work amounts to the decolonization of knowledge, intelligence, and personhood. With this in mind, our duty is to face ourselves, and it is the domain of the artist to say what needs to be done.[16] Or, rather, to enact it.

Feedback systems—from the cellular to the human to the cosmic level—are continuously at work in our interconnected condition. The world needs us to respond to it in kind by looking to those with innate abilities to interact well with those systems. Science alone, social justice alone, art alone cannot address this; these subjects need to talk to each other. The threads of understanding that I have described are necessarily interdisciplinary. 4E cognitive theory, the exploding field of art-and-science, scientific-and-indigenous technologies partnerships, and my own Neurodivergent Media work and the related work of others are helping to weave together existing vocabularies across fields. Studying autism may be difficult, but if we want to understand ourselves—a prerequisite for living in concert with nature—we must comprehend it better.

While our bodies perceive just a small fraction of the phenomena in which we are immersed, and with which we interact intimately, our fellow species are sensing and responding in astonishing ways that most humans do not. Every human does, however, have a private language of their own, their personal way of knowing, their means of sensing, processing, and exchanging information with the world. Erin Manning describes this more-insistent language in neurodivergents: "It is the intensities that sound, that so many don't seem to hear; those intensities that are continuously getting in the way of the human voice, that privileged site of human expression, the intensities that whisper to us that the world is lively and living beyond the space the human takes."[17]

Of the languages that curb anthropocentric modes of knowing, and orient humans toward those "intensities," experimental time-based art does so experientially by turning human awareness towards

our own participation in the feedback-system-within-feedback-systems. Through it, artists ask their audiences to regard the world and their place in it through other lenses, with a different acuity and attunement: considering the world at different scales of time and space; through different kinds of listening; and questioning audience relationships to both the medium and to the place in which they experience it. Conceiving the world as a system of feedback in this way offers a path out of anthropocentrism, toward restoring *inter*relationships with non-human entities, and further, imagining post-human potentials. As Baldwin would say, art has that power, to help people see reality again.

NOTES

1 Interview with the author, 29 November 2018
2 Ibid.
3 Ibid.
4 Ibid.
5 Paul L. Harris, *The Work of the Imagination* (Oxford, UK: Wiley-Blackwell, 2000).
6 Interview with the author, 12 April 2018
7 Nick Walker, "What Is Autism?," Nick Walker's website, http://neurocosmopolitanism.com/what-is-autism/ (accessed 10 July 2018).
8 Steve Silberman, *NeuroTribes: The Legacy of Autism and the Future of Neurodiversity* (New York, NY: Avery, 2015).
9 American Psychiatric Association, *The Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5)* (Arlington, VA: American Psychiatric Publishing, 2013).
10 Erin Manning, "Me Lo Dijo Un Pajarito: Neurodiversity, Black Life and the University as We Know It," Social Justice Institute Noted Scholars Series, University of British Columbia, 14 February 2018. https://www.youtube.com/watch?v=tYHSHRzj7eY (accessed 30 April 2019).
11 Ibid.
12 Ibid.
13 Michelle Murphy, "Work In Progress: Alterlife in the Ongoing Aftermaths of Chemical Exposure," Michelle Murphy's website, https://technopolitics.wordpress.com/technoscience-meets-biopolitics/ (accessed 15 July 2018).
14 Paul L. Harris, *The Work of the Imagination* (Oxford, UK: Wiley-Blackwell, 2000).
15 James Baldwin, "The Moral Responsibility of the Artist," the University of Chicago, May 21, 1963. https://www.youtube.com/watch?v=PlnDbqLNv-M (accessed 2 May 2019).
16 Ibid.
17 Manning, "Me Lo Dijo Un Pajarito."