

On the Frontier of Redefining “Intelligent Life” in Settler Science

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Growing up in Alamogordo, New Mexico, gave me the unique perspective that space exploration cannot easily be separated from other forms of colonial settling, such as manifest destiny, frontier expansion, and resource extraction. Southern New Mexico is squarely in the borderlands, a mix of Native communities, Air Force bases, and towns originally strung together by what used to be passenger trains and military forts. The main highways and routes across the state can be traced back to the Butterfield Overland Mail Trail and to the Spanish land grants even earlier. New Mexico seemed for a long time unchanged and unbothered. Born in 1970, I learned later that many people, even of my generation, did not grow up with horse hitching posts outside many of the bars and shops in their towns, as I saw sometimes on my hometown’s main street.

In stark contrast to this image, two buildings away was The Saturn Inn, a motel for weary travelers with a huge orb of neon lights, the rings of Saturn, alternating between pink, blue, green, and purple. Along that same thoroughway, one could bowl at the Apollo Lanes, or stay at The Satellite Motel—names signifying Anglofuturisms. We were the little town between the Sacramento Peak Observatory, Holloman Air Force Base, the White Sands Missile Range, and the military testing grounds for Fort Bliss. We were less than an hour from where the spaceship *Challenger* landed, and about two hours from Trinity Site, the location of the testing of the atomic bomb. We were a short drive from where Colonel John P. Stapp broke the sound barrier.¹ We were the home of the International Space Hall of Fame. Our little town even once had the country’s sixth-largest IMAX theater at our planetarium, which was built in a rural area to avoid light pollution. The nearby missile range was a rumored target for

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Russian attack, so underneath our yards of cacti and dirt were often bomb shelters stocked with emergency kits and canned foods.

Yet amid all this space technology, most of my cousins and I wore cowboy boots and carried guns and knives for hunting. Many of us could skin and clean our kills without adult supervision. Our ranching roots seemed so far away from the reaches of the galaxy and the space travel evoked by the many deactivated military rockets that were planted all around us in our parks, along the highways, and outside of some grocery stores. As we spent hours at a time, if not days, roaming mountains and valleys, the skies were filled with noises of sonic booms and military aircraft flying overhead, which we learned to identify by name (Tomahawk, Warthog, F-15, C130, etc.). It might seem odd to be raised in something akin to the Wild West while also being surrounded by physical evidence of space exploration, but even as a child I had the sense that these were two variations of the same endeavor. Mining, ranchers buying up land, the eminent domain that made the White Sands Missile Range possible, and space exploration: to my Hispanic and Mexican aunts, these were considered ventures that benefit white people.

As an adult, I can now trace the connective tissue that binds space exploration to colonialism. Just as my grandparents and great-grandparents had stories of a Southwestern contact zone full of Spaniards, Mexicans, Indians, and white land prospectors vying for control (read as “land ownership”), we are now in the middle of a story about the next arena for colonialism: space, the final frontier. We have reason to believe the galactic frontier will be approached much as those other borderlands have been. Like other technological frontiers, the “search for intelligent life” in space remains framed by a hierarchical and progressivist worldview, which, conceived in humancentric categories, props up a scientific paradigm that has propelled colonialism and environmental collapse. As long as cultures have been making “first” contacts with other people, consequences undeniably follow. In almost every contact situation with Europeans, the Indigenous people of the Americas suffered disease, wide-scale death, cultural disruption, and often community destruction and/or displacement. To varying extents, perhaps the same is true around the globe. This deep and painful history remains the consistent frame of analysis for many in Indigenous studies, helping us to understand humanity’s present endeavors off-planet.

In the Southwest United States, living on the frontier seemed to imbue an awareness of civilizational possibility at the expense of Indigenous cohesion. As a kid, I was often in the Pueblos, Mescalero, the Dinétah, and especially the “border towns” of Ruidoso, Gallup, and Santa Fe—places that resonate with the high rush of cheap sugar and fermented anger. When I moved away to college, having seldom traveled from my small, rural town, I learned quickly that most of my non-Indigenous friends and classmates had little exposure to that area’s frontier mentality. Over the years in my adult life, I regularly have met people who have had very little if any, Indigenous presence in their lives, nor have their educations exposed them to either Indigenous content or how colonialism operates in varied ways that continuously cause pain and destruction to Indigenous ways of life. The absolute erasure of Indigenous people, despite their continuing presence among us, is always a stunning feat to witness. A

foundational leader of SETI, Carl Sagan, wrote an essay on the likelihood either of being colonized by extraterrestrials or colonizing them—without once mentioning Indigenous perspectives on the consequences of colonialism that are still felt today.² As my professional networks increasingly included academics and intellectuals, I presupposed that most would be educated about Native politics and history. In regard to my interactions with those now actively engaged in the Search for Extraterrestrial Intelligence (SETI), I am shocked by my sense that very few of them appear to have taken a class in critical theory, ethnic studies, Indigenous studies, or gender studies.

Never speak of colonization in the past tense; colonialism is actively perpetuated and continues to evolve in new phases. As I was putting the final touches on this essay, the news was reporting the landing of the latest Mars Rover, which was sending back images of a red planet with red sky. I could not help but think of Diego Landivar’s 2014 comment, “In the Western worldview, if we can think of something, we can do it. Today, we are even thinking of colonizing Mars. But I don’t believe we can colonize the moon, the sky, Mars, simply because they are empty.”³ Hope springs eternal. We are colonizing Mars. Although some may counter that colonization only pertains to the colonization of people (hence we cannot “colonize” space), my reading in Indigenous studies literature does not firmly separate human life from other-than-human life, including animals, plants, and the land. As I show below, the European notion of “life” depends upon a hierarchical chain of being that was heavily influenced by Christianity and concepts of the soul, as well as continually shifting definitions of intelligence. The Rovers can test soil samples, determine subterranean topography, and send high-resolution video and audio recordings back to Earth. We have moved from surveillance to penetration. Not having human bodies on that planet merely saves someone the labor of the erasure and the disappearing that would happen at a later date. As Robert J. C. Young, Patrick Wolfe, Michael Taussig, and others have shown, the land has always been the goal of colonizers anyway.⁴ I have little doubt that, to some involved in space exploration, an empty planet saves them the pesky “Indian” problem. The robotization of massive areas of industry has replaced soldiers with drones and cameras, extending the cyborg manifestation of exploration and dominance.

I join the others in this volume to reflect on the search for extraterrestrial intelligence, though I write from the standpoint of a settler raised in the borderlands by a father who worked for a top-secret government-funded project tasked with identifying unidentified flying object (UFO) debris. My relationship with my father cannot be easily separated from a deeply personal history of our being followed by unmarked vans, never knowing who the people visiting our home were, and the locked doors and padlocked briefcases in the house. I recall the games of pool (billiards) and canasta, and the ping-pong parties, being surrounded by my dad and his drinking buddies talking openly about their work on UFOs and theoretical engineering, probably thinking (drunkenly) that the kid in the room surely could not remember much. But they were wrong.

As soon as I landed a tenure-track job, I came out of the supernatural “closet” by teaching a course called “Aliens, Psychics, and Ghosts,” which I continue to teach twenty years later. In the last two decades, I have read a great number of abduction

claims, studies of abductions, and psychological assessments of those individuals reporting close encounters of the first, second, third, and fourth kind; I also have attended Abductee Anonymous meetings and I remain in conversation with abductees. In the last ten years, I have attended amateur ufology meetings and followed the push for “disclosure,” which for many means the US government coming clean about their knowledge of UFOs. I have also started working on my own biographical writing about my father’s life and work, helped by interviews with him before his passing. I have come to learn the importance of separating some interwoven aspects of critical paranormal studies, or what I call the “borderlands of science.” My classes about aliens, for example, cover trauma, sexual abuse, the role of testimony in jurisprudence, government conspiracies, the history of science, and of course a healthy framing of colonialism studies. Because I apply social scientific methods to the study of what counts as truth, I have seriously listened to a range of perspectives about the paranormal. I must be very clear that ufology and the formal scientific fields embodied by SETI are hugely different; in fact, they are more like opposite ends of a very long spectrum. Ufologists are mostly non-STEM (science, technology, engineering, and mathematics) “scientific” thinkers who often put too much on the table, including false memories, alien-human hybridity, government conspiracies, interdimensionality, and even some pedestrian notions of string theory.⁵ SETI scientists, in stark contrast, are overwhelmingly formally trained in geoscience, planetary science, instrumentation/engineering, astronomy, or one of their subfields.

Having spent what feels like a lifetime in dialogue with the themes of aliens, UFOs, and scientific exploration, I had put SETI on a type of pedestal. I was delighted when invited to a workshop where there would be scientists from Breakthrough Listen (BL) and SETI, the scientific research program. SETI as an institute does not regularly engage the possibility that contact has already happened, though Carl Sagan considered ancient aliens a small but unlikely possibility.⁶ Only in the last year has the SETI Institute acknowledged that unidentified aerial phenomena (UAP) “might, indeed, be of extraterrestrial origin.”⁷ In separate ways, ufologists and SETI are easily critiqued: if many ufologists cannot seem to focus or employ consistent and verifiable methods, SETI researchers mostly understand contact as an event, rather than a dynamic. Moreover, they fail to meaningfully engage historians of earthly societal contact.⁸ Given a general lack of involvement from specialists in colonialism or Indigenous studies, SETI has had little Indigenous historical context from which to gain insights about previous contact situations on Earth.

What follows is my “apophenia,” a concept I learned from Susan Lepselter’s book, *The Resonance of Unseen Things: Poetics, Power, Captivity, and UFOs in the American Uncanny*.⁹ For those in search of an overview, Lepselter’s book masterfully weaves an intriguing tale of the complex ways that amateur ufologists, settlers, and those suspicious of the government create discourses about aliens and captivity. Rather than understanding Lepselter as a colleague, however, I feel more akin to one of her subjects (perhaps many in Indigenous studies can relate). Writing as if she were outside of, or above, her subjects’ meaning-making, Lepselter studies how they “recognize the resemblances and patterns between events and stories, and how they use that chime

to cast a new story about powers that seem too big to name.”¹⁰ Lepselter poetically uses apophenia as a term to capture “the experience of perceiving connections between random or unrelated objects . . . of seeing those things that have become invisible.”¹¹ In this essay, my purpose is to trace patterns among “powers that seem too big,” to make visible and identify certain ideologies of settler science in order to find agency in a world of reifications such as institutes and technologies.

In the following pages, I address neither UFOs, ufologists, nor SETI directly. I am, however, interested in how the language often used by SETI scholars seems ignorant of, and therefore arrogant about, Indigenous experiences of colonialisms. Concomitantly, this essay raises questions on the edges of SETI’s radar. How can such a scientific endeavor continue to exclude (from its core constituency) scholars from the humanities and social sciences?¹² What does it say about a collaboration seeking to represent all of humanity—and hopefully, not cause offense to any transmitters or receivers across the galaxies—that they only utilize the language and concepts that many scholars associate with colonial, progressivist thinking? These charges might be perceived as serious, yet the validity of my critiques can only be measured via a circuitous path that begins with a truncated history of SETI and how US agency in resource extraction is gradually displaced in favor of corporations and private entities. I then examine how SETI relies (at least in the form of Breakthrough Listen, though not solely) on language that must itself be historicized in order to understand the various meanings inherent in concepts such as “intelligence” and “advanced” civilization. I rely on the work of Enrique Dussel and Arthur Lovejoy to help explicate the contentions made apparent by engaging Indigenous studies perspectives. I aim to break through and be heard by those advancing a particular materialist and object-oriented definition of science. Lastly, I move toward reconciliation, asking how we can possibly step forward in conversation. I hope to find a middle ground between ufologists, who consider too much at once, and others (including SETI), who advocate an approach within our next contact zone, and possibly across species, that is informed solely by STEM.

SETI SENSES

Although the search for messages from ETs ranges back to the 1950s, SETI was born and raised in my generation and so I think of us as having grown up together. In the early 1970s, a loose collection of astronomers could be allotted time on one of Earth’s largest telescopes to work out their hypotheses regarding dwarf stars, black holes, the galaxy’s evolution, and the like. By the late 1970s, enough scientists had been raising the question of whether we were alone in space that they compelled NASA to allocate monies for the search. Lobbying congress for extraterrestrial research was a bit easier back then. We might call this the golden age of “ufology,” a term SETI avoids. *Close Encounters of the Third Kind*, *E.T.*, and *Alien* were movie box office hits, the first space shuttle was preparing to launch, and Cold War rhetoric was cranked up high.¹³ Although scientists were simply hoping to examine whatever was out there light-years away, to support their push they could rely on a public taste for intergalactic aliens, a political taste for celestial imperialism, and a corporate taste for resource extraction.

Space was the place. On television, *Cosmos* was airing to high rankings in viewership. The show's creator, Carl Sagan, positioned himself as the lead proponent of SETI, often taking his case to the airwaves and toward lobbying efforts.¹⁴

While the NASA budget was shrinking yearly (as a percentage of the federal budget), over the next few decades Sagan helped to collect more than two million dollars from colleagues and leading scientists from around the world in order to create The Planetary Society. He even convinced Steven Spielberg, director of *E.T.*, to pitch in \$100,000 for a large telescope at Oak Ridge Observatory. This would slowly grow into a large network of outposts designed for other astronomy, but commensal. Telescopes and observatories remain central to the search for extraterrestrial life, even if they often mean the destruction of life right in their shadows (see David Maille's article in this special issue). When they turned on the massive Arecibo Telescope in Puerto Rico, recently demolished in 2020, it was heralded as the newest single-dish radioastronomy tool in a growing perceptive grid across Earth. The interconnectedness of observatories and telescopes perhaps is best portrayed in the 1997 film *Contact*, in which Jodie Foster's character sits near the Very Large Array of Telescopes (VLA) while correlating the data transmissions with computer and observatory data elsewhere.¹⁵

I wish to be clear that SETI's function inspires both my imagination and sense of scientific inquiry. Debatably, no other group anywhere has quite the reach into space travel, observatory and telescope data analysis, and that which I consider the "intellectual side" of space exploration. The focus of the SETI Institute's Carl Sagan Center remains mostly focused on astrobiology and exoplanetary astronomy, subdisciplines that aim to detect biosignatures, that is, evidence of life beyond Earth. SETI Institute scientists write grants and collaborate with NASA and National Science Foundation (NSF) on projects with aims that are different from those of Breakthrough Listen, which more accurately "searches" for technosignatures rather than solely biosignatures.

I have long admired the persistence and intelligence of founding SETI scientist, Jill Tarter. Establishing the SETI Institute as a 501(c)3 nonprofit has helped them dedicate more funds and energy to education and research, an important counterweight to the vast array of unscientific, amateur ufology and paranormal discourse that is constantly represented by the entertainment industry. SETI researchers also carry out important roles that vary across projects, often helping to write formulas or handle the data pipeline for larger missions at NASA or other research bodies. On the Kepler Mission project, for example, eighteen SETI Institute scientists were embedded. The SETI Institute also recently entered into a more robust agreement with the VLA to "listen" all day, night, and year.

While I have only communicated with SETI associates through email, I do not get the sense that they are the drivers of colonization, as some of my statements may seem to suggest. Indeed, readers may at times wonder whom I mean by the "American SETI community"; such distinctions are difficult as originally it was a small grantee of NASA, then a larger association of scientists that incorporated as an institute in 1984. I have come to understand, I hope correctly, that SETI is best thought of as a "field" such as Indigenous studies, a field that has multiple disciplinary branches and scholars. SETI is like a professional organization with various research programs,

using telescopes from all over the world. We could say that comprehensively, their work is “SETI.” Breakthrough Listen, administered by Berkeley SETI Research Center (BSRC), is simply one experiment conducting SETI, and coincidentally the one best funded at this time. I attempt throughout this paper to speak of the language and ideology of SETI, not of their persons. I refer to SETI throughout as an entity that, while amorphous, seems to hold some truths as self-evident.

SETI research clearly breaks new ground—but parochially, not across many disciplinary fields outside of the hard sciences.¹⁶ And herein lies my central claim: if SETI Institute research and its initiatives, such as Breakthrough Listen, aim to be at the leading edge of our current space exploration frontier, then they can do better with their language and their understanding of colonial and contact histories. This critique is born directly from my role in the “Indigenous Studies Working Group,” a single and questionably heard group that was asked to be in conversation with BSRC astronomers. As a model of ethical and professional relationships, I would go so far as to say that having an Indigenous studies working group at BSRC’s Making Contact event should be modeled by the greater SETI community.

For those who currently have zero understanding of the societal dynamics surrounding SETI, I suggest reviewing the SETI Institute’s website and watching some SETI talks online, then the movie *Contact*. SETI scientists mostly were portrayed positively in that film; politicians and ET “believer” types, not so much. Society in this story line is split into two variations of the misguided: amateur ufologists, abductees, and religious people, swayed by ignorance, are contrasted to politicians and military leadership, swayed by power and domination. The scientists were portrayed as coldly objective, even with their own love interests, but also were proved the true heroes of the movie because of that objectivity (I sometimes wonder if scientists go too far in believing the science fiction that objectivity somehow prevents being swayed by human desire). The movie might seem dated, but it nonetheless weaves together a range of perspectives, and it remains a favorite of mine, though I must resign myself, as with almost any pop culture offering, to the omnipresent Indigenous erasure. The characters manage to hold onto all that hope, looking upward for contact, without once looking at how previous contacts have resulted for everyone down here.

As we align the past and future frontiers, this article will address two aspects of the Arecibo Observatory telescope (also featured in *Contact*) that provide an interesting example of the confluence of colonialism and exploration. First, this telescope, a watching and listening tool for sensing the outer limits of the known cosmos, sits in Puerto Rico, which is Taino land, originally named Borikén by the Indigenous people. Both the area and telescope are named for an Indigenous Taino leader, Arisebo, who was enslaved by the Spaniard given governance of the area by the Spanish Crown in 1515. Puerto Rico’s status today as an unincorporated territory of the United States cannot be understood without connecting it to this exclusion of local sovereignty in the sixteenth century. Second, the Arecibo Telescope’s earliest function was as a missile detection and defense system under the Department of Defense’s Advanced Research Projects Agency. As I learned from my father’s work in the desert of New Mexico, most of what can be developed in the name of science can also be used in the name of militarization.

This telescope and its contributions to science are made possible by a colonial relationship, one that David Vine accentuates in discussing why the United States does not give up its colonies. Places such as Puerto Rico remain colonies, he writes, “because the military can operate there without fearing eviction and with greater freedom than in the 50 states,” permitting construction, demolition, and environmental pollution that would otherwise be regulated.¹⁷ Due to a few successive hurricanes, the telescope fell into disrepair, began to collapse, and eventually was demolished in 2020. Before you indulge in any restorative sense that “nature is returning,” keep in mind the relentlessness of colonialism. The National Science Foundation has already supported a proposal for the Next Generation Arecibo Telescope, costing \$450 million.¹⁸ That proposal, written in 2020, spells out the win-win situation that justifies the funding: finding signs of intelligent life will be the “most important discovery in the history of humankind,” and not finding signs of life will serve as evidence “of the need to carefully care for our home planet.”¹⁹ Sometimes the audacity feels even too obvious to translate. The perspective that we need any further proof to “care for” our planet itself demonstrates colonialism’s relentlessness.²⁰ Yet when these projects are examined alongside the exclusion of Indigenous perspectives and environmental collapse, telescopes and observatories demonstrate structural overlap between forms of knowledge making, funding agencies, and nation-state interests.

Because Arecibo’s launch evidences the frontier mindset of many scientists involved in the exploration of space, one further point invites discussion. When it came time to turn on the big SETI HRMS (High Resolution Microwave Survey) experiment, scientists chose an auspicious day: October 12, 1992, the day marked within the United States as the 500th anniversary of Columbus’s discovery of the Americas.²¹ One would be mistaken to think that many astronomers and astrophysicists shy away from comparisons to explorers, conquerors, slave raiders, and resource extractors. As such intentional commemorations evidence, they relish those comparisons. The ubiquity of colonial commemorations, as well as their dismantling, emphasize that communities feel differently about historic events mostly depending on whether they benefited. To scientists who fancy themselves groundbreaking explorers, apparently colonialism’s downsides, if considered at all, seem to be calculated casualties.

I wish I could credit my own analytical skills for uncovering hidden intentions, but these institutions are literally declaring their values and intentions in their commemorative acts. We can easily see how space exploration is represented via a discourse of positivity. Those who endeavor to discover new frontiers, as Christopher Columbus did, must expect challenges to their enterprise, for instance, and hence the US space shuttles are named *Enterprise*, *Columbia*, *Challenger*, *Discovery*, *Atlantis*, and *Endeavor*. Their names signify the honor, the courage, and the militaristic framing of their pursuit. Much like “manifest destiny” itself, these words often are found in myths of a hero’s journey. I also note that “enterprise” not only implies a difficult undertaking, but also a business or corporate pursuit. “Enterprise” actually is more than a shuttle project; NASA recently awarded Axiom Space of Houston, Texas, a contract to build a commercial hotel and tourist complex on the International Space Station. NASA’s “Break the Ice Lunar Challenge” fosters competition among private entities to develop

moon-mining technology. The Breakthrough Initiatives, among which is Breakthrough Listen, are funded by the same Silicon Valley “elites” who fund Facebook, Twitter, and other corporate interests.²²

A thorough critical analysis of SETI is beyond the scope of this essay, as its history and self-representations are wide and varied.²³ Moreover, while much can be said about representations of societal contact and telescopes (see other articles in this special issue, for example), I will narrow my focus to simply the words that are being used. Specifically, we now turn to Breakthrough Listen’s own descriptions of their project and intentions, focusing particularly on their use of “intelligence,” “life,” and “advanced civilization.” And, while other scholars address the myriad topics of aliens, abductions, and the colonial aspects of space exploration, I focus here on only the language used by Breakthrough Listen (BL). However, I do frame BL as emblematic, if only one incarnation, of SETI ideology.

As a member of an Indigenous studies working group that compiled a statement to SETI reflecting an Indigenous studies perspective, I fully concur with my colleagues that Breakthrough Listen and SETI researchers must explicitly reflect on how the assumption that an “advanced civilization” might encounter less advanced peoples is forged in the fires of settler-colonial violence (see the Working Group statement on pages 11–18 of this special issue). Previous well-known colonial encounters form much of the intellectual foundation for current ways of thinking about “civilization,” often leading to uncritical assumptions about progressive linearity in the development of life and what counts as intelligence. As a working group, we suggested to Breakthrough Listen that they develop research protocols and a statement clearly outlining the “principles of care” that guide their attempts at contact. Yet without a deeper understanding of the terms that they use so freely, even their best intentions and statements of ethics are bound to continue the legacy of colonialism, which is inextricably connected to an object-oriented science that sees both human and nonhuman lives as resources, rather than kin.

PREPARING TO COVER OVER

Looking back at the colonial events occurring around 1492, Enrique Dussel provides a revolutionary analysis of how “discovery,” as a term and concept, can be spoken only from the position of the European ego.²⁴ Only one lens frames that series of contacts as “discoveries”: the self-rationalizing European perspective committed to justifying European modernity. Dussel, writing originally in Spanish, pivots between the verbs *descubrir* (to discover) and *encubrir* (to cover over) by using their common root, *cubrir* (to cover). While *descubrir* variously can express discovering, finding out, or learning about something, Dussel highlights that the European explorers did none of those things. Perhaps, at best, they were “encountering,” but mostly they were projecting their own fantasies, fears, and insecurities onto what they encountered, thus covering over (*encubrir*) Indigenous realities. In the Valle de México, where Indigenous communities exhibited complex social structure and urban planning, contact soon led to the destruction of most Indigenous histories, medical studies, and public policies.

Dussel points out that Columbus initiated a “modernity” for Europe. His analysis demonstrates that affects of modernity were baseless. Columbus died thinking he had discovered an endless chain of Asian landmasses. For all his accomplishments in traversing geography, he was neither correct nor ethically guided—quite a cautionary tale for future explorers. Modernity, for Europeans of the sixteenth century, was a crown they molded for their own appointment. The egotistic drive to “discover” and “conquer” did not need justification, but it did need financial sponsors. Much like Sagan’s endeavor hundreds of years later, these explorations were justified simply by the fact that the predominant model of “civilization” had the ability, and the technology, to discover new lands on which to duplicate their order of things.

Considering the first reports of the “new world,” Dussel’s argument is backed by solid evidence. In the first woodcut images and written descriptions of the inhabitants of this proto-America, Europeans depicted physical bodies (capable of labor) but omitted any of the social institutions that would constitute society, government, or civilization. The thick descriptions of the voluptuous women and hardy men were not simply projections of English prudence. They served as advertisements about the human laborers available to those Europeans wanting to come on the next ships. Some of the earliest encounters were useful in showing the Spanish Crown the labor force available to build New Spain, and able bodies to fuel the Hispanic slave trade.²⁵ The Indigenous “other” was never met, learned about, or learned from—at least not in any way that we could consider meaningful. Rather, at least as Dussel explains in his case study of the Spanish Crown, many colonists aimed to reproduce their hierarchies, economic models, and social relations from back home, essentially making Others into the same:

The Same violently reduces the Other to itself through the violent process of conquest. The Other, in his or her distinction, is denied as Other and is obliged, subsumed, alienated, and incorporated in the dominating totality like a thing or an instrument. This oppressed Other ends up either being interned [*encomendado*] on a plantation or hired as salaried labor on estates [*haciendas*] or if an African slave, regimented into factories turning out sugar or other tropical products.²⁶

Surely, these are not the traits that our contemporary scientists would want to celebrate and memorialize by marking the symbolic importance of Columbus Day. I would like to imagine those working on the forefront of space exploration instead being trained, even slightly, on how previous encounters might be perceived cross-culturally. At present, in reviewing the language of SETI talks online and tracking the commemorative practices of space explorers, we can see how Dussel’s analysis resonates strongly, not only about the past frontiers, but about the present off-planet frontiers as well.

“IT’S JUST A MATTER OF SEMANTICS”

In my initial review of the literature on the search for ET intelligence that our working group was asked to read, I was shocked by opaque terms—none more so than “intelligence”—being used casually, as if definition and context were unnecessary.²⁷ In contributing my thoughts to that co-written statement, I felt compelled to express the

matter in the simplest terms: “Cultures are not either intelligent or not.” Astronomers have known for decades that more than 20 percent of the Milky Way’s planetary bodies could support life. That is tens of billions of possibilities for life. That our search has centered on “intelligence” for more than fifty years requires some unpacking. Historically, the words SETI has chosen to explain its goals over time center on “intelligent life” or “intelligence” more broadly, rather than “culture,” for example; and “community” is referenced almost never, nor is any concept of multiple species interrelating, sharing, and negotiating for the purpose of joyful and peaceful coexistence.

The ways in which the word “intelligence” is applied in the description of Breakthrough Listen on the Berkeley Department of Astronomy website seem strikingly out of place, given that leading SETI scientists have looked deeply at intelligence. An almost legendary group of scientists met to talk about how to think of intelligent life as early as 1961; this “Order of the Dolphin” may even be central to SETI’s cosmogony. Additionally, some researchers and spokespeople from The Carl Sagan Institute affirm that they consider meanings of “intelligence” on a spectrum.²⁸ Jill Tarter, perhaps the most important leader of SETI, actually wanted to drop “intelligence” from the name. She thought a more appropriate title would be “the search for technosignatures . . . We use technology as a proxy for intelligence.”²⁹ Examining this proxy substitution and its underlying assumptions is a key aspect of this essay.

SETI focuses on one primary factor to determine intelligent life: technosignatures. As Andrew P. V. Seimion explains, these are a “remotely detectable indicator of technology; and if there is technology then we presume that there was some intelligent life that produced it.”³⁰ He offers an example of our own human technosignatures, radio signals. If radio, electromagnetic, and laser signals all demonstrate evidence of our own species here on earth, then we can assume that extraterrestrials could also produce technosignatures. SETI pulls information from telescopes and observatories across the globe, searching for these spectral residues of intelligent life. I say “spectral” because, as defined, technosignatures may not point to a currently living intelligence, due to the time it takes for radiation leaks, light, transmissions, etc. to travel to our listening posts or observatories. Because I am a social scientist and not an engineer, I cannot comment on the saliency of these hypotheses.

As someone who regularly teaches about the collusion between colonialism and the history of science, I see the larger SETI worldview as humancentric, even though space exploration seems to me the one area of research to avoid human-centrism. If we articulate the search for technosignatures as a marker of intelligence within a Dusselian framework, SETI researchers are literally preparing to cover over, *encubrir*, those Others in space. They are using a measurement, intelligence, designed by a human to measure one aspect of another human, and applying this human evaluative standard to a collectivity (a group of beings, a humanlike society that they understand as “life”). That approach alone would constitute a form of racism, speciesism, and essentialism. Work in humanities and social science fields clearly demonstrates how terms such as “intelligence” carry often-dire unintentional consequences, particularly in situations of first contact. In SETI’s typical view of the cosmos, life is advanced and intelligent if it has developed not merely technology, but a technology that mirrors

human technology on Earth, and specifically technologies from post-industrialized highly capitalist nations. As one SETI scholar recently commented to me, they are simply after technological commensurability, as well as hesitant to engage questions about alien ontology. In an expression of quintessential conquistador egotism, SETI scientists justify their work as being for humanity. In actuality, the core of their work relies upon the centuries-old “Great Chain of Being.”

As Arthur Lovejoy describes in *The Great Chain of Being*, in the sixteenth through the nineteenth century a large swatch of European intellectuals understood our entire system of life as a great chain wherein power and intelligence extended from the highest point (God), down to the most lifeless of substances, rocks.³¹ While sometimes this vertical axis differed in classifying what was considered “real”—angels, saints, demons, the Devil—all had their own link on the great chain. If exploration of new territories was of interest to the scientists, who were attempting to find missing links or to expand their consideration of one of the categories of Being, the one constant was that humans were positioned in the middle of the chain with animals under them, then plants, then rocks, and so on. The Christian bible’s book of Genesis similarly maintains human dominion over nature. Many sixteenth-century people even assumed that aliens would be on the great chain, though there was disagreement on whether they were positioned higher or lower than humans. The prevalent theory was that if they were closer to the sun, then they would be higher—more intelligent.

The Great Chain of Being helps us to understand not only how Europeans perceived the world hierarchically, but also to see how that chain then justified exercises of power. All of the contents within each category had a place below or above another: within the human link, royalty had power over the citizenry, who had power over slaves, for example. Importantly, the Great Chain of Being was not a minority view on the periphery of “Western” philosophy. As Lovejoy shows, the Great Chain was foundational to Aristotle, Kant, Plato, Aquinas, Copernicus, Descartes, Leibniz, Pope, Augustine, Lucretius, Bacon, More, Fontenelle, Darwin, Macrobius, Spinoza, Kepler, Locke, Linnaeus, and Galileo. We can imagine that philosophers and theologians seeking state sponsorship might find a theory that morally justifies exercising power over lower classes of people to be serviceable.

To say that SETI, a collective without official self-representations, embodies such views, would be challenging, however. Rather, my claim here is that SETI and BL are significant examples of contemporary scientific views of the world that place humans at the center of a hierarchical cosmology, rather than among a horizontal and co-constitutive spectrum of variously intelligent lives. Surely, SETI researchers might also want to consider how their assumptions serve political power and corporate interests. Why else would technology be the *sine qua non* of intelligence?

I cannot help thinking of a proposition about human projections of intelligence that I heard from a professor in my graduate program, Donna Haraway. We both have spent years understanding dog training and behavior and have long talked together about dogs. Once, Haraway referenced the dog intelligence lists that many were talking about, which showed that cattle dogs and blue heelers were the most intelligent breeds, followed by border collies, Australian shepherds, standard poodles, huskies,

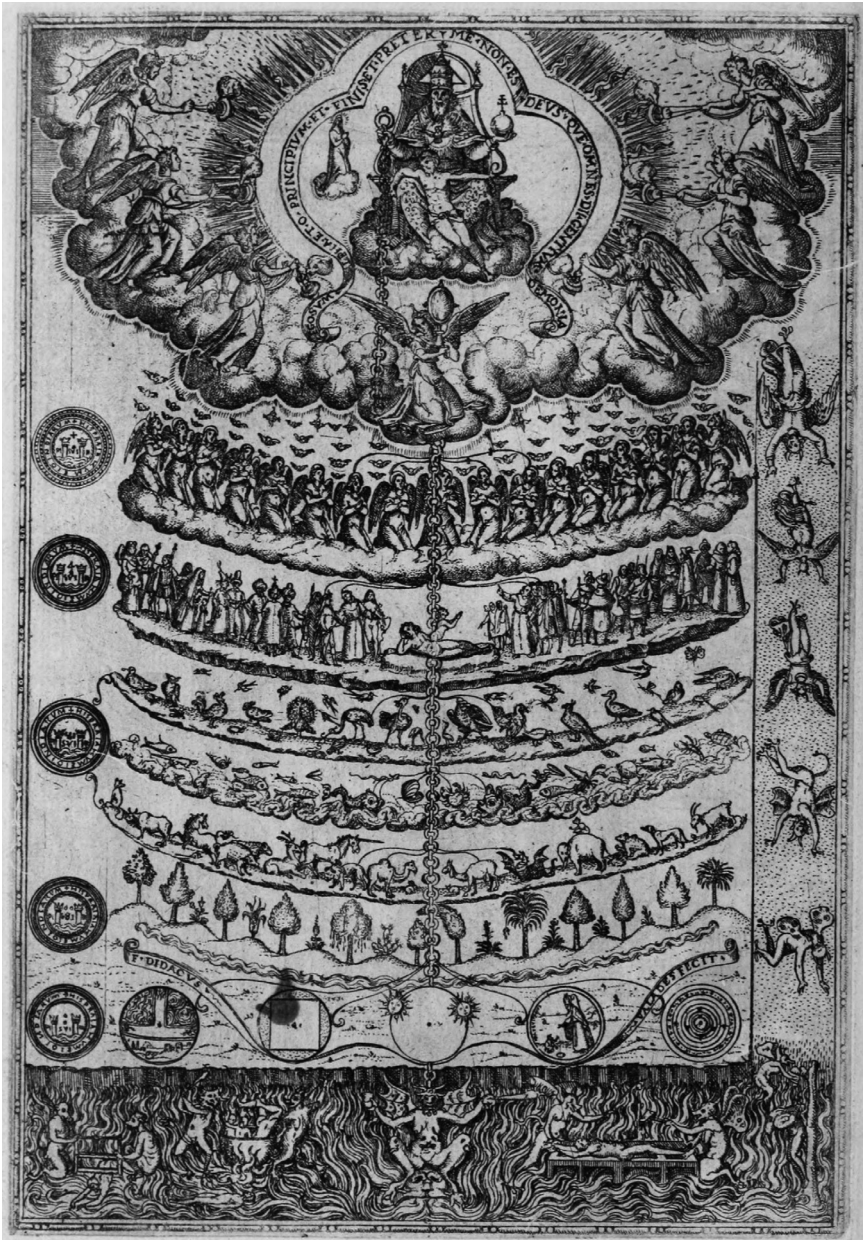


FIGURE 1. Diego Valadés, *The Great Chain of Being* (1579), copperplate engraving, *Rhetorica christiana : ad concionandi et orandi vsvm accommodata, vtrivsq[ue] facultatis exemplis svo loco insertis : quae quidem ex Indorum maximè deprompta svnt historiis : vnde praeter doctrinam, svma quoque delectatio comparabitvr* (Perugia: Petrus Jacobus Petrutius, 1579), available at https://upload.wikimedia.org/wikipedia/commons/b/b5/Great_Chain_of_Being_2.png.

and so forth. These were based in part on evolutionary theories of canine–*Homo sapiens* socialization, the phenology of the distance from the nose to the ears, amount of white hair, and, of course, their propensity for human work. These lists also relied on language-learning capability (different from language acquisition; also, language is a communicative technology, bringing us back to what counts as “intelligent” to BL). The dogs ranked higher could learn the most words or follow human direction better. Haraway expressed frustration that these measurements were human designs applied to dogs and that intelligence was not considered from the dog’s point of view. She and I ponder together: why would we define intelligence as learned obedience to otherwise meaningless cues? Why are we projecting our human definitions of intelligence onto another species?

She suggested that “play” would be a powerful scene to consider. Play is where invention happens. Haraway reflected on an exchange with the well-known interspecies philosopher Vicky Hearne while they watched various dogs do whatever they were interested in: retrievers retrieving, diggers digging, shepherds shepherding, and so on. Where among those activities would we find intelligence, if not in the creativity and impromptu decision-making required of play? In a certain light, the goofy Labrador and golden retrievers who bound into the dog park, roll over and submit quickly, and then begin to play with others, seem more intelligent than dogs who are hyper-focused on obeying their human, or controlling others.³² Rather than the ability to engage in semiotic and mechanical means of production, would not the propensity for pleasure and fun be better evidence of intelligence? I mean, if you know you are going to be fed later, why not have a good day making more joy in your life?

Yet here we are, defining the intelligent life we might find in the cosmos as having, undeniably, technology that looks like ours—because our methods define our results. No wonder Carl Sagan thought aliens are probably avoiding us.³³ To effectively measure intelligence, one would have to agree on the terms of evaluation: linguistic diversity, skill acquisition, intuitive development, a variety of arts, large-scale economic systems, and more. Furthermore, keep in mind that some of these already have been shown to be poor and inadequate indicators of intelligence, easily misrepresented and misunderstood, or impossible to find at all due to the chasm between expectations and reality. The “intelligence” (and related concepts) in SETI and BL statements require contextualization, which would help demonstrate awareness of variables in measuring intelligence. We seem to be seeing the beginning of such conversations in BL materials online. Intelligence should be understood contextually, and so should technology, especially if being used to define the former.

Defining the search for “intelligent life” is reminiscent of another aspect of the Great Chain of Being, one that is very important in my courses on colonialism but not necessarily discussed by Lovejoy. If we draw a horizontal axis halfway down the vertical line, the Great Chain of Being can be transformed into a graph. The horizontal axis demarcates humans in the chain and its length can be understood as time itself, adding a useful temporal dimension to the Great Chain of Being. Humans are not only in the middle of the great chain of being; often, we are perceived as slowly becoming more civilized over time also, so that in this view, we are moving forward from prehistoric

times, evidencing progress and industriousness, traveling toward the elusive state of perfection. Where the vertical and horizontal axes intersect could be seen as “now,” the present. Those trained in historiography know this as the “progressivist, civilizational” trope that has so inundated our cultural ideology; many historical narratives, for example, are based on characters, including heroes, groups of people, and nation-states, moving from one state of social evolution to a newer, better one. I struggle to see how SETI is not simply using intelligence, or a proxy for “intelligent life,” as a stand-in for “progressive civilization,” despite its suggested reorientation to technology.

Moreover, to adopt the contrary view, that ETs somehow are more advanced than earthlings, simply duplicates the Noble Savage paradox, leading to further dangerous misconceptions and projections. To put Others on a pedestal for their lack of capitalist infection simply flips the notion that another is more, or less, worthy of coeval relating. Even if some scientists presume that ETs might be more intelligent, as Sagan regularly hypothesized, the absence of ETs from visitable and viewable spaces has led to the prospecting and scientific experimentation we see taking place among the international space station, Mars expeditions, and soon, the Jeff Bezoses and Elon Musks of the world. We should also keep in mind that one prime argument for the colonization of land has always been that the land is empty or not used productively. That worldview is evolutionary in that it relies on a particular understanding of presence, intelligent, civilized habitation, and resourceful usage.

Graphing the Great Chain of Being offers a useful tool for conceptualizing how humans see themselves positioned for a range of ethical acts—including animal testing, dietary choices, and social comparisons. I have turned to the graph for decades when

Great Chain of Being

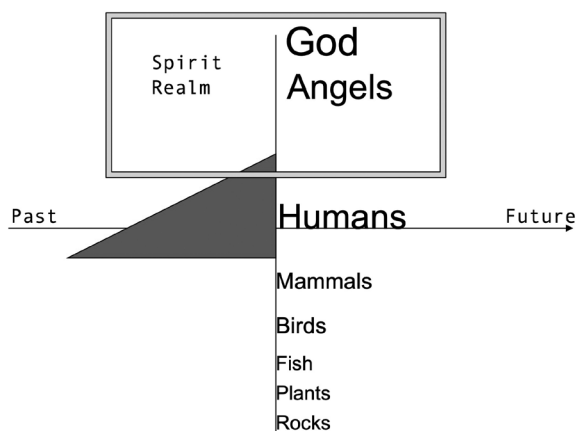


FIGURE 2. Author’s visualization of the Great Chain of Being with time axis and representations of Indigenous people.

teaching about how Indigenous people have been represented in literature, news, and film. The red triangle above represents how settlers like to imagine Native people: behind them in terms of civilization, below them in terms of societal advancement, or, in the rare instances that assume contemporaneity, perhaps above settlers in terms of not being tainted by capitalism or materialism. Among financially successful films we are still more likely to see Indigenous people in animal skins, or on a hunt, than Native characters who are running corporations, using technology, or developing cutting-edge research methods.³⁴ Capitalist success demarcates “modern” people. Settler societies cannot afford to perceive Indigenous communities as coeval and contemporary, since otherwise settler pretenses and acts of charity would be seen and felt, viscerally, as colonialism.

From mascots to plastic medicine men, we value the Indigenous person who is behind us, immaterial, perhaps a great-great-grandparent or a percentage on our ancestry tests. In the United States, Indigenous stereotypes remain important to the myths of the melting pot and manifest destiny, fantasies that many people support by conceiving of the Indigenous person between them and their cavemen ancestor, closer to the land or animals, or closer to a spiritual world. As those of us who have worked in Indigenous studies can attest, once we begin to account for precolonial seafaring, meteorology, herbalism, physics, medicine, and on and on, settler science can be understood as part of the colonial order to erase, replace, or cover over. From controlled burning to strategic hunting, from nonliterate historicity to agricultural practices, allegedly advanced methods often must catch up to precolonial practices.

To extend this line of thinking to nonhumans, we must be cautious of applying human standards to nonhuman contexts. Excellence in one measure (time/space/dimensional travel or long-range signaling) does not mean advancement in anything else. Contact between cultures is highly shaped by fantasies, fears, and expectations of otherness. Our working group members could have spoken at length about contact scenarios throughout history on multiple continents, recounting stories told both before and after previous contacts, by both contactees and contacters. Understanding these “contact zones” is our professional bread and butter. We unequivocally expressed in our presentation that BSRC scientists were setting themselves up for quite a surprise if they think that an entire culture, civilization, or population is “more advanced,” or less so, in a wholesale comparative manner.

In considering extraterrestrial lives, that is, the possibility of many vastly different lives from different times and places, the possibility of non-carbon-based lifeforms, nonhumanoid lives, multiple intelligences, as well as other alternatives, we must consider how our expectations define how we see, hear, and possibly contact. Most ufologists, and even the scientists working for SETI and BL, seem to rely on standards that are culturally specific and formed out of a meta-paradigm. In my work with healers, with Native peoples, and as a Native studies scholar, I have come to the undeniable conclusion that materialism and its brother, “objective science,” are meta-paradigms that threaten a habitable planet and produce limited results in our attempt to not only understand our worlds, but also to be in good relations. As Thomas Kuhn wrote, while we might recognize that paradigms (such as an understanding of cultural categories

or a scientific method) will shift, we rarely recognize how meta-paradigms shift, since our practices of making and sharing scientific knowledge are rooted in both historically limited group-think (peer review) and precedented methods (assuming that what was right before is still correct now).³⁵ More importantly, barring rare scientific “a-ha moments,” meta-paradigms shift perhaps only every two hundred years, at least. No one can see such shifts within one lifetime, or even a few generations. The peer-reviewed, double-blind study, demonstrating proof of a scientific theory, is by its own method only temporarily significant. Several hundred years is not a very long time in the long duration of galaxies, black holes, wormholes, planets, and anthropocenes. More can, and should, be done to think outside of the anthropocentric and progressivist box when we contemplate these subjects.

In this light, non-Indigenous communities may not be as well prepared as Indigenous communities to narrate, account, and interpret long-term, slow shifts over generations. The extremely long history of Earth's Indigenous peoples co-constituting and relating with their nonhuman relatives cannot be denied, regardless of how we delineate who constitutes an Indigenous community.³⁶ It seems evident that the group of people on the forefront of extraterrestrial societal contact should be in conversation with the people who have developed long-term, even ancient, methods of living in their changing environments. These are the same people who have extensive and reliable modes of historical knowledge making. These are the same people who have encountered multiple contacts and learned difficult lessons from those encounters and settlements. Some have their own histories of ET life. The Indigenous Yoeme (Yaqui) community, where I worked for decades, told of their protohuman ancestors who went into the cosmos and would someday return. These telepathic “little people” knew a great deal about relating and communicating with other species, but probably not how a microwave oven worked. In considering their short protohuman ancestors and the contemporary Yoeme, which group would be classified as more or less intelligent than other societies?

Much of the extraterrestrial-themed literature has failed to recognize that the life in other dimensions or galaxies might not in fact be carbon-based, might not rely on our laws of physics, and might not share any of our biological or psychological needs and desires. Stories from Indigenous communities around the globe include contacting and relating with other-than-human life. When we conceive of bodies and intelligences as having certain characteristics and functions, we mostly develop expectations that are *Homo sapien*-centric and culturally biased as well. As the alleged intelligent life of this planet, humans are still in disagreement about what our bodies can do, causing much disagreement about what comes before we are born or after we die, or even what constitutes a fully lived “life.” Allopathic medicine often fails to consider the individual as more than a collection of physiological responses. Yet, as some people around the world are aware, humans and others are more than their physicality. Any concept of a “being” should be open to including telepathic, energetic, nonlocal, collective, and empathetic dimensions, among many others. Before contacting aliens, we should probably learn about how human-animal, human-plant, and human-rock communication have been fostered by Native communities, and do so without the dismissive notions that these are folklore or pre-modern or religious thinking.

When SETI and BL scientists create tools for finding possible signals, then set standards for what counts as communication, they are relying on a settler science of physics. By way of analogy, consider how contemporary medical science relegates certain views of corporeality as folklore or new age nonsense. Allopathic doctors, as they are currently trained, have difficulty valuing the contributions of traditional Chinese medicine (TCM), which conceives of the body as having channels, meridians, and winds. Yet, by the numbers, TCM has helped more people than radiology has, having existed since approximately 2000 BC.³⁷ Is one system simply wrong, or are US medical schools favoring an approach to medicine and healing that is devoted almost entirely to the physical/objective approach? Accentuating only the physical aspect of health makes sense, since capitalism relies on objects or mediated forms on which to place value. The capitalist forms of pharmacological corporations and the healthcare industry resist non-object-oriented health care. The singular focus on the physicality of the body dialectically relates to the tools that medical schools use to measure health and the quality of life. The methods shape the results: surgeries, pills, physical therapy. A scientific approach built solely on objective and objectivist paradigms is bound to reproduce the same conclusions: that life is in its thing-ness and not in the immeasurable qualities of relating.

While making such claims about ways of knowing, we must avoid dichotomies such as, “bad settler science” versus “important but unscientific Indigenous people’s viewpoints.” Who is attracted to, recruited to, and afforded STEM training in colleges has a direct consequence on who become the published and cited scholars invited to such institutes as SETI and in programs such as BSRC. Because their cultural worldviews are often dismissed early in their educations, Indigenous students are regularly led to choose non-STEM educational paths. While we have seen more Indigenous people and perspectives engaged in both hard and social sciences, the current need for Indigenous co-design and collaboration remains.³⁸ Some outstanding examples demonstrate the value of developing tandem theories and methods among multiple communities.³⁹ Among the few forums devoted to indigenizing STEM are the Summer Internship for Indigenous Peoples in Genomics (SING) and the concentration on Indigenous People and Technoscience at the University of Alberta. There, Drs. Jessica Kolopenuk and Kim TallBear are helping students better understand how scientific methods must be understood historically in relation to colonialism and imperialism. Ray Norris (chief research scientist at the Council for Scientific and Industrial Research) has decades of work with the Aboriginal Astronomy Project which collaborates across Australia. Aradhna Tripathi has developed collaborative relationships with Indigenous studies programs and Indigenous communities at UCLA’s Center for Diverse Leadership in Science.⁴⁰ Such programs dare to suggest that many ways of knowing can improve, if not constitute, science. Much depends on what counts as science and what counts as “life.”

THINKING BEYOND THE HUMAN

Here lies the crux of major disagreements between STEM knowledge making and many Indigenous knowledge-making practices, as I, a settler who attempts to make good kin with Indigenous people, have come to understand them: if the scholarly

world, and the best practices for discerning truth, rely solely on an object-oriented epistemology, then we disagree on ontological matters, about what or who is “real.” If we cannot see any common ground on ontology, then we have little hope of agreeing on axiology, how to value and establish moral action. The burgeoning field of multispeciesism is born from a conjunction between science studies, ethnographic methods, theories of ontology, and Indigenous studies. From that literature, we have learned much about how other societies understand relations “beyond the human,” meaning with rocks, plants, landscapes, planets, meteorological events, and of course, animals.

What object-oriented science has considered “material reality,” small-scale societies, primarily oral peoples, and many Indigenous communities, among others, have understood intersubjectively. Put another way, human health and illness are inextricably linked to our relations with the elements, meteorological events, and our balance with others, including other-than-human persons. Some of these intersubjective approaches to health are indeed aboriginal (the term “New Age” mislabels many of the ways of knowing that are the opposite of new). To avoid falling into binary thinking, such as truth vs. folklore, bear in mind that many of these same communities understood categorical differences between “sayings,” “tales,” and “knowledge;” and they saw knowledge as changing over time as well.

Central to these ontological perspectives about the world is the recognition that “things” might not be “things” at all. As one particular form of technology, communication structures culture and enables humans and others to foster intersubjectivity through their play with signification systems.⁴¹ A few examples may help illustrate my point. For the Tlingit people, glaciers have been communicating since before Europeans came around.⁴² Some Quichua speakers in the Amazon can communicate with plants, trees, the soil, and even the animals sharing that particular perceptive ecology.⁴³ My work with the Yoeme enabled me to experience firsthand how flowers, animals, and humans can sustain forms of communication and intersubjective agency.⁴⁴ For some Kashaya Pomo, baskets can diagnose and treat patients.⁴⁵ The ability of the baskets to do so seems to flow from a combination of the physiology, intentions, and abilities of the plants from which their strands grew as leaves. These encompass the plants’ relations with the pollinators, organic allies, and humans; the process of the baskets being made with intent through intersubjective artistry (basket weaving); and their ritual use in maintaining healthy social relations, which support healthy individuals. The ontological research rarely claims that all objects have the ability to communicate, but rather that certain Indigenous communities, through their languages, have a perceptual door open that most European-based languages and cultures keep firmly shut.⁴⁶ For A. Irving Hallowell in particular, grammatical categories of nouns that are animate (rather than inanimate) provide the option for language speakers to perceive some nonhuman persons as exercising will, intention, and ability.⁴⁷ Such perception enlarges our ability not only to see life differently, but to appreciate the ways that organisms act intelligently.

We have only recently been afforded glimpses into the complexity and intelligence of octopuses, who show signs not only of higher order reasoning, but perhaps even consciousness.⁴⁸ Carrion crows have recently been shown to demonstrate neuronal responses in the palliative end brain, correlating with sensory consciousness as well.⁴⁹

While the large-brained octopus can easily be perceived as intelligent life, considering plants takes us down the Great Chain of Being. And yet, Monica Gagliano has demonstrated scientifically that some plants remember and learn, essentially making decisions.⁵⁰ She reminds us that the Latin etymology of the word “intelligence” means “choosing between.” Gagliano’s studies of plants brings this objective science into intersubjective territory. If only they produced technosignals, then they might be understood as intelligent.

Much of this final section constitutes a form of analogic thinking not too far afield from *The Order of the Dolphin*: if plants and what many call “nature” (including rocks, landscapes, groves, rivers, etc.) are alive and capable of intelligence and emotion, then we must collectively reconsider what we consider life on other planets, and what we consider intelligent life. Not doing so, not attempting to think beyond the human, invites the question of how “advanced” we ourselves are as a society, and whether we should use our own model as a standard for the civilizations we hope to perceive. How can we be drawn ethically to pursue the next frontier honestly without examining our own history of societal contact and colonization? Our working group offered perspectives based on work among Indigenous communities and our knowledge of Indigenous studies methods and theories.

In some ways, we wanted to lay out our case in terms that were likely to be understood, by comparing it to institutional review boards. We explained how our universities require us to prove not simply that our research is unlikely to be harmful, but that we most definitely would mitigate any and all risk of causing harm to our collaborators. We wanted to convey that the responsibility was on the BL, BSRC, and SETI scientists to clearly state their intentions for contact and how their methods for listening were safe and ethical. The response we received from them was simple: how could just listening be harmful? Their question (in response to our question) demonstrates that we are still very far from the establishment of any sort of BL administrative body that would research and determine guidelines for what safe and ethical practices look like in their research. We still cannot agree on the salience of the question. We were hoping to be taught by BSRC members how they know that their listening is ethical. We were trying to make this case when a technological failure enabled them to eavesdrop on our conversation, constituting a form of surveillance and an acoustic power difference between those who had the power to hear and those powerless to avoid being heard, much less contacted. Intent is indeed powerfully constitutive of social relations. As I often heard in a dear Navajo family’s household, “how things start are how they will end.” With such human-centric notions of “intelligence,” “life,” and “advancement,” the scientists at the forefront of the search for life on other planets seem well prepared to cover over other life with the same European ego that still fails to encounter the diversity of life on this planet.

HEARING RESONANCE

How communications are heard depends greatly on shared signifiers between signalers and their audiences. Talk of “frontiers” and “exploration” rings suspiciously in my ears,

much like when politicians and university administrators ask activists to be more “civil,” stirring up all the progressivist ways that “civilized” aligns with ethnocentric, settler colonialism. I grew up on one frontier, that of the US Southwest, and my first book was based on a larger overlapping one, that of New Spain.⁵¹ In the sixteenth century, setting out into the New World’s frontier entailed Spanish surveillance, projections, prospecting, cultural comparisons, and a series of disasters for Indigenous people. Earlier Aztec imperialism of wide swaths of Mexico surely entailed the same. In almost every case study of colonialism, resource extraction and slave labor soon followed. In this article, I have aimed to cover a handful of ways that current space exploration dangerously seems to duplicate earlier frontier missteps, including reliance on ethnocentric standards of evaluation and pursuits in science.

Embedded in a frontier itself, my family’s history remains entangled in the cultural and geographic history of the borderlands, between the United States and Mexico, between the past and the future. Our home has been the site of Indians and cowboys, humans and aliens, settlers and Natives, all vying for a place to call their own—and maybe dominate. I was raised by family members who thought of military personnel as trespassers on their land. They talked frequently of the rich white people coming to buy up all the land and gentrify the “Land of Enchantment,” New Mexico’s state motto. Truthfully, my Spanish and Mexican relatives had displaced Indigenous people in a previous century. They just moved to where it seemed there were no people or where the land was not being cultivated. As the government seized land to build the current Air Force bases and missile ranges, the displaced locals’ suspicions of the government festered into outright distrust, shaping communities where today, the politically far right reaches all the way around to meet the far left. Susan Lepselter’s nuanced understanding of these borderlands rings particularly true:

[T]he desert here is filled with resonating, layered tropes in a colonized land. The Native people who lived in this place were no longer visible in many of the small towns dotting ambiguous territories between ranchland and military bases of the West, but their traces were central to its identity. . . . Here we see fallout from the unfinished accountability of historical human displacement, and ambivalent alignments with just what the natural might be, in the over-written, lived-in, secretive, and militarized West.⁵²

Many of us, Indigenous and not, stand in this fallout, waiting for accountability.

In this essay, I have aimed to trace some of the alignments between the amorphous and agentless bodies of government, science, and colonialism. I have used my very slim engagement with Breakthrough Listen, and tangentially, BSRC and the SETI Institute, as an opportunity to work against further Indigenous erasure by centering Indigenous studies perspectives in a conversation that seems to want to disappear Native peoples. Indigenous concerns were disappeared from *Arecibo*; Indigenous people were disappeared from the film *Contact*; and Indigenous studies mostly has been absent from the professional search for extraterrestrial life. To counter these absences, this apophenia has intended, in Lepselter’s words, to naturalize patterns that normally go without saying. I have traced certain words to their uses in previous centuries, as well as

the lacunae between their speakers' intents and the societal results. If this essay has seemed disjointed, perhaps we are best-served by adjusting the expectations for a tidy resolution. As Lepselter explains about apophenia, "the product is never finished. . . . Here each found or revealed sign leads to other resemblances, other openings."⁵³ The most we can hope for from apophenia is resonance, or "the social affective, and aesthetic dimension of a perspective found in apophenia."⁵⁴ Colonialism and tropes of manifest destiny have moved from the horizontal plane to the vertical exploration, differently affecting settler scientists and Indigenous peoples. The discourse of intelligence, civilization, and progress resonates strongly among colonial endeavors. Can we begin to signal and attune our hearing any other way?

These odds and ends have led to a chord that sounds like a call outward into the void, an acoustic mirroring of Breakthrough Listen and SETI. We already know the subaltern can speak; we do not know who can hear and whether they can listen.⁵⁵ By directly addressing the history of colonialism, and by making good relations with the original communities and nations of our planet, we can ethically explore space and perhaps contact life on other planets. Nevertheless, to listen ethically means hearing those who have already been "advanced" at understanding how we sense, who is alive, and how intelligence presents itself in a variety of forms. The longevity of life on earth depends on settler science recognizing the practical, logical, and related knowledge-making practices of Indigenous people.

Acknowledgments

I would like to thank Madelyn Boots, Kathryn Denning, Donna Haraway, and Anthony Webster for their help in some of my perspectives and phrases. Missteps in my thinking remain fully my own.

NOTES

1. YouTube, "Rocket Sled Test by Human Factors Pioneer John Paul Stapp 3099," uploaded by PeriscopeFilm on May 18, 2014, <https://www.youtube.com/watch?v=u4Zp4skb1ks>.
2. Carl Sagan and William I. Newman, "The Solipsist Approach to Extraterrestrial Intelligence," *Quarterly Journal of the Royal Astronomical Society* 24 (1983): 113–21, [https://doi.org/10.1016/0198-0254\(83\)96683-9](https://doi.org/10.1016/0198-0254(83)96683-9).
3. Quoted in Séverine Kodjo-Grandvaux, "Colonialism, the Hidden Cause of Our Environmental Crisis," *WorldCrunch*, February 12, 2020, <https://worldcrunch.com/culture-society/colonialism-the-hidden-cause-of-our-environmental-crisis>.
4. Robert J. C. Young, *Postcolonialism: An Historical Introduction* (Hoboken, NJ: John Wiley & Sons, 2001); Patrick Wolfe, "Settler Colonialism and The Elimination of the Native," *Journal of Genocide Research* 8, no. 4 (2006): 387–409, <https://doi.org/10.1080/14623520601056240>; Michael Taussig, *Shamanism, Colonialism, and the Wildman: A Study in Terror and Healing* (Chicago, IL: University of Chicago Press, 1987).
5. My use of "scientific" comes from Sharon Hill's exploration into amateur research and investigation groups who strategically use scientific terms and concepts to bolster their claims on the paranormal, including the Mutual UFO Network, ghost hunters, Sasquatch trackers, and

cryptozoology. See Sharon Hill, *Scientifical Americans: The Culture of Amateur Paranormal Researchers* (Jefferson, NC: McFarland & Company, Inc., 2017).

6. L. S. Shklovskii and Carl Sagan, *Intelligent Life in the Universe* (San Francisco: Holden-Day, Inc., 1966), 453–64).

7. See SETI Institute, “The UAP Story: The SETI Institute Weighs In,” June 25, 2021, www.seti.org/press-release/uap-story-seti-institute-weighs.

8. For an exception to the view of contact as an event, see Milan M. Cirkovic, “Is Contact a Process?” *Space Policy* 42 (2017): 103–8, <https://doi.org/10.1016/j.spacepol.2017.05.001>. My use of “meaningful” stems from SETI supporters responding to these criticisms by pointing to a handful of SETI talks in the last five years, the often-journalistic writing of two or three SETI affiliated scholars, or those few official SETI or NASA publications in the last fifty years. See John Billingham, Roger Heyns, David Milne, Stephen Doyle, Michael Klein, John Heilbron, Michael Ashkenazi, Michael Michaud, Julie Lutz, and Seth Shostak, *Social Implications of the Detection of an Extraterrestrial Civilization* (Mountain View, CA: SETI Press, 1994); and *Archaeology, Anthropology, and Interstellar Communication*, ed. Douglas A. Vakoch (Washington, DC: NASA Office of Communications, 2014).

9. Susan Lepselter, *The Resonance of Unseen Things: Poetics, Power, Captivity and UFOs in the American Uncanny* (Ann Arbor: University of Michigan Press, 2016).

10. *Ibid.*, 150.

11. *Ibid.*, 4.

12. While SETI Institute scientists are without exception STEM-trained, I must be clear that many scholars both inside and outside of STEM have been attempting interdisciplinary interventions. Due to funding silos across partitioned disciplines, leadership and administrative instability at SETI Institute, and substantive debates about the value of the “soft sciences,” core interdisciplinary engagement still remains to be seen. Just a few of those scholars doing interdisciplinary SETI scholarship (including the social sciences and humanities) include Lucianne Walkowicz, the Baruch S. Blumberg NASA/Library of Congress chair in Astrobiology at the Library’s John W. Kluge Center; Michael Oman-Reagan; and Claire Webb.

13. *Alien*, dir. Ridley Scott (Twentieth Century Fox, 1979); *E.T., The Extraterrestrial*, dir. Steven Spielberg (Universal City Studios, Inc., 1982); *Close Encounters of the Third Kind*, dir. Steven Spielberg (Columbia Pictures, 1977).

14. Among many others, see Carl Sagan, “Carl Sagan on the Tonight Show with Johnny Carson,” May 20, 1977, *YouTube*, 13:33, <https://www.youtube.com/watch?v=0YRZqI9tjU4>; “Carl Sagan on *The Tonight Show* with Johnny Carson,” March 2, 1978, *YouTube*, 15:44, <https://www.youtube.com/watch?v=g-Q8aZoWqF0>; *Cosmos: A Personal Journey*, Carl Sagan, Ann Druyan, and Steven Soter, dir. Adrian Malone, PBS documentary television series (1980), available as Collector’s Edition DVD (Studio City, CA: Cosmos Studios, 2000).

15. *Contact*, James V. Hart and Michael Goldenberg, dir. Robert Zemeckis (Warner Bros., 1997). The feature film *Contact* is based on Carl Sagan’s science fiction novel of the same name (New York: Gallery Books, 1985).

16. Some exceptions stand out, including Linda Billings, “Colonizing Other Planets Is a Bad Idea,” *Futures* 110 (2019): 44–46, <https://doi.org/10.1016/j.futures.2019.02.020>; Kathryn Denning, et. al., “SETI and Post-Detection: Towards a New Research Roadmap,” 70th International Astronautical Congress, Washington, DC, October 21–25, 2019, <https://iafastro.directory/iac/paper/id/52210/summary/>; and Kathryn Denning and Steven J. Dick, “Preparing for the Discovery of Life Beyond Earth,” *Bulletin of the AAS* 51, no. 7 (2019), <https://baas.aas.org/pub/2020n7i183>. SETI Institute does host several outreach programs designed to engage those outside of STEM fields, though those examples are few. For example, their Artists in Residency program aims to facilitate

exchanges between SETI researchers and artists. Mostly, SETI outreach serves to share their non-interdisciplinary work to broader audiences, such as Star Trek fans, libraries, Silicon Valley, and on social media as well.

17. David Vine, "Most Countries Have Given Up Their Colonies. Why Hasn't America?" *The Washington Post*, September 28, 2017, <https://www.washingtonpost.com/news/made-by-history/wp/2017/09/28/most-countries-have-given-up-their-colonies-why-hasnt-america/>.

18. D. Anish Roshi, et al., "The Future of the Arecibo Observatory: The Next Generation Arecibo Telescope," White Paper, vers 2.0, February 1, 2021, http://www.naic.edu/NGAT/NGAT_WhitePaper_v2_01022021.pdf.

19. *Ibid.*, 37.

20. Of course, grant writing is a particular genre that often necessitates broad claims of significance, but here at least one STEM grant writer clearly feels we need more evidence to support caring for Earth.

21. Dava Sobel, "Is Anybody Out There?," *Life Magazine* (September 1992): 60–7, <https://doi.org/10.1038/464034a>.

22. Sarah Scoles, "Yuri Milner and the Fellowship of Silicon Valley Science Influencers," *Wired* magazine (November 10, 2017), <https://www.wired.com/story/yuri-milner-and-the-fellowship-of-silicon-valley-science-influencers/>.

23. For a deeper analysis of how frontier ideologies inform space exploration, see Linda Billings, "Overview: Ideology, Advocacy, and Spaceflight—Evolution of a Cultural Narrative," in *Societal Impact of Spaceflight*, ed. Steven J. Dick and Roger D. Launius (Washington, DC: NASA Office of External Relations, History Division, 2007), 483–99.

24. Enrique Dussel, *The Invention of the Americas: Eclipse of the Other and the Myth of Modernity*, ch. 2 (London, UK: Continuum, 1995).

25. Andrés Reséndez, *The Other Slavery: The Uncovered Story of Indian Enslavement in America* (Boston, MA: Mariner Books, 2016).

26. Dussel, *The Invention of the Americas*, 39.

27. See the description of Breakthrough Listen on the website of the Berkeley Department of Astronomy, University of California Berkeley Department of Astronomy, "Breakthrough Listen Initiative," <https://astro.berkeley.edu/research-facilities/projects/breakthrough-listen/>, also quoted in the discussion of the Working Group Statement reprinted on page 10 of this special issue.

28. Those interested can find online the recording of a SETI panel that includes comments on different types of intelligence (*YouTube*, "Carl Sagan Institute LIVE- March 2020," Carl Sagan Institute, March 1, 2020, <https://www.youtube.com/watch?v=691VUrmz478>). Via another (audio) recording available online, you can hear Jaan Tallinn from the Future of Life Institute discuss multiple intelligences, including artificial intelligence. See Lucas Perry, "Jaan Tallinn on Avoiding Civilizational Pitfalls and Surviving the 21st Century," Future of Life Institute, April 20, 2021, <https://futureoflife.org/2021/04/20/jaan-tallinn-on-avoiding-civilizational-pitfalls-and-surviving-the-21st-century/0>).

29. Calia Cofield, "'Search for Extraterrestrial Intelligence' Needs a New Name, SETI Pioneer Says," *Space.com*, January 25, 2018, <https://www.space.com/39474-search-for-extraterrestrial-intelligence-needs-new-name.html>.

30. SETI pulls data from the Very Large Array in New Mexico and the Allen Telescope Array in Hot Creek, California, and soon also from satellites with laser SETI (SETI Institute, "SETI Talks: Who is the SETI Institute?," October 6, 2020, <https://www.seti.org/event/seti-talks-who-seti-institute>).

31. Arthur O. Lovejoy, *The Great Chain of Being: A Study of the History of an Idea* (Cambridge, MA: Harvard University Press, 1971).

32. For more on play as intelligence in canines, see Donna Haraway, *When Species Meet* (Minneapolis: University of Minnesota Press, 2007).

33. Sagan and Newman, “The Solipsist Approach,” 120. See also L. S. Shklovskii and Carl Sagan, *Intelligent Life in the Universe* (San Francisco: Holden-Day, Inc., 1966). In one of the most focused studies of ET intelligence, Shklovskii and Sagan posit that one factor stands out as an important characteristic of intelligence: seeking to control. They briefly consider that other pursuits might prove a mark of intelligence, but abandon that line of inquiry as not having any specialists in this area (360–61).

34. For an analysis of some recent changes to stereotypes and tropes of Native persons in contemporary popular long-form television series, however, see Courtney Elkin Mohler, “Playing (the Casino) Indian: Native American Roles in Peak TV,” *American Indian Culture and Research Journal* 44, no. 4 (2020): 79–100, <https://doi.org/10.17953/aicrj.44.4.mohler>.

35. Thomas Kuhn, *The Structure of Scientific Revolutions*, 3rd ed. (Chicago, IL: University of Chicago Press, 1996).

36. See also Kathryn Denning, “How Humans Matters Now: The Relevance of Anthropology and Archaeology for the new SETI,” <https://daiworkshop.seti.org/sites/default/files/workshop-2018/Denning%20-%20How%20Humans%20Matter%20Now%20-%20The%20Relevance%20of%20Anthropology%20and%20Archaeology%20for.pdf>.

37. See Paul Unschuld, *Huang Di Jing Su Wen: Nature, Knowledge, Imagery in an Ancient Chinese Medical Text* (Berkeley: University of California Press, 2003).

38. Adam R. Pearson and Jonathan P. Schuldt, “Facing the Diversity Crisis in Climate Science,” *Nature Climate Change* 4 (2014): 1039–42, <https://doi.org/10.1038/nclimate2415>.

39. See Katrina G. Claw, Matthew Z. Anderson, Rene L. Begay, Krystal S. Tsosie, Keolu Fox, Nanibaa’ A. Garrison, and Summer internship for INdigenous peoples in Genomics (SING) Consortium, “A Framework for Enhancing Ethical Genomic Research with Indigenous Communities,” *Nature Communications* 9, no. 2957 (2018): 1–7, <https://doi.org/10.1038/s41467-018-05188-3>; David S. Edmunds, Ryan Shelby, Angela James, Lenora Steele, Michelle Baker, Yael Valerie Perez, and Kim TallBear, “Tribal Housing, Co-Design, and Cultural Sovereignty,” *Science, Technology & Human Values* 38, no. 6 (2013): 801–28, <https://doi.org/10.1177/0162243913490812>; Adam Gaudry and Danielle Lorenz, “Indigenization as Inclusion, Reconciliation, and Decolonization: Navigating the Different Visions for Indigenizing the Canadian Academy,” *AlterNative* 14, no. 3 (2018): 218–27, <https://doi.org/10.1177%2F1177180118785382>; Ian Mosby, “Administering Colonial Science: Nutrition Research and Human Biomedical Experimentation in Aboriginal Communities and Residential Schools, 1942–1952,” *Histoire Sociale/Social History* 46, no. 1 (2013): 145–72, <http://doi.org/10.1353/his.2013.0015>; Ricardo Ventura Santos, Michael Kent, and Verlan Valle Gaspar Neto, “From Degeneration to Meeting Point: Historical Views on Race, Mixture, and the Biological Diversity of the Brazilian Population,” in *Mestizo Genomics: Race Mixture, Nation, and Science in Latin America*, ed. Peter Wade, Carlos López Beltrán, Eduardo Restrepo, and Ricardo Ventura Santos (Durham, NC: Duke University Press, 2014), 33–54; Daniella Scalice and Alice Carron, “Crossroads and Connections: An Evolving Relationship between NASA and the Navajo Nation,” *Science Education and Outreach: Forging a Path to the Future* 431 (2010): 217–22, <https://ui.adsabs.harvard.edu/abs/2010ASPC..431..217S/abstract>; Kim TallBear, “Indigenous Scientists Constitute Knowledge across Cultures of Expertise and Tradition: An Indigenous Standpoint Research Project,” in *Re:Mindings: Co-Constituting Indigenous, Academic, Artistic Knowledges*, ed. Johan Gärdebo, May-Britt Öhman, and Hiroshi Maryuama (Uppsala, Sweden: Uppsala University, 2014), 173–91.

40. Dr. Aradhna Tripathi’s Center for Diverse Leadership in Science at UCLA is also working to recruit and retain Indigenous students into a STEM training that reflects cultural protocols. Their

environmental justice and First Nations outreach entails collaborating with the United American Indian Involvement, Inc., the Navajo Technical University, and Indigenous knowledge-bearers. See David Colgan, "New Center at UCLA Raises Everyone's Voices for Environmental Science," July 13, 2017, UCLA Newsroom, <https://newsroom.ucla.edu/stories/new-center-at-ucla-raises-everyones-voices-for-environmental-science>.

41. Languages are structures but also changing, enabling human invention, play, and restructuring. They have a physical form as in writing and immaterial forms such as their sounds, significations, and affects.

42. Julie Cruikshank, *Do Glaciers Listen? Local Knowledge, Colonial Encounters, and Social Imagination* (Toronto, Canada: University of British Columbia Press, 2014).

43. Eduardo Kohn, *How Forests Think: Toward an Anthropology Beyond the Human* (Berkeley, CA: University of California Press, 2013).

44. Felipe S. Molina and David Delgado Shorter, "'The Living Beautiful Part of Our Present World': The Yoeme Sea Ania (Flower World)," in *Flower Worlds: Religion Aesthetics, and Ideology in Mesoamerica and the American Southwest*, ed. Michael D. Mathiewetz and Andrew D. Turner (Tucson: The University of Arizona Press, 2021), 70–86.

45. Greg Sarris, *Mabel McKay: Weaving the Dream* (Berkeley: University of California Press, 1997).

46. A. Irving Hallowell, "Ojibwe Ontology, Behavior, and World View," in *Contributions to Anthropology: Selected Papers of A. Irving Hallowell*, ed. Raymond D. Fogelson (Chicago, IL: University of Chicago Press, 1976); Kenneth M. Morrison, "Animism and a Proposal for a Post-Cartesian Anthropology," in *The Handbook of Contemporary Animism*, ed. Graham Harvey (London, UK: Routledge, 2015), 38–52.

47. Without embarking on a tangential overview of Hallowell's contributions to ontology more broadly, he argues that language provides humans with the ability to rationalize their actions and vice versa, whether consciously or unconsciously.

48. Peter Godfrey-Smith, *Other Minds: The Octopus and the Evolution of Intelligent Life* (Cork, Ireland: Collins Press, 2017).

49. Andreas Nieder, Lysann Wagener, and Paul Rinnert, "A Neural Correlate of Sensory Consciousness in a Corvid Bird," *Science* 25 vol. 369, no. 6511 (2020): 1626–29, <https://doi.org/10.1126/science.abb1447>.

50. Steve Paulson, "Guided by Plant Voices," *Nautilus*, April 29, 2020, <https://nautilus.us/issue/84/outbreak/guided-by-plant-voices>.

51. David Delgado Shorter, *We Will Dance Our Truth: Yaqui History in Yoeme Performances* (Lincoln: University of Nebraska Press, 2009).

52. Lepselter, *The Resonance of Unseen Things*, 83.

53. *Ibid.*, 4.

54. *Ibid.*

55. Gayatri Spivak, "Can the Subaltern Speak?" in *Marxism and the Interpretation of Culture*, ed. Cary Nelson and Lawrence Grossberg (Urbana: University of Illinois Press, 1988), 271–313.