THE CONCEPT OF NATURECULTURE DOCUMENT: A CONCEPTUAL EXPLORATION OF SEEDS, EMBODIED INFORMATION, AND UNCONVENTIONAL RECORDS

Anthropocentric alterations to the environment are beginning to negatively impact the long-term health and survival of seeds.[1] These dramatic environmental changes are resulting in the extinction of plant life. In the context of biodiversity, extinction "insinuates the loss of a potential genetic resource more than the loss of individual lives. A fear of extinction is, in part at least, a fear of losing what might be valuable in the future—a very archival feeling."[2] This ongoing and increasing extinction of plant life generates fear about losing biodiversity not only in the future but also in the present, which, as a result, "prompts us to ask what . . . the archives might be and might look like in future eras of planetary time."[3] So-called arks of the apocalypse are responding to and attempting to counter accelerating anthropocentric alterations to the environment by seeking to collect, store, and preserve seeds. These institutions, or what this article refers to as "archival arks of the apocalypse," are acquiring representative examples of seeds from around the world to preserve them from increasingly damaging climatic changes and harmful human activities.[4]

These archival arks are seedbanks collecting, classifying, and conserving diverse kinds of seeds to preserve them for both present and future agricultural needs and scientific objectives. These needs and objectives vary among different seedbanks and can include protection, long-term storage, and research with various degrees of access and circulation. Whether active research repositories or specimen collections, these institutions aim to help address anthropocentric changes and, for possible worst-case apocalyptic scenarios, preserve and maintain seeds vital for vegetal life.

In these ways, seedbanks serve as archives of seeds. Unlike archives focusing on conventional documents, these institutions are concerned with unconventional records insofar as seeds are not conventional paper, or increasingly digital, forms but instead living entities. Seedbanks' collection, classification, and conservation of these objects "demonstrates a similar interest in the relationship between preserving records and using them in the natural sciences suggesting that there are parallels between seed banking and ongoing efforts to preserve written and material records."[5] While specialized archival repositories are central to these seedbanks, seeds are consequently approached, framed, and used as documents for agricultural and scientific research, classification and preservation work, and various administrative purposes.

Inspired by feminist scholar Donna Haraway's concept of "naturecultures," this article introduces the concept of natureculture documents to more fully understand and appreciate the important

[1] The Anthropocene represents the current epoch of ongoing ecological degradation, climate change, and other climatic upheavals and natural disasters that are largely a result of human activities on earth systems. This environmental crisis is considered so extreme as to have an existential scope over the future of humanity, nature, and the planet. For analyses of the Anthropocene, see, for example, Chakrabarty, "The Climate of History"; Crutzen, "Geology of Mankind"; Crutzen, "The 'Anthropocene'"; and Lewis and Maslin, "A Transparent Framework for Defining the Anthropocene Epoch."
[2] Stuchel, "Material Provocations in the Archives," 19.
[3] Stuchel, "Material Provocations in the Archives," 20.
[4] See, for example, Pellegrini and Balatti, "Noah's Arks in the XXI Century," and Wollan, "Arks of the Apocalypse."
[5] Peres, "Saving the Gene Pool for the Future," 96.

documentary status of unconventional objects like seeds within these archival arks of the apocalypse.[6] Nature and culture have often been considered separate phenomena. This perceived duality dissociates humans from the more-than-human world in which they are inherently embedded and enmeshed. The natureculture concept, however, recognizes that nature and culture are mutually constitutive. The intertwining of humans and nonhumans is so intimate, so interactive, and indeed so existential that the binary of nature and culture is impossible to sustain. As this article discusses, seeds within seedbanks can be regarded and understood as natureculture documents insofar as they are natural phenomena intertwined with, and in some cases dependent on, the cultural practices of these specialized archives.

Drawing on scholarship in documentation studies, information philosophy, environmental science, and feminist studies, this article presents an interdisciplinary conceptual intervention in archival science by introducing the concept of seeds as natureculture documents. This concept, coupled with its interdisciplinary tools, offers unique conceptual approaches to help analyze the documentary status of objects not typically considered documents. Approaching seeds as natureculture documents can help provide new conceptual pathways or reconsiderations of archival objects and their diverse kinds and materialities. This article thus begins a conceptual exploration of the documentary status of seeds within seedbanks to help broaden understandings of (what can or could be) records within unique archival contexts. Due to "the planetary scale of the Anthropocene, it is important to understand the spectrum of 'things' that may be considered as documents."[7] Serving as a framing device, the concept of natureculture document helps illuminate the ways in which seeds can be seen as, and indeed are, material, informational, and documentary objects embedded in, entangled with, and co-constituting nature and culture. As a framing device, it can help "begin to take note of the other-than-human existences which populate our [archival] repositories."[8] This concept also serves as a possible point of departure for other examinations of the documentary status of objects that are not necessarily or usually considered or understood as being documents or having documentary characteristics.

The concept of natureculture document further responds to the urgent appeal of Cecilia Åsberg and Rosi Braidotti for greater scholarly attentiveness to the intertwined human and more-than-human world by showing seeds' co-constitutive relationships with nature and culture through their use as documents within seedbanks.[9] This greater scholarly attentiveness also helps cultivate what Thom van Dooren, Eben Kirksey, and Ursula Münster call greater arts of attentiveness to our diverse world. Arts of attentiveness explore "a broad terrain of possible modes of classifying, categorizing, and paying attention to the diverse ways of life that [co-]constitute worlds," in order to provide greater focus to the multiplicity of connections among species, objects, and the wider world.[10] The concept of seeds as natureculture documents contributes a conceptual documentary attentiveness to seeds, seedbanks, and their many connections.

This article, however, does not intend to directly discuss the nature of seedbanks or the political economic issues and controversies surrounding their agendas, practices, or effects on farming,

[6] Haraway, *The Companion Species Manifesto*.
[7] Radio, "Documents for the Nonhuman," 3.
[8] Stuchel, "Material Provocations in the Archives," 12.
[9] Åsberg and Braidotti, "Feminist Posthumanities."
[10] Van Dooren, Kirksey, and Münster, "Multispecies Studies Cultivating Arts of Attentiveness," 1.

Indigenous cultures, or the environment. This article also does not aim to examine the professional or practical aspects of archival or other related work within seedbanks or important attempts at addressing climate change effects on archival materials. There is a rich and growing interdisciplinary literature that concentrates on and critically examines these various important matters from various disciplinary interventions and cultural perspectives.[11]

[11] For more on the political economic issues surrounding seedbanks, see, for example, Breen, "Saving Seeds"; Harrison, "Freezing Seeds and Making Futures"; Mihesuah and Hoover, eds., *Indigenous Food Sovereignty in the United States;* Nazarea, *Heirloom Seeds and Their Keepers;* Roa-Rodríguez and Van Dooren, "The Shifting Common Spaces of Plant Genetic Resources"; Van Dooren, "Terminated Seed"; Van Dooren, "Inventing Seed"; Van Dooren, "Banking Seed"; Van Dooren, "Genetic Conservation in a Climate of Loss"; Vernooy et al., "The Multiple Functions and Services of Community Seedbanks"; Vernooy, Shrestha, and Sthapit, eds., *Community Seed Banks;* Vernooy et al., "The Roles of Community Seed Banks in Climate Change Adaption"; and Yadav et al., eds., *Crop Adaptation to Climate Change*.

For further discussions of anthropocentric effects on archives, see, for example, Adger et al., "Cultural Dimensions of Climate Change Impacts and Adaptation"; Chowdhury, "Carbon Footprint of the Knowledge Sector"; Fatorić and Seekamp, "Are Cultural Heritage and Resources Threatened by Climate Change?"; Fatorić and Seekamp, "Securing the Future of Cultural Heritage"; Goldman, "It's Not Easy Being Green(e)"; Gordon-Clark, "Paradise Lost?"; Gordon-Clark and Shurville, "'To Take Up Arms against a Sea of Troubles'"; Mazurczyk et al., "American Archives and Climate Change"; Muir and Senton, "If the Worst Happens"; Tansey, "Archival Adaptation to Climate Change"; and Wolfe, "Beyond 'Green Buildings.'"

While the conceptual frameworks are drawn on and supported by scholarship emanating from more disciplinary and institutionally conventional sources, themselves emanating mainly from the global North, it is important to also acknowledge the long-established traditions of knowledge and ongoing bodies of work conducted by Indigenous academics, activists, and allies on Indigenous approaches to and philosophies of the environmental humanities, environmental ethics, ecocriticism, traditional ecological knowledge, climate (change) matters, land issues, preservation of natural resources, and nature broadly construed. For some focused explorations of Indigenous concerns and considerations, see, for example, Adamson, *American Indian Literature, Environmental Justice, and Ecocriticism;* Agrawal, "Dismantling the Divide between Indigenous and Scientific Knowledge"; Berkes, *Sacred Ecology;* Booth, "We Are the Land"; Brush, "Protecting Traditional Agricultural Knowledge"; Burkhart, *Indigenizing Philosophy through the Land;* Ellen, Parkes, and Biker, eds., *Indigenous Environmental Knowledge and Its Transformations;* Gaard, "Indigenous Women, Feminism, and the Environmental Humanities"; Gratani et al., eds., "Indigenous Environmental Values as Human Values"; Kamau and Winter, eds., *Genetic Resources, Traditional Knowledge and the Law;* Kelbessa, "The Rehabilitation of Indigenous Environmental Ethics in Africa"; McCune, "The Protection of Indigenous Peoples' Seed Rights during Ethnobotanical Research"; Monani and Adamson, eds., *Ecocriticism and Indigenous Studies;* Nadasdy, "Transcending the Debate over the Ecologically Noble Indian"; Nazarea, Rhoades, and Andrews-Swann, eds., *Seeds of Resistance, Seeds of Hope;* Oguamanam, "Genetic Resources and Access and Benefit Sharing"; Roothaan, *Indigenous, Modern and Postcolonial Relations to Nature;* Shepheard, "Indigenous Knowledge Stewardship and Accountability of Seed Bank Institutions"; Stevens, ed., *Indigenous Peoples, National Parks, and Protected Areas;* Whyte, "On the Role of Traditional Ecological Knowledge as a Collaborative Concept"; and Whyte and Cuomo, "Ethics of Caring in Environmental Ethics."

Additionally, for more specific examinations of Indigenous approaches to and considerations of/for archives and records, see, for example, Anderson, "Indigenous Knowledge, Intellectual Property, Libraries and Archives"; Gilliland and McKemmish, "Recordkeeping Metadata, the Archival Multiverse, and Societal Grand Challenges"; Gilliland, McKemmish, and Lau, eds., *Research in the Archival Multiverse;* Gilliland et al., "Pluralizing the Archival Paradigm"; Iacovino, "Rethinking Archival, Ethical and Legal Frameworks for Records of Indigenous Australian Communities"; Janke and Iacovino, "Keeping Cultures Alive"; Krebs, "Native America's Twenty-First-Century Right to Know"; McKemmish, Chandler, and Faulkhead, "Imagine"; McKemmish et al., "Editors' Introduction"; McKemmish and Piggott, "Toward the Archival Multiverse"; Morse, "Indigenous Human Rights and Knowledge in Archives, Museums, and Libraries"; Nakata, "Indigenous Memory, Forgetting and the Archives"; Pugh, "Educating for the Archival Multiverse"; Russell, "Indigenous Records and Archives"; Russell, "Indigenous Knowledge and Archives; Thorpe, "Indigenous Knowledge and Archives"; Thorpe and Galassi, "Rediscovering Indigenous Languages"; and Washburn, "New Indians and Indigenous Archives."

This concept has implications for archival theory and practice. It aims to help "make the archival field more diverse, culturally sensitive, and responsive to the interests of the many communities and identities that make up humanity [and the world] today."[12] In practice, on the one hand, archivists and recordkeepers can work with and through this concept to discover more nuanced insights into the records they keep, the processes they enact, the agendas they serve, and the people they assist. For example, for those archivists working in seedbanks, it can help expand their awareness of the intertwined co-constitutive natural elements and cultural aspects of their unconventional records, which in turn can help inform their practices by encouraging greater sensitivity not only toward nature and culture but also toward Indigenous, traditional, and local claims and considerations to these organic objects. In academic settings, on the other hand, archival and information scholars can apply or use the concept to analyse other cases of unconventional documentation in different kinds of natural, cultural, and natureculture contexts.

The following discussion outlines a conceptual journey of the natureculture characteristics and contexts of documents. It applies the concept of natureculture documents to seeds within the archival context of seedbanks, which serves as the frame of its six interrelated sections. The first section analyzes the intimate interconnections of nature and culture and the ways in which objects like seeds are a part of, shaped by, and shape nature and culture. The second section explores how seeds are embodied living information that is essential for natureculture. The third section applies the concept of natureculture documents to seeds within seedbanks. The fourth section further unpacks this concept by tracing seeds' rhizomatic multiplication into different kinds of documents. The fifth section draws attention to the complex contingencies affecting seeds as natureculture documents. The sixth section reveals how seeds as natureculture documents bring together and determine past, present, and future possible worlds for their genetic information, seedbanks, and the environment. The final two sections present possible implications of this concept and call for greater scholarly attentiveness to this more-than-human (archival) world.

Ultimately, this conversation will hopefully help illuminate how archives' responses need to understand that their "documentary projects [are] inseparable from the environment and their material conditions."[13] To begin, let us examine the implications of the prevailing false duality between nature and culture.

Seeds, Natureculture, and Trans-Corporeality

A duality in (post)modern thinking separates nature and culture. This duality, embedded in many scientific and humanistic traditions and discourses, distinguishes nature and culture as different kinds of phenomena and realms partitioned by distinct boundaries. This oppositional separation effectively dissociates them from one another and, by extension, segregates humans from all nonhumans, such as the rich diversity of animals, plants, rocks, minerals, bacteria, and ecological environments. It is as though culture, and hence humans, are apart or exempt from nature and consequently not a member or part of this diversity of species, entities, and environments.

Separating nature and culture obfuscates their intricate interconnections. Marilyn Strathern argues that "there is no such thing as nature or culture, each is a highly relativized concept whose ultimate

[12] Pugh, "Educating for the Archival Multiverse," 70.
[13] Radio, "Documents for the Nonhuman," 2.

significance must . . . be derived from its place within a specific metaphysics. No single meaning can be given to nature or culture in Westernized thought; there is no consistent dichotomy, only a matrix of contrasts."[14] Put differently, treating nature and culture as separate, distinct categories is a fallacy. Nature and culture are not dichotomous concepts nor are they mutually exclusive phenomena; instead, they are enmeshed within a complex matrix of entangled, co-constitutive, co-creating, and co-(de)evolving collective relationships.

Expanding on Strathern's argument, Donna Haraway famously introduced the concept of "natureculture" to reveal the close relationship between nature and culture. Haraway states that conceiving of and approaching nature and culture as opposites is misguided, even "foolish." Nature cannot exist apart from culture, and culture cannot exist apart from nature. They are mutually inclusive of one another, sharing partial but vital connections in which they are not only co-constituted but also co-dependent and co-created. These partial but vital connections, or what Haraway refers to as "relations of significant otherness," shape, make up, and enfold upon, into, and within each other.[15] Nature and culture therefore cannot stand outside of one another because, as Joanna Latimer and Mara Miele state, "The meaning of nature . . . is not just determined by culture but is also the result of specific historical, material and political conditions of possibility. What humans identify as natural . . . is an effect of culture."[16] It is historically, materially, and politically situated and contingent culture that establishes notions about and approaches to nature which, in turn, simultaneously impact and influence, in historically, materially, and environmentally contingent ways, that culture. In this sense, nature and culture are neither wholes on their own nor parts of each other but rather are conjoined collectives co-constructing each other within contingent contexts.

The natureculture concept collapses the duality between nature and culture by illuminating their intimate intertwining and inseparability. This concept reveals the mutual inclusivity of nature and culture and simultaneously recognizes their materiality and material relations. Stacey Alaimo presents the concept of "trans-corporeality" to shed light on the materiality of natureculture. Trans-corporeality offers "a mode of posthumanism that begins from the unacknowledged site of human corporeality, insisting that what we are as bodies and minds is inextricably interlinked with the circulating substances, materialities, and forces of the wider world." Similar to Strathern and Haraway, she posits that nature is neither external nor eternal but instead immediately present within, affected by, and affecting culture in complex and contingent material ways. Humanity is not situated in "a safe, outside position but always from within. The trans-corporeal subject . . . [is] not only situated within but constituted by networks of material agencies."[17] Trans-corporeality consequently recognizes that nature is not a passive entity or some exploitable resource but, instead, building on Jane Bennett's ideas, made up of "vibrant matter" that actively and simultaneously constitutes all "things" in symbiotic networks, systems, and exchanges.[18] All things, in other words, are trans-corporeal natureculture subjects sharing mutually inclusive relationships and immersive environments or contexts.

[14] Strathern, "No Nature, No Culture," 177.
[15] Haraway, *The Companion Species Manifesto*, 8.
[16] Latimer and Miele, "Naturecultures?" 11.
[17] Alaimo, "Material Feminism in the Anthropocene," 49, 50.
[18] Bennett, *Vibrant Matter*.

Seeds, for example, are material entities deeply enmeshed within and entangled by nature and culture. They are natural phenomena that are also dependent on cultural practices for their use and, in some cases, perpetuation and survival. As material entities, moreover, seeds encode and embody culturally assigned genetic information that has become a fundamental consideration within many agricultural and institutional (that is, cultural) practices. Seeds, indeed, can be interpreted and understood as living beings embodying living information.

Seeds as "Living" Embodied Information

Seeds are vital material components of natureculture, deeply embedded in ecological webs and entangled in cultural networks. Seeds are formed by and simultaneously form life around themselves. Without seeds, the earth would lack vegetation, diverse kinds of species, ecological stability, as well as food, food systems, and agriculture. Seeds, in other words, are part of the vibrant essence of both vegetal and indeed all life.[19] Indigenous traditions and native seed savers, in fact, consider seeds to be living beings situated within, and which help make possible, natureculture. Seeds give rise and respond to natureculture that reciprocally nurtures, spreads, and (re)produces the seeds themselves. Louie Hena, a tribal elder of Tesuque Pueblo in New Mexico, for example, describes seeds as "living beings that exist within a web of relationships . . . connected to the human who plants the seed, the microbes that live in the soil alongside the seed, the soil itself, the harvester, and those [humans and nonhumans] who use and/or consume the plant." Seeds' enmeshment in the material world and subsequent reciprocal interrelations with natureculture "are the essence of what it means to be a seed." This perspective is complemented by approaching seeds as kinds of living, embodied information. As Sheryl D. Breen notes, "In all shapes, sizes, and distributions, seeds are genetic powerhouses that store life's codes."[20] A significant part of seeds' vitality is the genetic information encoded within and embodied by them.

This genetic information is essential for natureculture by contributing to and helping facilitate the (re)emergence, (re)growth, and (re)production of plants, vegetation, and ecological environments, in addition to the agricultural, scientific, and administrative practices of various institutions and groups. Information, in this sense, helps constitute nature and culture. Marcia J. Bates characterizes information as being material and evolutionary, stating that it is "the pattern of organization of matter and energy as it exists in the universe and in living beings." Bates further explains that "information is the pattern of organization of the *matter* of rocks, of the earth, of plants, of animal bodies, or of brain matter. Information is also the pattern of organization of the energy of my speech as it moves the air, or of the earth at is moves in an earthquake."[21] Information helps facilitate and form patterns of energy and matter that, in turn, make up everything in the universe. It is consequently a fundamental part of all matter in the universe from atoms and cells to planets and solar systems.

[19] For additional analyses of the emerging field of plant studies, see, for example, Aloi, "Sorely Visible"; Balding and Williams, "Plant Blindness and the Implications for Plant Conservation"; Beerling, *The Emerald Planet;* Challenger, *On Extinction;* Coccia, *The Life of Plants;* Gibson and Brits, eds., *Covert Plants;* Gibson and Gagliano, "The Feminist Plant"; Hall, *Plants as Persons;* Head et al., "Vegetal Politics"; Irigaray and Marder, *Through Vegetal Being;* Kaban, "Plant Behavior and Communication"; Knapp, "Are Humans Really Blind to Plants?"; Koller, *The Restless Plant;* Mancuso and Viola, *Brilliant Green;* Marder, *Grafts;* Marder, *Plant-Thinking;* Marder and Roussel, *The Philosopher's Plant;* Nealon, *Plant Theory;* and Sanders, "Standing in the Shadows of Plants."
[20] Breen, "Saving Seeds," 46, 47, 40.
[21] Bates, "Fundamental Forms of Information," 1034, 1033.

Information, arguably, is not necessarily always or inherently meaningful. Bates further explains that "information exists independently of living beings in the structure, pattern, arrangement of matter, and in the pattern of energy throughout the universe, and would do so whether or not any living being were present to experience the information." Information is assigned meaning only when some living being imbues it with meaning in culturally contingent contexts. Likewise, culture imbues something with meaning. Thus, Bates continues, "we can talk about information as an objectively existing phenomenon in the universe, which is also constructed, stored, and acted upon by living beings in countless different subjective ways, each way distinctive to the individual animal [or nonanimal or any sentient being] having the experience."[22] Information exists in nature and plays a fundamental role in helping facilitate relationships of matter and energy that constitute nature, regardless of whether humans or nonhumans perceive, interpret, or understand it as such.

Yet information also exists in culture and has a key part in helping constitute aspects of culture and its assignations of contextually contingent meanings to things, including seeds. The genetic information of seeds crucially assists in constituting, generating, facilitating, and spreading plant and vegetal life regardless of any human or nonhuman being aware of it. Yet, the identifying, classifying, nurturing, harvesting, storing, and using of seeds by humans in culturally contingent agricultural, scientific, and administrative contexts and their associated practices assigns cultural meaning to these seeds. In these ways, seeds become seen as things that help plants and vegetation to (re)grow, (re)produce, and so on. Additionally, the scientific "discovery," identification, and assignation of meaning to the genetic information of seeds similarly happens within networks of culturally contingent scientific, scholarly, and ecological networks.

Further, information is material. It is a part of and helps constitute material objects. In this trans-corporeal sense, information is not situated as something outside of or external to natureculture but as something inside and internal. It encodes the patterns of the organization of matter and energy and embodies their physical instantiations. Michael Buckland's concept of "information-as-thing" helps shed light on these physical instantiations of the organization of matter and energy.[23] Information-as-thing refers to material objects that are processed, perceived, situated, or otherwise used as information within contextually contingent settings. Most information-intensive institutions, such as archives, libraries, and administrations, create, depend on, and deal with diverse kinds of information-as-things. Within these institutional contexts, what is handled and operated on, what is stored and retrieved, is physical information.

Information-as-thing, moreover, is often associated with, or sometimes even synonymous with, documents, which are neither conceptually nor practically limited to text-bearing objects. Information-as-things—or documents—can be composed of, inscribed with, or display diverse kinds of information including textual, audio/visual, graphic, pictorial, and so on. Documents are necessarily material objects perceived to relay or signify evidence, intended to be used for informational purposes, and embedded within particular cultural contexts. Seeds, for instance, can be approached as information-as-things, especially within the institutional context of seedbanks. These institutions are information-intensive insofar as they collect, handle, store, preserve, and otherwise use seeds as information-as-things. Seeds can therefore be treated as the material

[22] Bates, "Fundamental Forms of Information," 1034.
[23] Buckland, "Information as Thing."

embodiments of encoded genetic information upon which seedbanks depend for their operations and to justify the need for their existence. Treating seeds as information-as-things helps reveal their status as natureculture documents.

Seeds as Natureculture Documents within Seedbanks

Seedbanks are not traditional archives dealing with manuscripts or other physical documents. They are dealing with living entities of diverse kinds of materialities different from these conventional records. The archiving of seeds within these institutions consequently requires "an expansion of our understanding of documents that includes documents mediated by nonhumans facilitates the emergence of different possibilities." Yet instead of employing a rigid definition of the term "document" for examining seeds, this article, following Erik Radio, grounds the question on a material basis.[24] A material object, whether a manuscript or a seed, is or becomes a document when perceived as and intended to be a document within specific cultural contexts. Its materiality configures and is configured by its institutional embeddedness as well as the disciplined practices associated with and required by that materiality. And, importantly, its major effect is the materialization of information.

The documentary components of materiality, institutionality, discipline, and historicity, presented by Bernd Frohmann, help to shed more light on an object's documentary status.[25] First, a document is material in some form—paper, digital, silicon, clay, stone, chemical—that determines the practices which can be done to and with them. Second, a document often relies on institutional arrangements for both its status as a particular kind of document and the ways it is to be used for specific purposes. Third, a document requires discipline; specifically, practices with a document must be disciplined insofar as its creation, interpretation, management, storage, and usage are concerned. Fourth, a document is historically contingent. An object's materiality, associated practices, and institutional associations and embeddedness depend on particular cultural contexts.

Applying Frohmann's documentary components to seeds reveals their documentary status. They are material objects regarded as having evidentiary value in terms of their genetic information. They are institutionally embedded within seedbanks, which, in turn, depend on them to help fulfill their different missions and objectives. Dani Stuchel proffers a few important observations about the materiality of archives that help shed light on the documentary status of seeds within seedbanks.[26] First, since "archives are repositories of information, then we must recognize that not all information is textual or graphic." Second, "not all agents or entities responsible for material changes in the archives are human," and third, archival things are assemblages "formed and altered through material contact as well as archival context."[27] In the same vein, seedbanks, as archival

[24] Radio, "Documents for the Nonhuman," 4.
[25] Frohmann, *Deflating Information*; Frohmann, "Documentation Redux."
[26] For more analyses on the materiality of archives and objects, see, for example, Burns, "The Aura of Materiality"; Cifor, "Stains and Remains"; Dever, "Provocations on the Pleasure of Archived Paper"; Dever and Morra, "Literary Archives, Materiality and the Digital"; Drucker, "Entity to Event"; Jardine, "State of the Field"; Kosciejew, "Documenting and Materialising Art"; Kosciejew, "A Material-Documentary Literacy"; Kosciejew, "Documentation and the Information of Art"; Kosciejew, "Considering a Non-Document"; Lester, "Of Mind and Matter"; Lischer-Katz, "Studying the Materiality of Media Archives in the Age of Digitization"; Mattern, "The Big Data of Ice, Rocks, Soils, and Sediments"; Rekrut, "Material Literacy," 28–29; and Rekrut, "Matters of Substance."
[27] Stuchel, "Material Provocations in the Archives," 6.

repositories of information, are not primarily dealing with traditional records like manuscripts or physical, printed records but instead "living" informational entities. Second, since these unconventional records are, in a sense, living, their materiality is subject to natural lifecycle processes that must be taken into account through archival practices. Seedbanks' institutional practices with them are disciplined according to their materiality; for example, they are packed in sealed bags and/or crates, classified and cataloged in part according to their physical features, shelved and stacked on racks in freezer storage, studied and reported on according to certain scientific standards, and subject to other administrative needs. Third, these seeds' collection, classification, and conservation within these specific institutional arrangements and contexts help establish their status as natureculture documents. Seeds can therefore be approached as documents of nature, documents of culture, and, within the context of seedbanks, documents of natureculture.

Seeds can be considered as nature's documents that encode and embody genetic information. When embedded within assemblages of agricultural, scientific, and in many cases administrative practices and settings, this genetic information can take on new physical forms through transformations into plants and other vegetation. As documents of nature, seeds materialize genetic information that allows plants and other kinds of vegetation to emerge and (re)produce, thereby functioning "as a form of biosocial archive in [their] own right . . . in the sense that each seed holds within its genetic material records of localized crop experimentation and natural and cultural selection, which although partial and iterative, describe histories of agricultural activity."[28] Seeds can be considered as culture's documents when used in interventionist ways to help (re)create and (re)grow food, medicine, and other resources that support and sustain diverse kinds of life. Seeds become documents of culture when collected, arranged, classified, cataloged, managed, stored, studied, or otherwise used in institutional settings such as agricultural, scientific, scholarly, administrative, or information-intensive settings. Many of these institutional settings require these seeds not only for their various projects and practices but also as justification for their existence.

Ultimately, seeds can be seen as natureculture documents. They are trans-corporeal as they are both a part of and help make up the substances of the natural and cultural worlds. As Stacey Alaimo explains, "Trans-corporeality positions the subject as interconnected with the substances of the material world."[29] Marcia Bates's concept of informational levels further expands seeds' trans-corporeal aspects.[30] She describes how, on one level, information exists independently of and from cognizant living beings. Seeds as documents of nature do not need humans or any other living beings for the encoding or embodying of its genetic information. On another level, however, information is assigned subjective meanings by cognizant living beings in culturally contingent contexts. Seeds as documents of culture need humans or some other living beings to help nurture, preserve, share, and use their encoded information. The concept of seeds as natureculture documents transverses the duality between these two levels of information by bringing together and revealing how, like nature and culture, they are not dichotomous but instead combined phenomena sharing intimate interconnections.

Within the context of seedbanks, seeds are essentially treated as and serve a similar function to documents. Just as administrative records are central for the constitution and operation of

[28] Harrison, "Freezing Seeds and Making Futures," 85.
[29] Alaimo, "Material Feminism in the Anthropocene," 49.
[30] Bates, "Fundamental Forms of Information."

contemporary institutions, seeds are central documents for the makeup and functioning of seedbanks. These institutions are entangled with and dependent on these natureculture documents as the objects constituting their collections, shaping their practices, and justifying their existence.

Archives, for instance, acquire, appraise, describe, arrange, and preserve records to safeguard their information, in addition to safeguarding them as historical objects for future research and other uses. A common strategic aim of seedbanks is also documentary in scope and practice: collecting, compiling, and conserving seeds to safeguard their genetic diversity from ongoing erosion, in addition to preserving them as examples of current, and past, seed diversity for potential genetic maps for possible future needs. Within seedbanks, "the seed functions as the 'document' within the accession 'folder,' which is a component of the genebank as 'archive.'"[31] Seeds, in other words, function as these institutions' (natureculture) documents in various respects. They are selected, organized, classified, and recorded into specialized, cataloged collections in similar ways as conventional documents, such as how books, papers, and files are managed in diverse archival, library, database, and administrative collections. Additionally, seeds are similarly perceived as containing information, just as archivists perceive books, papers, and files as furnishing information. Further, seeds are used in similar ways as conventional documents in terms of such practices as classifying, storing, managing, searching, retrieving, accessing, examining, and viewing for various information needs and purposes. Seeds are moreover reproduced through diverse kinds of documentation for different objectives and contexts. There are diverse ways in which seeds are multiplied by and through documentation, both within and beyond seedbanks.

Seeds' Rhizomatic Multiplication

As natureculture documents, seeds can be continuously multiplied into different kinds of documents. The rhizome metaphor helps illuminate the multiplicity of documentation. Sabine Roux, for instance, drawing on ideas of Gilles Deleuze and Félix Guattari, states that "to analyze the document as a rhizome . . . [helps] to understand the fundamental multiplicity of the document. 'A rhizome has no beginning or end; it is always in the middle, between things, intermezzo. The tree is filiation, but the rhizome is alliance.'" New and different kinds of documents "are constantly being added, changing the apparent organization of the whole. The document circulates in social spaces and, just like the rhizome, it multiplies the nomadic associations which involve attribution, intention, meaning, interpretations and social values."[32] As seeds are added to seedbanks' archival repositories, they not only expand these collections but also necessitate other considerations—such as locating and making additional space, creating new entries in catalogs, and so on—and circulate within institutional spaces as new additional resources for agricultural, scientific, and administrative practices. This documentary multiplication—which includes catalogs, indexes, print and digital files, photographs, audiovisual recordings, books, pamphlets, letters, emails, and the like—consequently helps further materialize and constitute information about these seeds for use within these seedbanks and beyond them for different agricultural, scientific, educational, political, and economic settings.

Within seedbanks, seeds become a part of, contribute to, shape, and in turn are shaped by standardized institutional classification systems and catalogs that record information about them,

[31] Harrison, "Freezing Seeds and Making Futures," 85.
[32] Roux, "The Document," 11, 12; Deleuze and Guattari, *A Thousand Plateaus*.

such as their physicality, species, origin, genus, country of origin, continent of origin, depositor institutes, date, crop, and so on. Administratively, seeds become parts of seedbanks' bureaucratic systems. They are recorded, quantified, described, and examined in various policies, procedures, and diverse files on operational, financial, legal, technical, personnel, and other bureaucratic matters. Scientifically, seeds as natureculture documents become vital for scientific and scholarly work in these seedbanks as different scientists and scholars study, analyze, preserve, and perform experiments on them. This scientific and scholarly work on these seeds become instantiated in various documents—such as articles, journals, books, and correspondences—that are deployed, circulated, consulted, and discussed within seedbanks and various academic, political, economic, agricultural, and media contexts. These documents further influence and become a part of other documents. For example, they both shape and can be embedded within scientific or scholarly reports, which in turn, can be used to inform news stories or incorporated within political policies on the environment, climate change, and ecological projects.

This documentary multiplication of seeds reveals their fertility. Ronald Day, for example, notes that "the documentary 'fertility' of the original 'fact' or object is, from its discovery through its continuous unfolding in social and cultural spaces, dependent upon these discourses, their differences, and their affordances for expressing the 'fact's' identity." Documents are "materials within, and for, discursive (in the broad sense) production. Out of what we now term 'discursive systems' or simply 'discourse,' further documents are produced. The elements of discourses, including documents, indexically point to the other elements within them, to other discourses, and to the empirical world."[33] The more fertile a document, the more it multiplies, the more it circulates in and affects different contexts, and, as a result, the more it becomes embedded in and entangled with different discourses.

As seeds are turned into documents, their genetic information is materialized for and extended beyond seedbanks to other institutions, practices, and audiences. For instance, such information multiplies beyond the seedbanks and discourses on the environment, climate change, agriculture, and botanical science into other discourses on politics, economics, policy, law, administration, science, and scholarship. The more seeds as natureculture documents multiply in different contexts, thus becoming increasingly embedded within and entangled with different discourses, the more they are attached to or generative of other documents for other purposes. Yet, their fertility notwithstanding, seeds are also perishable. There are, in fact, various vulnerabilities associated with these unique documents.

Seeds' Contingencies

Natureculture documents are contingent on various factors. Seeds are perishable. Their existence and viability depend on their own longevity and durability. Within seedbanks, seeds as simultaneously living entities and archival things—that is, as natureculture documents—"exist on terms relevant to their materiality." While seedbanks "may shape these [living] material entities for human purposes, they are material things which change in ways proper to their materiality without regard for our desire to remember and prove [and provide]—desires which drive the archival institution."[34] Many seeds, for instance, can survive for years, possibly centuries, without

[33] Day, "'A Necessity of Our Time,'" 156.
[34] Stuchel, "Material Provocations in the Archives," 14.

germinating or having their genetic information degrade, but they will not survive forever. Yet, "there are many problems with these [seed repositories] around the world. In particular, many of them do not have long-term storage capabilities, and a large percentage of the accessions . . . are in desperate need of regeneration—the process whereby seeds are planted, cultivated and recollected to keep them viable."[35] Different kinds of seeds require replanting at certain times in order to help regenerate, renew, and nurture their lifespan; however, many seedbanks are designed, built, and maintained only for *ex situ* storage and practices, often neglecting some of the benefits of and needs for *in situ* practices. Without *in situ* practices, some seeds in *ex situ* seedbanks could wither away or lose their capacity to contribute their genetic information.

There are further various administrative and preservation issues surrounding seeds. Amelia Acker explains that dealing with living informational objects is subject to complex contingencies because "life processes are not stable or fixed." The "materiality of living information as biotechnical objects of reference . . . [affects] archival [and other recordkeeping] practices" that must account for biological, chemical, physical, and other changes to living organisms.[36] These contingencies affect the ways seeds can be managed, stored, preserved, and used, especially for long-term projects.

Many seedbanks, moreover, claim to be secure, climate-controlled repositories protected from climate change and disasters. The recent flooding of the Svalbard Global Seed Vault, however, indicates that it and its brethren repositories are nonetheless at serious risk from climate changes.[37] While this flooding did not directly impact the seeds themselves, it serves as a stark reminder that seedbanks cannot guarantee they are fully secured against external hazards and/or climate change effects.

These complex contingencies show that seeds remain in "an entangled world of contingency and uncertainty."[38] Not all documents, after all, "must, or should, or were intended to last forever—and none can. This is not a cautionary tale about archival practice, but a window into archival materialities, which are overlooked in favor of extractable textual and pictorial information."[39] Nevertheless, even if seeds are compromised, their rhizomatic multiplication of documents provides possibilities for their extension into other and future contexts, at least regarding their genetic information. Seeds as natureculture documents can often help construct past, present, and future worlds.

Documenting Past, Present, and Future Worlds

Documents are entangled with time, helping bring together the past, present, and future into a unified moment. They help shape interactions with, responses to, and understandings of different temporal contexts. Tim Gorichanaz discusses the concept of the "futurepresentpast possibilities"

[35] Van Dooren, "Banking Seed," 377.
[36] Acker, "How Cells Became Records," 5, 7.
[37] Many seedbanks are vulnerable to various natural and human-made risks. For example, see Carrington, "Arctic Stronghold of World's Seeds Flooded after Permafrost Melts"; Hodges, "The 'Doomsday' Seed Vault"; Netto and Simon, "Water Breaches 'Doomsday' Vault Entrance"; and Resnick, "The Arctic 'Doomsday' Seed Vault Is Supposed to Ensure Our Future."
[38] Åsberg and Braidotti, "Feminist Posthumanities," 4.
[39] Stuchel, "Material Provocations in the Archives," 17.

of documents. A document and one's practices and interactions with it help meld "the past, present and future of both the person and the object. These temporalities intersect at the present—the moment of the transaction, which is the moment of the document."[40] Documents thus serve important temporal functions. They link the past and the future while manifesting a shared present between, and for, the past and the future. They also shape future possibilities for their information to extend into and be used in other situations and/or for other purposes. Seeds as natureculture documents, for example, connect the present (which soon becomes the past) of their genetic information with different possible futures.

These futurepresentpast possibilities help show that documents share material worldliness with nature and culture. This shared worldliness is affected by the past and impacts the present and future. Humans and the environment are mutually embedded and entangled within materiality and time. Humans are "composed of ancient molecules, including a set of organisms upon which the human is co-dependent, which are constantly being exchanged with molecules from the environment. . . . In a very real sense, then, a person is their environment, and the environment is the person."[41] Humans and the environment are co-constituted and consequently inextricable from one another, or, from Donna Haraway's perspective, they are all natureculture phenomena. This entangled worldliness is rooted in their shared past and it influences both their shared present and future.

An object, "by virtue of being an object, it always already has a relationship with other objects. Objects, indeed, are composed of objects. Worldliness directs the future in that the future must also be worldly."[42] Objects, such as documents, are similarly embedded in and entangled with the environment because they are made from ecological materials. Likewise, they are embedded in and entangled with culture because they require specific and contingent sociohistorical periods, technologies, and understandings in which to be made, understood, and used.

Within seedbanks, seeds are intended to preserve the past, safeguard the present, and shape, indeed materialize, the future. Put differently, seedbanks' collection, organization, and preservation of these seeds determine what is in the present, what was in the past, and what could be in the future, but from their specific institutional perspectives and objectives. They therefore serve as multitemporal markers pointing to and reaching into the past, present, and future. On the one hand, they provide evidence of a plant's genetic information—at least at a particular historical moment, or more specifically, the date of its selection and accession—that serves as evidence of the past (what the seed once was or what it once could have grown and produced) and a potential guideline for the future (what the seed could grow, produce, and become). On the other hand, these seeds materialize their genetic information into something physical, tangible, and, in certain ways, usable for present and future agricultural, scientific, and administrative purposes. By materializing their genetic information, seeds as natureculture documents make different futures, or different future worlds, possible.

Seedbanks shape their institutional objectives through their treatment of and practices with seeds as natureculture documents. Thom Van Dooren, however, criticizes seedbank practices of framing

[40] Gorichanaz, "Documents and Time," 9, 8.
[41] Gorichanaz, "Documents and Time," 8.
[42] Gorichanaz, "Documents and Time," 8.

and using seeds as documents, which he refers to as "proxies," arguing that they "are primarily utilised as a convenient form of 'gene storage.' Consequently, it is the genetic information that a seed contains, as opposed to the plant that it might grow into, that is valued." Seedbanks' objectives, and by extension the resulting possible futures or worlds made possible, regard seeds as "potentially very valuable pieces of genetic informational property."[43] These pieces of property, moreover, are usually imagined for human interests and exploitation instead of as living entities essential in the reproduction, conservation, and overall health of actual plants, agricultural environments, and botanical diversity. Most seedbanks are banking on plants' genetic information for present and future value. They are not conserving plants or ecological contexts, nor are they supporting or making allowances for *in situ* farming, harvesting, or conserving practices. They are instead conserving the (living) informational representations of these organisms, environments, and traditions with these seeds as natureculture documents.

Although seeds as natureculture documents may provide future possibilities for vegetal life, they are not functionally equivalent to living plants. They do not account for the complicated bio-sociotechnical and discursive shifts that occur within seedbanks. Within these institutions, seeds and their possible futures are "fundamentally transformed by the process [of being archived, thus] creating something significantly different in ex situ conservation when compared to that which is conserved in situ."[44] The possible futures only emerge from "what gets banked and also how (and for whom) it is made available for use. As a result, only certain kinds of natures, only certain human/plant relationships and possibilities, are supported and nourished in these conservation projects."[45] Seeds as natureculture documents in these seedbanks are meant to serve as evidence to inform, instruct, guide, and show future users genetic information for potential future value and use. It is these informational ways of approaching seeds that are made possible by framing them as natureculture documents, which in turn help establish possible future worlds involving *ex situ* institutional settings and excluding *in situ* considerations. Rodney Harrison, following from the work of Ann Laura Stoler, notes how seedbanks' seeds "are reconfigured and acquire new forms of significance through their archival deposition. . . . Different forms of relations are ordered and shaped, and . . . in turn shape and order the worlds to which these archives refer."[46] Put differently, documents set up a possible future world in which genetic information and not actual vegetal life or habitats are conserved.

The possible future worlds offered up by these seedbanks will have real implications for nature, in terms of vegetal life, and for culture, in terms of agricultural, scientific, and administrative practices. Part of the reason why these seedbanks seem to be privileged over *in situ* conservation projects is cost effectiveness and institutional efficacy. It can be cheaper and more convenient to collect and store seeds than to preserve and manage operational agricultural or dynamic ecological landscapes. As Michael Buckland notes, "How accessible [a document] appears to be and how easy to use both strongly influence whether we bother with it. We 'make do' (satisfice) rather than optimize."[47] While both *ex situ* and *in situ* conservation projects may indeed optimize preservation

[43] Van Dooren, "Banking Seed," 381, 380.
[44] Harrison, "Freezing Seeds and Making Futures," 86.
[45] Van Dooren, "Banking Seed," 381.
[46] Harrison, "Freezing Seeds and Making Futures," 86; Stoler, *Along the Archival Grain*.
[47] Buckland, *Information and Society*, 24.

efforts, it appears most convenient for seedbanks to "make do" with seeds as natureculture documents for their institutional needs.

Possible Further Implications of the Natureculture Document Concept

The concept of a natureculture document introduces a new way of approaching and thinking about records, particularly those objects not commonly considered conventional kinds of documentation. It acknowledges the diversity of archival environments within a changing climate while simultaneously responding to Mary Pugh's call for moving "from a world constructed in terms of 'the one' and 'the other' to a world of multiple ways of knowing and practicing, of multiple narratives co-existing in one space."[48] Specifically, this concept encourages archival theory and practice to abandon the false dichotomy between nature and culture. It helps shift archival discourses and traditions away from separations of nature and culture to worlds of multiple ways of knowing and practicing with all kinds of unconventional records, in addition to the diverse aspects—including natural and cultural aspects—inherent in each kind of record.

This shift in turn helps illuminate the importance of considering, understanding, and becoming aware of the many different items, as well as their special attributes and manifold materialities, that can have documentary status and value beyond the confines of traditional archival approaches and contexts. In other words, it can help reveal or bring to the surface many of the heterogeneous natural and cultural realities of seeds and other unconventional records. This revealing or surfacing demonstrates this concept's potential for connecting and engaging multiple perspectives and concerns emanating from diverse quarters, including archival/institutional, Indigenous, and environmental, all layered within a matrix of nature and culture concerns.

The archival multiverse is expanded by the natureculture document concept.[49] According to Pugh, the archival multiverse "encompasses the pluralism of evidentiary texts, memory-keeping practices and institutions, bureaucratic and personal motivations, community perspectives and needs, and cultural and legal constructs with which archival professionals and academics must be prepared . . . to engage."[50] This concept also advances Anne Gilliland's argument for increasing pluralized research agendas in the archival community to address the situated contexts of archival thinking and practices that, in turn, support more nuanced understandings and wider awareness of the multiple traditions and pluralities of the archival multiverse.[51] This concept presents a unique point of departure, as well as various theoretical tools, that can be used for analyses of unconventional records within particular, even seemingly peculiar, archival settings, including additional examinations of seeds and seedbanks. In this sense, this concept opens the way for greater pluralized research into natural and cultural situated contexts of archival thinking, and in so doing, supports more nuanced understandings and awareness of the complex natural and cultural interconnections of the archival multiverse.

[48] Frings-Hessami and Foscarini, "Archives in a Changing Climate"; Pugh, "Educating for the Archival Multiverse," 73.
[49] Gilliland, McKemmish, and Lau, eds., *Research in the Archival Multiverse*.
[50] Pugh, "Educating for the Archival Multiverse," 73.
[51] Gilliland, "Archival and Recordkeeping Traditions in the Multiverse," 58.

Multiple narratives are extended and enriched by this concept. Narratives of both nature and culture can be gleaned, interpreted, and developed from objects like seeds that have not usually or conventionally, let alone routinely, been treated as kinds of documentation. These natureculture narratives can also coexist, particularly in these unique archival repositories managing and preserving seeds, by illuminating the many different, simultaneous, and co-constitutive material realities of nature and culture.

Hopefully, moreover, this concept can contribute a way to help address a pressing grand challenge confronting the world, namely anthropocentric alterations to the environment.[52] While most seedbanks are archival institutions directly responding to this grand challenge, all archives, regardless of focus or purpose, must increasingly contend with, or at least (attempt to) anticipate, the impacts of ongoing climate change and environmental upheavals on their records, collections, infrastructures, and spaces. Nothing is spared. As Bruno Latour observes, there is a "wicked universality" to the Anthropocene in its scope and reach that demand urgent reconceptualizations of humanity's relationship to the earth. We cohabit and share the planet with diverse beings, including seeds, within complex natureculture matrices that "are not limited by frontiers . . . [but instead] are constantly overlapping, embedding themselves within one another. Seeds as natureculture documents, specifically, helps to conceptually reveal how these organic objects are not limited by frontiers but instead embedded within nature as well as cultural practices, traditions, and knowledge."[53] Regarding the archival and information science communities, the natureculture document provides a conceptual way of approaching, thinking about, and understanding the objects they are dealing with—both conventional and unconventional records—as consisting of natural and cultural elements, considerations, and requirements. After all, every record, whether a conventional document consisting of paper, pixels, or (organic) particles, is embedded within, serves as a part of, and contributes to natureculture.

It is also important to note that this concept could contribute theoretical tools for James Lowry's idea of displaced archives, which refers to "records that have been removed from the context of their creation and where the ownership of the records is disputed."[54] This removal includes records of Indigenous communities in the institutional custody of non-Indigenous/postcolonial states or entities. Seed preservation is a controversial and contested endeavour with competing views on the advantages and disadvantages of *in situ* versus *ex situ* settings, as well as the access, availability, ownership, stewardship, rights, ethics, and heritage claims from various antagonistic claimants including governments, corporations, and (usually sidelined at best, ignored and exploited at worst) Indigenous communities.[55] Some indigenous claims, for instance, posit that aboriginal knowledge of the land and its vegetal life is being exploited, expropriated, and expunged by seedbanks and similar neocolonizing initiatives. Many seeds come from the land and simultaneously from the cultural practices, traditions, and knowledges of local communal (Indigenous, but also other small-scale farming and gardening) contexts.

[52] Gilliland, "Archival and Recordkeeping Traditions in the Multiverse," 58. See also note 11, above, for further discussion of anthropocentric effects on archives and archival issues.
[53] Latour, *Down to Earth*, 9, 83.
[54] Lowry, "'Displaced Archives,'" 350.
[55] See also note 11, above, for more in-depth coverage of the political economic and Indigenous issues surrounding seedbanks.

Archival displacement consequently helps "surface the importance of displaced records as actively and persistently enacting geopolitical power imbalances and abuses."[56] Seedbanks are seen as neocolonial institutions artificially dissociating seeds from their original natureculture origins, thereby helping exacerbate power imbalances between Indigenous communities and non-Indigenous governmental and/or corporate organizations. Perhaps the concept of natureculture document—and seeds as natureculture documents in particular—could help seedbanks more fully recognize this displacement from seeds' original natureculture origins, these disconnections from the local and traditional knowledge and cultural practices that nurtured them, and these deprivations of their cultural heritage status. This greater recognition could not only stimulate and point toward potentials for more participatory perspectives and practices incorporating, and indeed including, Indigenous insights but also in so doing encourage these institutions to engage with greater sensitivity and responsiveness to Indigenous claims and concerns.

Viewing these organic objects not only as seeds, nor only as unconventional records, but also as natureculture documents can help stimulate appreciation for and sensitivity toward their importance for nature and culture and, by extension, their embeddedness within and significance for nature and culture. The term "natureculture document" itself can serve as a constant reminder that these are organic, living entities vital for biodiversity, plant survival, and the wellbeing of Indigenous, local, and traditional contexts.

Conclusion: Greater Attentiveness to a More-Than-Human World

As anthropocentric alterations continue affecting the world, various archives are responding by adopting programs and practices aligned with more sustainable development agendas and efforts. Seedbanks are a prime example of archival institutions addressing aspects of the Anthropocene through their collection and preservation of seeds appraised as vital for the long-term survival of various vegetal life. Unlike records in traditional archival settings, these organic objects represent a unique and unconventional category, namely a natural living organism sourced from diverse ecocultural contexts.

Seeds are inherent parts and products of nature and culture. They are embedded within and necessary for the growth of vegetal life. Humans simultaneously play significant roles in their propagation and manipulation; in fact, in many ways, humans are responsible for the continuing existence of seeds, some of which could not survive without human intervention. This intertwined natural and cultural constitution of seeds is illuminated by their use as documents within institutional contexts such as seedbanks.

A document is a material object furnishing evidence that is perceived, intended, and used as a resource for different purposes in diverse contexts. Like conventional documents, seeds are similarly material objects encoding and embodying genetic information vital for vegetal life, which are treated as documents within seedbanks for various agricultural, scientific, and administrative objectives. These cultural objectives affect the ways in which seeds are handled as documents insofar as classifications, management, storage, access, availability, research, and other usages are concerned. Seeds are further multiplied into different kinds of documents for multiple reasons and settings, thereby extending and reconstituting their genetic information across diverse

[56] Lowry, "'Displaced Archives,'" 354.

spatiotemporal cultural contexts while simultaneously helping establish possible future worlds. The more seeds are multiplied into different documents, the more they expand into other contexts and consequently inform and influence other practices and shape the contours of other discourses.

Seeds within seedbanks are constituted by and represent what Haraway refers to as natureculture phenomena. The concept of seeds as natureculture documents also collapses the duality of archives being separate from nature and vice versa. By providing a theoretical tool in which we can "begin to take note of the other-than-human existences which populate our [archival] repositories," this approach reveals the ways in which living entities are of documentary value and possess a documentary status.[57]

Admittedly, from a practical perspective, seeds require different kinds of acquirement, appraisal, and arrangement than conventional print or digital records; however, they also, simultaneously and significantly, require broader and more flexible conceptualizations of documentation to help better inform practice and provide greater contextualization of their provenance and documentary status. Archives are arguably significant cultural institutions that are embedded within and affected by nature. They deal with items that not only require cultural attention, knowledge, and sensitivity but also are influenced by nature, needing certain kinds of climate control and caretaking. These natural and cultural considerations are, of course, particularly pertinent for organic objects like seeds. Seeds, in other words, require practical and conceptual approaches from both nature and culture perspectives. The natureculture document therefore serves as a conceptual framing device for archivists and others working or concerned with seeds to view and understand them as documents of nature and culture, and in turn using this concept to help them approach and think about their practices with seeds and indeed other kinds of organic, living, and unconventional objects.

By introducing the concept of natureculture documents, this article intervenes within archival science by presenting a combined feminist studies, environmental science, information philosophy, and documentation studies perspective in which to help analyze unconventional documents. To that end, this article provides the start of a theoretical analysis of seeds as unconventional records, specifically natureculture documents, within seedbanks. Approaching seedbanks as archival institutions concerned with unique kinds of records, it begins a conversation about unconventional documents in addition to their interconnections with nature and culture. The aim is to present a new framing device in which to help expand understandings of how living objects like seeds are treated as natureculture documents within these institutional contexts and, in so doing, present new possible pathways for exploring the materiality of archives, documents, and other objects, as well as a new interdisciplinary theoretical tool for other studies on archives and the Anthropocene.

Specifically, the natureculture document concept presents a point of departure for theorizing the materiality of archival objects, specifically by developing new kinds of insights on the documentary characteristics and contexts of objects that are not conventionally considered documents. It provides potential pathways for analyzing the important roles played by archives and other efforts aiming to address accelerating anthropocentric alterations to the world. It offers new opportunities for archivists and scholars to understand and, in turn, deal with living

[57] Stuchel, "Material Provocations in the Archives," 12.

information and other unconventional records. It also encourages conceptual expansion of both the archival multiverse and documentation theory; for instance, further research could explore if natureculture characteristics apply to all documents or only biological or genetic information-bearing entities. Ultimately, this article hopefully contributes to greater scholarly attentiveness to this diverse and fragile more-than-human world constituted of and by humans and nonhumans, from seeds to archives to documentation.

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