Soilkin

Relational Exercises with Soil and Stones

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Abstract Drawing on ideas from the history and philosophy of soil science, Fluxus performance, and queer-feminist STS, this article responds to a question posed by environmental researcher Hugo Reinert: "What modes of passionate immersion—or love, or intimacy—could a stone afford?" Situated in a fluid space between environmental humanities and artistic research, the *Soilkin* project develops a series of relational exercises to frame three basic propositions: (1) a non-normative, animistic understanding of geologic subjectivity could trouble accepted criteria for life on earth, leading to kinship with geogenic entities; (2) soil formation (pedogenesis) could be interpreted as a performative process of learning and becoming, rather than simply weathering and aging, with appreciable ontological implications; and (3) soil kinship is situated within a dynamic interplay of resistance and consent, demanding that the terms of reciprocity between humans and soils be mutually beneficial and appropriate to the slowed-down timescale of events in which soil-beings live and operate. The article integrates theoretical provocations with performative scores to expand and sensitize soil-scientific knowledge while, at the same time, contributing to multispecies scholarship on kin-making with geogenic and pedogenic others.

Keywords soils, performativity, geologic subjectivity, pedontology, Fluxus

One way to stop seeing trees and rivers and hills only
as natural resources is to class them as fellow beings, kinfolk.
—Ursula K. Le Guin, *Late in the Day: Poems, 2010–2014*

In the essay "About a Stone: Some Notes on Geologic Conviviality," Hugo Reinert poses the question "What modes of passionate immersion—or love, or intimacy—could a stone afford?"[1] Reinert's provocation entertains the possibility of subjectivity—and

1. See Reinert, "About a Stone," 96.

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with it vulnerability—of geogenic entities within a larger context of "Northern resource extraction and capitalist modernization."[2] In the following, I engage with Reinert's work on "geologic conviviality" by tracing the glacial journey of kindred stones from Sámpi lands in Norway to a terminal moraine north of Berlin. Looking at soils and rocks through the multifaceted lenses of relational, geomorphic, and multispecies aesthetics, the *Soilkin* project picks up where Reinert leaves off—namely, with the above suggestion by science fiction writer Ursula K. Le Guin that natural resources may be seen as kin.

The article responds to Reinert's invitation for experimental scholarship in "relational landscape practices"[3] through the employment of performative methodologies for geo- and pedologic (soil) study.[4] Drawing on ideas from the history and philosophy of soil science, performance research, and queer-feminist science and technology studies (STS), I introduce a series of relational exercises and reenactments that invite reflection on the individual and collective agency of more-than-mineral entities and the boundaries of what it means to be alive. In particular, I turn to the instructional practices of the (anti)art movement Fluxus, a group of artists, designers, architects, engineers, musicians, and theorists from the late 1960s onward known for their process-based work, which conceptually challenged established aesthetic, political, and social paradigms.[5] Methodologically, the *Soilkin* exercises can be seen as a playful approach to citation beyond footnotes. They reinterpret specific event scores penned by Fluxus artists George Brecht and Yoko Ono, among others, while thinking with later forms of artistic inquiry and referencing examples of environmental art, speculative design, and ecosexual performance.[6] The *Soilkin* exercises are envisaged as embodied thought-experiments, to be tested and developed in different ecologies with different actors, seeking kinships across spheres, knowledge-cultures, generations, and communities of practice. Furthermore, the exercises trouble neoliberal expectations of the performativity of soils and agricultural landscapes through the lens of performance art. With a critical view toward the expectation of soils to perform in terms of yield and the delivery of ecosystem services and nature-based solutions, the project asks, what other performative acts engender kinship-oriented human-soil relations?

More than anything else, the *Soilkin* exercises are an invitation to take action along more-than-human timescales: on the one hand, to expand and sensitize bodies of expert knowledge held by soil scientists and land managers; and, on the other hand, to contribute to existing multispecies scholarship on kin-making with and through geogenic and

2. Reinert, "About a Stone," 96.

3. Reinert, "About a Stone," 97.

4. *Ped*, as in *pedogeneis* (soil formation), *pedology* (the study of soils), and *pedontology* (the study of soil subjectivity), comes from the Greek word *pedon*, meaning "ground" or "earth."

5. See George Maciunas's *Fluxus Manifesto* (1963); Friedman, Smith, and Sawchyn, *Fluxus Performance Workbook*. See also an analysis of "instructional art" in Dezeuze, "Origins of the Fluxus Score."

6. See references in the exercises.

pedogenic entities. Situated in a fluid space between environmental humanities and artistic research, the *Soilkin* exercises are used as a performative framework for developing three basic propositions, which are built up like horizontal layers in the soil to form the article's structure:

1. a non-normative understanding of geologic subjectivity and (post-)Anthropocenic animism could trouble accepted criteria for life on earth, leading to kinship with geogenic entities;
2. in consideration of the familial bonds between soils and their parent materials, soil formation (pedogenesis) could be interpreted as a performative process of learning and becoming, rather than simply weathering and aging, with appreciable ontological implications; and
3. soil kinship is situated within a dynamic interplay of resistance and consent, demanding that the terms of reciprocity between humans and soils be mutually beneficial and appropriate to the slowed-down timescale of events in which soil-beings live and operate.[7]

Geologic Subjectivity—On Bringing Soilkin to Lyfe

Let's begin with a campfire. A small bright flicker in a ring of stones rests on the surface of a fine aeolic sand bed about six meters deep in the middle of forested lands north of Berlin. Settled by winds after the last ice age before vegetation took hold, the sand is now held by a patchwork of Baltic pines and sessile oaks in the remains of a native woodrush-beech community with remnant plantings of Douglas fir and random wildings of black locust and black cherry. At the end of a cool evening, on the recommendation of a wildcrafter friend, I remove a hot stone from the edge of the campfire and place it in my sleeping bag (fig. 1). This simple act marks the transformation of something perpetually cold, hard, and inaccessible into something warm, comforting, and familiar. For a brief moment in time, this stone is a source of solace, a friend. In this exercise, I am interested in tracing the lines of agency etched into the crystalline surface of the granite cobble worn smooth by ice from another era. Its very shape and topographic and geographic position stir forgotten doubts of what is now taken for granted as (Western) natural history. Only two hundred years ago, Plutonists and Neptunists passionately debated the nature and origins of such geologic entities. Boulders many times larger than this now memorialize the ice-age landscape of the Biosphere Schorfheide Chorin as the very site where Pleistocene glaciation was "discovered." While one theory favored the forces of water, the other favored the forces of fire. Neptunists, most famously championed by Abraham Gottlob Werner (1749–1817), followed by the poet/naturalist Johann Wolfgang von Goethe (1749–1832), believed that rocks formed in the

7. Cf. Puig de la Bellacasa, "Making Time for Soil."

Figure 1. Soilkin exercise #1: *Stone heat transfer event* (2020). Fluxus-inspired instructions as meme, dimensions and media variable. In reference to Ken Friedman, *Heat Transfer Event*, 1970, reproduced in Friedman, Smith, and Sawchyn, *Fluxus Performance Workbook*, 42.

earth's primordial oceans as a result of sedimentation and precipitation processes. In contrast, Plutonists such as Anton Moro (1687–1750) and later James Hutton (1726–97), the so-called father of modern geology, argued that the origin of rocks was to be found in the planet's fiery depths.[8]

It was during Goethe and Hutton's time of geologic contemplation that brutal forces of colonialism were at work making capital and conquest out of geologic discovery. Plutonic-Vulcanic debates were inevitably tied to larger projects of imperial nation-building and extractive practices that set the stage for the rapid unfolding of the Anthropocene and its parallel, critical iterations as Capitalocene, Plantationocene, and Chthulucene.[9] The stone in my hands thus poses as witness to both modern theorization on glaciation processes and processes of colonial violence, dispossession, and extraction. Following Kathryn Yusoff and Elizabeth Povinelli, the birth of geology as a field of knowledge creation is historically linked to the silencing of Indigenous knowledge creation, while progress in modern geological engineering has contributed to the delegitimization of Indigenous and artisanal technologies.[10] Povinelli argues for a political agency

8. Cf. Knebel, Maul, and Schmuck, *Abenteuer der Vernunft* (*Adventures in Reason*).

9. Haraway, *Staying with the Trouble*.

10. Yusoff (*Billion Black Anthropocenes*) and Povinelli ("Geontologies") have argued that geology is inseparable from the systematic racism and genocide implicit in extractive practices of mining, suggesting that understanding settler colonialism is essential to understanding the Anthropocene.

of the geologic, suggesting that stones can be understood by humans to be either creatures of the desert, a space "where life was, is not now, but could be if knowledges, techniques, and resources were properly managed," or creatures of the imagination with animating, affecting forces.[11] For our purposes here, the latter is noteworthy. Largely absent in Goethe and Hutton's geologic worldviews and the emergence of contemporary geo-engineering practices that followed are the affective forces of the more-than-human world, which have been variously described as "animism."[12] Key to kinship with soil and stones in the Anthropocene is a rekindled belief in animism, as it has been upheld by Indigenous peoples around the planet for millennia. Citing a song by the Sámi artist Nils-Aslak Valkeapää, Reinert retells the story of climate activists passing stones from hand to hand as they run to take part in the COP 15 protests: "Take a stone in your hand and close your fist around it—until it starts to beat, live, speak and move."[13] This kind of animism implies both that stones may be seen by us as lively and having livelihoods and that we can become enlivened by stones to act urgently and politically. This stone in my hands is not only a historical witness but also a catalyst for change.

The cobbles lining my firepit are igneous in origin, surrounded by a sea of sandy sediment. Their sharp crystalline faces formed slowly deep underground, only later to be softened and rounded by their glacial journey from north to south. They are known in German as *Geschiebe*, literally translated into English as "that which is pushed," and commonly referred to in geologic terminology as "glacial erratic." I pull the stone to my body in recognition of its enlivening, animating capacities and then push it back into the sand, "You were born of fire, grew up in ice, and were pushed until your edges are no longer edgy. Can you push us back and teach us how to soften our edges too?" In this simple exchange (fig. 2) the stone offers an alternative imaginary to push the Anthropocene aside, just as Plutonism once pushed aside Neptunism and Indigenous storytelling now pushes the edges of Western scientific knowledge creation.[14] Starting to beat, live, and speak, the rock cries out: "Soften your edges with offerings: rituals of legal protection and postcolonial reconciliation and reparations, of grand but also small, simple acts that can be performed at different times by different people." This exercise envisions a (post)anthropocenic animism in the cultivation of kinship with stones, or the idea that

11. Povinelli, "Geontologies."

12. See, e.g., Brian Massumi's reinterpretation (in *Ontopower*) of Charles Sanders Peirce's semiotics to include the nonliving; Jane Bennett's living matter of "vital materialisms" ("A Vitalist Stopover on the Way to a New Materialism"); Nils Bubandt's "Haunted Geologies"; Chris Salter's multiscaled mechanical and computational entanglements (*Entangled Technology*); Jens Hauser and Lucie Strecker's "On Microperformativity"; Tim Ingold's "Rethinking the Animate"; Eben Kirksey's *Multispecies Salon*; Neera M. Singh's "The Nonhuman Turn"; Donna Haraway's conception of composting posthumanism (*Staying with the Trouble*); Jennifer Hamilton and Astrida Neimanis's "Composting Feminisms and Environmental Humanities"; Robin Wall Kimmerer's beautiful gift of *Braiding Sweetgrass*; Tsing et al., *Arts of Living on a Damaged Planet*; Harvey, *Handbook of Contemporary Animism*; and Deborah Bird Rose's engagement with Val Plumwood's article "Philosophical Animism."

13. See Reinert, "About a Stone," 110.

14. See, e.g., Little Bear, "Naturalizing Indigenous Knowledge," especially the linking of critical thinking to the practice of storytelling in Blackfoot (and other) Native traditions.

Figure 2. Soilkin exercise #2: *Observe a stone* (2020). Fluxus-inspired instructions as meme, dimensions and media variable. In reference to Milan Knizak, *Ceremony*, 1977: "5. breaking a stone (to find its soul)"; and Yoko Ono, *Stone Piece*, 1963: "Take the sound of the stone aging," both reproduced in Friedman, Smith, and Sawchyn, *Fluxus Performance Workbook*, 67 and 86, respectively.

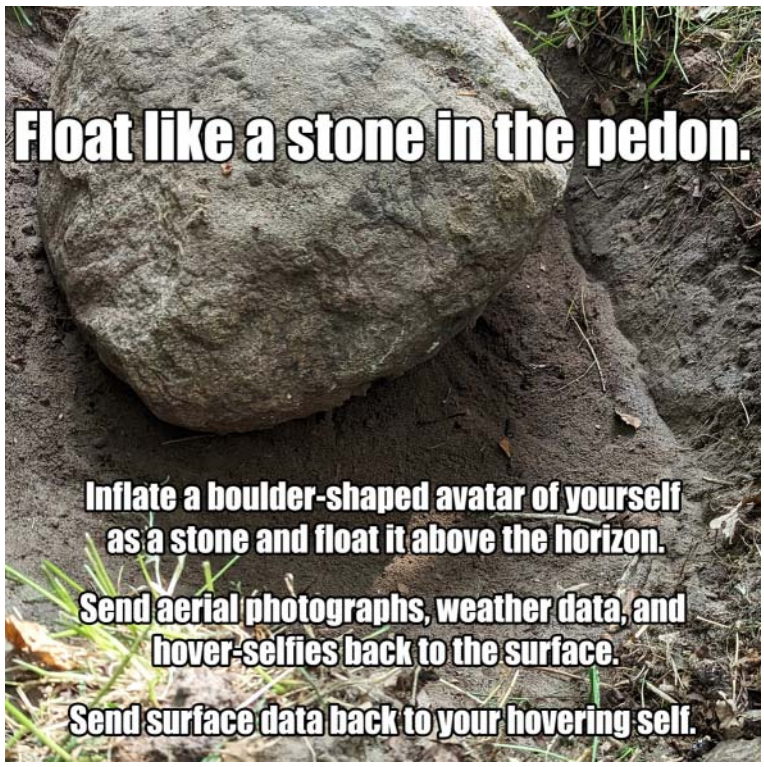

Figure 3. Soilkin exercise #3: *Become a stone observing itself* (2020). Fluxus-inspired instructions as meme, dimensions and media variable. In reference to Tomás Saraceno's *Aerocene Project*, 2015, and Julius Schoppe's Margrave Stone of Fürstenwalde, 1827.

glacial erratic may eventually be replaced with a kind of glacial kinship, even now as the last vast bodies of glacial ice mourn the passing of the Holocene with melting spectacle.

Stone, are you alive?

Reinert retells the stories of particular stones with cultural heritage status who, through their relationship with human neighbors, become alive: "In their time, sieidi stones were recognized as powerful entities—capable not just of transacting with humans but of forming bonds and entering relations."[15] Compare these capacities with the biological capacities for life. NASA scientists Stuart Bartlett and Michael L. Wong coined the term *lyfe* to describe a more generative concept of what life is and what it could be, arguing that "standard definitions of life are restrictive and may blind future astrobiological research from life that is hiding in plain sight."[16] Liberated from the carbon-based "organometallic molecular toolbox" of life on earth as we know it, "lyfe is defined as any system that fulfills all four processes of the living state, namely: dissipation, autocatalysis, homeostasis, and learning."[17] With a stretch of the mind, my new felsic-faced friend exhibits these and other traits, suggesting that astrobiological liveliness could begin right here on earth, in this end moraine. I feel the *dissipation* of heat from the fire, to the stone, to my own body, to a final state of coolness in the morning. Given its once Neptunistic appearance on these pine-covered dunes in Brandenburg, the stone poses as an *autocatalyst* for nothing less than the advent of modern earth science. Its banded crystalline body displays a kind of primitive *homeostasis*, echoing Alexander Graham Cairns-Smith's theory of clay genes in which clay crystals are said to have acted as prototypical chemical scaffolding capable of instructing the earliest forms of carbon-based molecules that led to (biological) life on earth.[18] Finally the stone's ability to *learn* blends fiercely with its ability to remember, from its recollections of glacial unbecoming to its birth as crystallized magma. Like its silicate kin in northern Fennoscandia and distant cousins on exoplanets in our own galactic neighborhood, this stone is "alyve," with its own agency and story to tell.

The story, of course, is one of paradigm change. The need for a new geologic paradigm, made explicit by recent advances in astrobiology as well as a postcolonial recognition of Indigenous scholarship, can be described as what Kathryn Yusoff has dubbed the "geologic turn," or a critical "engagement with the mineral dimensions of humanity."[19] This is especially pertinent in research concerning the Anthropocene, for example, in human dealings with fossil fuels, rare earth minerals needed for digital technologies, and other large-scale mining activities. Following Jacques Rancière's proposal for a political redistribution of the senses, making sense of the "geologic turn" is also a

15. Reinert, "About a Stone," 97.
16. Bartlett and Wong, "Defining Lyfe in the Universe," 42.
17. Bartlett and Wong, "Defining Lyfe in the Universe."
18. Cairns-Smith, *Seven Clues to the Origin of Life*.
19. Yusoff, "Geologic Subjects," 384.

question of aesthetics.[20] "Geomorphic aesthetics," writes Yusoff, allows "passage into the radically incommensurate time of the geologic" and provides "a possible site and mode of sensibility for engaging with the temporal and material contractions of the Anthropocene."[21] While Yusoff's investigation of "Geologic Subjects" centers on some of the earliest known art to be produced by human beings—the rock paintings at Lascaux and the Gwion Gwion paintings of western Australia—there seems to be an invitation in her writing for contemporary artists to respond in kind.[22]

At this point, it is useful to invoke the works of Fluxus to demonstrate how stones might animate such a paradigm change. In a playful mashup of Yoko Ono's *Tape Piece I*, *Stone Piece*,[23] in which the artist instructs us to "take the sound of the stone aging," and Povinelli's groundbreaking article "Do Rocks Listen? The Cultural Politics of Apprehending Australian Aboriginal Labor,"[24] a new score may be formulated: *Listen to rocks until politics age*. This kind of listening invites observation beyond the capacity of human ears or life spans, encouraging attentiveness to more-than-human ontologies as they directly relate to human sociopolitical systems.[25] In another event score dedicated to fellow Fluxus artist Dick Higgins, Peter Frank poetically linked the power of observation to the self-fulfilling prophecy of paradigms: "Locate an object, not spatially isolated from other objects of its kind nor different from them in any significant way, and designate it the current existing model for all such objects. Observe how the distinctiveness of that object emerges under these conditions."[26] Stone in hand, I follow these instructions to better understand the nature of geologic entities and the scientific and political worldviews they have inspired. Further instructions for observation ensue (fig. 2): analyze a stone's hardness, luster, color, and specific gravity; sketch its appearance; take photos; make poetry; create thin sections; use radiometric dating to estimate its age; map its location in a geologic survey; call it "Friend" in a warm embrace; watch and listen until "it starts to beat, live, speak and move."[27] In reciprocation for this observational experience, I design an inflatable avatar of the stone, so that it too may gain new perspectives on its place and time in the world (fig. 3). If kinship can be established through the performative dimensions of geomorphic aesthetics and a critical engagement with the sensual, affective, and (geo)political subjectivity of geogenic beings, then a stone's qualification as kin lies ultimately not in its capacity for life in a conventional biological sense

20. Ranciere, *Politics of Aesthetics*, 174.

21. Yusoff, "Geologic Subjects," 383.

22. Yusoff, "Geologic Subjects," 383.

23. See Yoko Ono's *Tape Piece I* and *Stone Piece*, 1963, reproduced in Friedman, Smith, and Sawchyn, *Fluxus Performance Workbook*, 86.

24. Povinelli, "Do Rocks Listen?"

25. See Krzywoszynska, "Caring for Soil Life in the Anthropocene," for arguments for "attentiveness" rather than simply knowledge-sharing in soil management and land care.

26. Peter Frank, *Paradigm (for Dick Higgins)*, 1983, reproduced in Friedman, Smith, and Sawchyn, *Fluxus Performance Workbook*, 38. See also Merton, "Self-Fulfilling Prophecy," for his thoughts on self-fulfilling realities, especially as they relate to scientific paradigms.

27. Valkeapää, cited in Reinert, "About a Stone," 110.

but, rather, in its capacity for making meaning, shifting perspectives, and pushing paradigms. Floating above the horizon (fig. 3), the pink-gray grainy face has aesthetic potential in its animated storytelling-beyond-words capacity for revealing historical coordinates to curious humans, and affective potential in the rediscovery of geogenic agency through performative acts of observation. Whether it lives or not is secondary. In the "temporal and material contractions of the Anthropocene,"[28] I am interested in not only what it can do but also what it can do with me.

Stone, I'm listening.

Learning—Conjuring CLORPT, Soilkin's Teacher

If a stone may be understood as a critter that we grant agency to, then how do we make the leap toward entities without easily identifiable critter features? "Empathy is not so hard to establish, rooted in a shared experience of embodied life: death, pain, joy, even hope are accessible," notes Reinert.[29] But these common experiences are confined to what Reinert, citing Povinelli, calls the carbon imaginary, "a preanalytical orientation that parses the world through the lens of organic life."[30] Reinert challenges stepping outside this imaginary in order to question the idea of classification according to kingdom. In Soilkin worlding, the task of extending empathy between animal, mineral, plant, and microbial lyfe-forms belongs to the soil. A hybrid amorphous being made up of weathering, life-giving minerals, and decaying—literally mineralizing—organic matter, soil defies classifications and kingdoms because of its all-inclusiveness. It is both body and surrounding environment. It occupies space and time but is neither here nor there, now nor then. It is always in a state of becoming. Soil is the place where all other spheres and stages and scenes merge into one: the dynamic interface between biosphere, lithosphere, hydrosphere, atmosphere, and all that plays out in the technosphere. Soil at first seems to resist subjectivity because of its massive distributedness around the earth or its "hyper-objectness," in Timothy Morton's terms.[31] On closer examination, the critter we are dealing with can be described in Yusoff's terms for non-normative subjectivity: "Stretched between the inhuman and nonhuman elements, determined by unfamiliar material and temporal orders . . . the possibility for an identification with the earth and other biological formations that does not start from a point of alienation or whole-ism (Gaia), but recognizes an entirely different mode of production."[32] Such a non-normative mode of production fosters a sensibility for empathy and kinship in the coproduction of knowledge, which is in turn necessary for the coproduction of lyfe-respecting food stuffs, fuels, textiles, shelter, and medicines for Humankin.

28. Yusoff, "Geologic Subjects," 383.
29. Reinert, "About a Stone," 106.
30. Reinert, "About a Stone," 106.
31. Morton, *Hyperobjects*.
32. Yusoff, "Geologic Subjects," 399.

Figure 4. Soilkin exercise #4: *Soil knowledge-transfer event #1* (2020). Fluxus-inspired instructions as meme, dimensions and media variable. In reference to Joel Tauber, *Seven Attempts to Make a Ritual*, 2000.

Echoing Reinert's question "What kind of critter might a stone be?"[33] we might then ask, "What kind of critter might soil be?"—not as in the critters that live in soil, but soil as a critter itself. At first glance, soil is the direct offspring of parent rocks. But soil is more than the mineralogical sum of its parts. Characterized by its shaggy coat of disintegrating litter, celebrated by soil scientists as the "detritusphere," soil is quite clearly a zombie kind of critter: sometimes leaky, sometimes gassy, partly living, partly nonliving, a spongy, sprawling mass of chemically related minerals and decaying plant life teeming with billions of unassuming creatures that diligently feed on the dead to make room for the living. How is one to possibly love this zombie-critter without being able to easily differentiate it from the rest of the landscape? Relational exercises in embodied knowledge-transfer offer simple gestures for recognizing non-normative subjectivity (figs. 4 and 5) and set up an amiable foundation for exploring what could be called "pedontology," or the speculative study of soil-being and -becoming. Where a stretch of the mind is needed to give lyfe to a stone, soils exhibit dissipation, autocatalysis, homeostasis, and learning with such complexity and elegance that categories of life and nonlife are conceptually and, given the state of the Anthropocene, ethically problematic.

The concept of an individual soil is hardly comparable to individual trees or humans or even stones. Human classification of individual "species" of soils—taxonomically

33. See Reinert, "About a Stone," 96.

Figure 5. Soilkin exercise #5: *Soil knowledge-transfer event #2* (2020). Fluxus-inspired instructions as meme, dimensions and media variable. In reference to Ana Mendieta, *Silueta Series*, 1973–80; and Annie Sprinkle and Beth Stephens, *Dirty Wedding to the Soil*, 2014.

organized as soil groups such as podsols, alfisols, cambisols, or luvisols—is a skill that can be learned with the aid of taxonomic handbooks and soil-scientific guidelines, or passed on as local knowledge and performed as diagnostic encounter, for example, in the assessments of fields made by farmers. Recognition of the nuanced differences and needs as well as vulnerabilities of individual members of a species (i.e., soil groups), however, usually requires years of direct interaction with soil critters. To read the soil, or speak its language, is not only to identify material features that can be measured with the eyes, hands, and a host of measuring instruments but also to recognize the interdependencies and agential connections within the local and global soil neighborhood: the socioeconomic tendencies of the farmers down the road who may or may not be overfertilizing their fields; the political will of elected leaders who have the power to regulate fertilizer loads; the waterless creek in the valley; the planes overhead and powerplant in the next town contributing to rising temperatures that dry out the fields.

A particularly convivial exercise in soil science studies is soil judging (fig. 6), a competitive sport-like event in which students, teachers, and practitioners gather to describe the diagnostic features of a soil. In a research area increasingly informed by proximal soil-sensing technologies and big data paradigms like pedometrics and precision agriculture, soil-judging represents an opportunity for researchers to connect with soils in an embodied way. The work is done in TEAMs ("together everyone accomplishes more") in soil pits arranged as a parcourse, and focuses on the observational and descriptive skills

Figure 6. Soilkin exercise #6: *Observe a soil* (2020). Fluxus-inspired instructions as meme, dimensions and media variable. In reference to herman de vries, *this earth*, 2018; and Newton Harrison / Harrison Studio, *Making Earth (raking, digging, eating)*, 1970.

of attentiveness needed to read a soil's history.[34] Soil judging, with its ethos of skill-sharing-as-sport, is performative on multiple levels. Taxonomic guides provide the score, soil-scientific societies provide the stage, and the soil itself steps in as sparring partner. While feminist scholars such as Karen Barad and Judith Butler have examined performativity in different social and environmental contexts, Jens Hauser and Lucie Strecker have proposed the term *microperformativity* to describe post-Anthropocentric performative practices in the arts and sciences, and Chris Salter has acknowledged the extension of performance as knowledge production to more-than-human worlds: "Bacteria perform processes. Scientists perform experiments. Algorithms perform actions. Humans perform gender and sex . . . who or what nowadays *doesn't* perform?"[35] Soil judging brings different forms of performativity together to collectively coauthor soil biographies in the verse of soil taxonomic description, enacted as ritual offerings of attentiveness and knowledge sharing, albeit firmly grounded in the disciplinary legacies of soil science. An extended task of soil judging would be not only to identify the faces in the landscape

34. See Cooper, "T.E.A.M. Soil Judging"; and Ponte and Carter, "Evaluating and Improving Soil Judging Contests," for a description of the pedagogical ideas behind soil-judging.

35. See Barad, "Posthumanist Performativity" and "Nature's Queer Performativity"; and Butler, *Gender Trouble*. Hauser and Strecker, "On Microperformativity," draw on ideas of entangled technologies in Salter, *Entangled Technology and the Transformation of Performance*, to develop their theory of "microperformativity," which could be attributed to the microbial actions within soils.

but also to speculate new methods of care for Soilkin, to acknowledge past and future human-soil relationships and to imagine alternative soil-time trajectories.

Fluxus artist Dick Higgins once wrote that "musical activity takes place in time, and . . . anything that just breaks up time happening in it, absorbing it, is musical."[36] According to this logic, the events of a soil-judging contest as well as those events in the lyfe story of a soil being judged in such a contest are musical. The score of an individual soil biography is written in horizontal bands below the surface, called soil horizons, which detail recognizable patterns of chemical and physical events in the distribution of various materials. Soil groups are born of genderless parent materials, which then age over time in a process called weathering. Weathering is usually understood as an active force (wind, rain, heat, frost, etc.) on a passive body (soil). Soil scientist Roy Simonson, however, argued that weathering is only one process that causes soil to "age" and that weathering alone does not create a soil.[37] Rather, this is where pedogenesis comes into play. Pedogenesis is a process understood as acts of transfers, transformations, additions, and removals within or from the forming soil. This understanding echoes early Russian concepts of soil memory, or the site-specific recording of chemical changes over time.[38] Pedogenetic processes can furthermore be seen as evidence of learning, or what Bartlett and Wong have described as the fourth criteria for lyfe: "The ability of a system to record information about its external and internal environment, process that information, and carry out actions that feedback positively on its probability of surviving/proliferating."[39] In soil-scientific terms, pedogenesis refers to the patterned weathering of soils resulting from predictable responses to other agents, such as climate (including the infiltration of rainwater and temperature effects, e.g., surface heating or freezing), interaction with macro- and microorganisms, topographical position (e.g., steepness of slope, as well as top, bottom, or middle position on a slope), parent material (e.g., sand dunes, granite, or volcanic ash), and time. Soil scientist Hans Jenny, inspired by the pioneering work of Vasily Dokuchaev in the 1880s, famously gave these factors of pedogenesis a nickname: CLORPT (climate + organisms + relief + parent material + time).[40]

Well over a century after the introduction of the concept of pedogenesis, and a good few decades after Fluxus disrupted the art world with its text-as-event–based provocations, I propose a reimagining of pedogenesis in Soilkin terms: CLORPT is conjured as a superagent that *teaches* rather than *ages* soil. Instructions are given and soil responds. Soils, with their own unique more-than-mineral agency, "learn" from CLORPT's lessons,

36. Higgens, cited in Dezeuze, "Origins of the Fluxus Score," 3–4.

37. See Simonson, "Outline of a Generalized Theory of Soil Genesis."

38. See, e.g., Targuliana and Bronnikova, "Soil Memory," 229–43; and Wells, "Cultural Soilscapes."

39. Bartlett and Wong, "Defining Lyfe in the Universe."

40. Hans Jenny's *Factors of Soil Formation* is a functional-factorial model and focuses on external factors that influence a soil. It is most applicable over regional scales. Simonson's model is a process-systems model, which focuses on what happens within the parent material; it is most applicable at the landscape scale. However, Jenny's and Simonson's approaches are often combined in a complementary way.

writing their lyfe experiences on horizontal bands of color, texture, and acidic testimony. Pedogenetic processes thus are a form of soil performativity, not in a neoliberal sense of performing ecosystem services or soil functions, but in an aesthetic sense of performing ontologies. Fluxus again provides the context here for performance as knowledge creation. Chemist-turned-artist George Brecht, while studying with John Cage, developed the characteristic Fluxus form of the event score as well as one of its most-cited examples, *Drip Music*.[41] Brecht's event score "simply indicates that a source of dripping water and an empty vessel are arranged so that the water falls into the vessel."[42] In Soilkin terms, a soil is a living vessel with unique pedogenetic histories that direct the outcome of the performance. The instructions it receives by soaking up dripping water and redistributing it via capillary action can result in the translocation of mineral notes and the transformation of the vessel itself over time. A reinterpretation of Brecht's event score in the forested ice-age landscape of Chorin could be called *Podsolation*. Dissolved organic matter and iron and aluminum ions of sandy acidic soils translocate from the surface to the subsoil where these materials are immobilized, leaving behind a bleached or ashy (the name for podsolated soils comes from the Russian *podzol*, meaning "ash-soil") upper horizon and a darker, slightly compacted band of organo-metallic particles in the lower horizon. Regardless of differing human histories on the surface, a podsol in the Schorfheide Chorin learns—or, rather, performs—in a manner similar to a podsol on the coast of Oslofjord, in the land of sacred sieidi. Its musical score is ash-colored:

Drip water on quartz-rich sands covered by humus and wait.

Dancing with Soilkin: On Social Resistance and Reciprocity in Times of MUDDD

Soils are social beings. In the empty pits of a speculative future soil-judging parcourse in the Biosphere Reservation Schorfheide Chorin, I place upright mirrors to encourage Soilkin to reflect on this fact (fig. 7). Simonson notes that "individual bodies of soils are seldom set apart from their neighbors by sharp boundaries. Adjacent bodies commonly grade into one another."[43] Pale, leached podsols in a forested moraine gradually morph into rich brown luvisols in the glacial valley below, sometimes spilling into abandoned leaching fields at the outskirts of the city. These soil individuals link arms in a terrestrial dance known as the "soil catena,"[44] or a chain of individual soils chemically and physically related to one another over time and space. Drops or spikes in pH levels and the shifting of soil horizons mark differences between bodies, but the genealogy between

41. See von Froreich, "Meeting the Alien Halfway," 85, which suggests that event scores are particularly suitable for exploring nonhuman scales, textures, and temporalities of matter.

42. See the comparison of Brecht's *Drip Event* (1959–62) and Cage's *Water Music* (1952) in Dezeuze, "Origins of the Fluxus Score," 86.

43. See Simonson's description in "Outline of a Generalized Theory of Soil Genesis." The catena concept is so prevalent in soil science that Elsevier publishes a journal titled *Catena*, dedicated to research on geoecology and landscape evolution.

44. For original descriptions of the soil catena as a soil-scientific concept, see Milne, "Normal Erosion as a Factor in Soil Profile Development"; and Bushnell, "Some Aspects of the Soil Catena Concept."

Figure 7. Soilkin exercise #7: *Get to know neighbors* (2020). Fluxus-inspired instructions as meme, dimensions and media variable. In reference to Robert Smithson, *Yucatan Mirror Displacements 1–9*, 1969.

pedons is ever-present. Establishing social sensibilities in scientific constructs such as the soil catena is essential for creating reciprocal kinships with more-than-mineral others. Reciprocity, however, can be a double-edged sword. While Reinert gives amicable accounts of how certain sieidi stones interact benevolently with humans, he also warns of the flip side of such arrangements, in which humans can be cursed with poverty, illness, or death in retribution for disrespectful removal or destruction of sieidi.[45] If we can assign agency to stones, Reinert argues, it follows that these autonomous beings can also harm and be harmed.

Current pedometric data underscores a grim picture of lyfe on earth, in which harm perpetuates more harm. The Great Acceleration charts of the Anthropocene depict spikes in fertilizer consumption and water use as socioeconomic trends, and forest loss, biosphere degradation, and domesticated land use as earth system trends.[46] These have risen exponentially since the 1950s, leading to catastrophic flooding, mudslides, desertification, and other soil-based harm. In their assessment of the Anthropocene, Katrin Klingan, Ashkan Sepahvand, Christoph Rosol, and Bernd Scherer suggest that humans must come to terms with a world that has become muddier. "The flooding of desertified lands, the thawing of permafrost, . . . damming of rivers detaining sediments, the extraction of tar sands . . . the leakage of open mining pits, and hydraulic

45. See Reinert, "About a Stone," 97.

46. See depictions of the "great accelerators" in Steffen et al., "Trajectory of the Anthropocene."

fracking of rocks" have turned the critical zone, that permeable, life-supporting safe space from the treetops above to groundwater flows below, into a mud zone.[47] Thinking with Klingan and colleagues, the mud zone is a direct result of intentional and collateral harm to the lithosphere and pedosphere that form the very foundation of the critical zone.[48] MUDDD (man + *Umwelt* + degradation + dislocation + disillusionment) is CLORPT's cursed offspring from a violent relationship with Anthropocene's Accelerator-Man.[49] To heal harm already perpetrated and to promote preventative care against future muddying, Humankin must rejoin forces with CLORPT and start creating soil immediately and continually. This requires a rethinking of conventional timescales, multispecies worlds, and soil-protection paradigms, for CLORPT itself has changed: **cl**imate now includes extreme temperatures and weather events brought on by global warming; **o**rganisms include human societies and their technologies;[50] **r**elief can be anthropogenic, as in the case of shifting landmasses resulting from mining, damming, and remediation; **p**arent materials now include technogenic substrates such as building rubble, mine spoils, and garbage heaps; **t**ime can now last several months to several millennia.

With muddiness comes the chance for resistance and reciprocity, and a thorough recalibration of Soilkin-Humankin relations in the critical zone. Once again Fluxus offers a methodology of performing with the world that has historically embraced resistance—against art world conventions and social norms of labor, gender, morality, philosophy, and politics—while resonating with movements of creative resistance today. Fridays for Future, Land Back, and Extinction Rebellion recall, in their own ways, the spirit of Fluxus—for example, in the performative staging of events of protest and in the reproducibility of their actions. Beyond resistance, Fluxus also offers a practice of generosity in the scripting of scores that can be re-created and reinterpreted indefinitely, questioning art world norms of authorship, authenticity, and audience. Dance in particular plays a prominent role in Fluxus methodology: George Brecht and Ken Friedman, among others, drew on the conviviality of movement to facilitate reciprocity.

Stone, will you dance with me? (fig. 8)

Let's conclude by the fireside. Carefully placing the granite cobbles back into the ring around the firepit in Chorin, I admit that the stones and soils participating in the

47. Introduction in Klingan et al., *Textures of the Anthropocene*, 25, published in the context of the Anthropocene Curriculum hosted by the House of World Cultures and Max Planck Institute in Berlin from 2013 to 2022.

48. In the *Critical Zones* exhibition, series of events, and publication, Latour and Weibel used the critical zone as framing mechanism for the geopolitical crisis of the Anthropocene. The critical zone historically refers to the spatial unit stretching from the top of the lower atmosphere to the top of the lithosphere beneath the soil.

49. *Man* rather than *hu-man* is used here in reference to the overwhelmingly masculine, techno-normative framing of the Anthropocene as critiqued by authors such as Stacy Alaimo, Rosi Braidotti, and others in Grusin, *Anthropocene Feminism*.

50. Although Jenny originally included humans in his CLORPT model, Rudi Dudal, among other prominent soil scientists, include humans as a sixth soil-forming factor, reasoning that humans cause so much change that they are distinct from other organisms. See Dudal, "Sixth Factor of Soil Formation."

Figure 8. Soilkin exercise #8: *Possible Flux performance for the post-Anthropocene* (2020). Fluxus-inspired instructions as meme, dimensions and media variable. In reference to Luce Fierens, *Possible Flux Performances or Postfluxgames*, 1987, reproduced in Friedman, Smith, and Sawchyn, *Fluxus Performance Workbook*, 35: "Ask a child to dance with you. 1 minute."

Soilkin exercises are not mine to claim as dance partners or otherwise. I wonder if my actions are truly received as reciprocal, if my human desires for conviviality are congruent with other life- and lyfe-forms. Harm is inevitably framed by resistance and consent in a language of geontological and pedontological agency beyond the capacity of human comprehension. Mere acknowledgment of the possibility of geogenic and pedogenic agency does not necessarily lead to nonharmful treatment. In a more-than-human reckoning with the #MeToo movement, there is little guidance in technoscientific literature or the social sciences regarding appropriate ways to ask geogenic and pedogenic others for consent. Guidance can be better found from those who already know how to ask. In this sense, one of the most meaningful "event scores" for engaging with Soilkin could be interpreted as the retelling of the Honorable Harvest by Robin Wall Kimmerer, revered by many but as of yet not cited in most guidelines for soil management:

> Take only what you need and use everything you take. Be accountable as the one who comes asking for life [or lyfe]. Ask permission before taking. Abide by the answer. Never take the first. Never take the last. Take only what you need. Take only that which is given. Never take more than half. Leave some for others. Harvest in a way that minimizes harm. Use it respectfully. Never waste what you have taken. Share. Give thanks for what you have been given. Give a gift, in reciprocity for what you have taken.[51]

51. Kimmerer, *Braiding Sweetgrass*, 183.

Figure 9. Soilkin exercise #9: *Practice reciprocity* (2020). Fluxus-inspired instructions as meme, dimensions and media variable. In reference to Peter Frank's *Thank You Piece*, n.d., reproduced in Friedman, Smith, and Sawchyn, *Fluxus Performance Workbook*, 37: "Thank you / [repeat fifteen times] / Politeness is no crime"; and Asad Raza, *Absorption*, 2019–2023.

Staging the instructions of the Honorable Harvest in the Anthropocene offers a starting point for performing reciprocity, for giving back for years of taking without asking, for heeding rather than appropriating Indigenous wisdom, for reconciling Humankin with CLORPT in a way that makes room for new lyfe and replaces muddiness with gratitude.[52] Through social readings of geological and pedological worlds, new event scores can be scripted for new rituals of reciprocity: dance with soil for one minute and with stone for one millennium (fig. 8); unseal sealed surfaces; replace concrete beds with mulch blankets; compost as if your life depended on it (it does); give thanks (fig. 9).

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52. See, e.g., Imoro et al., "Harnessing Indigenous Technologies"; Dickson-Hoyle et al., "Walking on Two Legs"; see also soil scientist D. L. N. Rao's plea to relearn Indigenous soil management practices, quoted in Puig de la Bellacasa, "Making Time for Soil," 708.

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