Chance and Certainty: John Cage's Politics of Nature

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"Nature stands behind everything he did" (34), David Rothenberg wrote some years ago. Indeed, John Cage forged strong associations with "natural" and environmental sounds, from the open frame of *4'33"* (1952) to the recording of dawn in Stony Point, New York, that is played at the end of *Score (40 Drawings by Thoreau) and 23 Parts* (1974). Scholars such as Christopher Shultis and David Ingram have picked up on this natural inclination in his work, and have written about Cage in a longer musical tradition of composers exploring, in the words of Austin Clarkson, "a new relationship with nature in which man is no longer the feudal monarch of the world but only one element in a global organism, all the parts of which are linked in symbiosis" (62; see also Gann; Ingram; Shultis).

This idea of the human and the natural brought into equal alignment is an important one in environmentalist readings of Cage. For example, on the subject of *Inlets* (1977), in which performers tilt water-filled conch shells that gurgle unpredictably, Ingram remarks, "Music thus arises out of the chance sonic encounter between human performer and the natural material of the instrument itself. It is as if nature is being allowed an equal role in the process of composition" (573). But Ingram might be understating the weight of nature's participation in Cage's cosmos. Since at least 1950 the composer took the junior role in his collaboration with what he understood to be nature; Cage sought to remove his own control, to be affected rather than to affect. In his musical experiments, he tells us, he was nothing more than "a faithful receiver of experience," committed to eliminating personal expression in favor of revealing a more general truth (1961, 32; see also Cage and Charles, 235; on the latter point, see Ulman, 247). As Shultis has demonstrated, Cage's work resonated with a tradition of U.S. letters

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in which poets "attempted to express the world without active mediation of the human will" (78). In fact, Cage occasionally imagined a musical scenario bearing no trace of humans at all, except for the amplification they might provide to allow nature to speak for itself. In 1980 he rhapsodized about "a piece of music performed by animals, and butterflies, which sounds fantastic now but is almost within reach, I think, of our technology" (Cage and Cope, 13). Who wouldn't want to hear this barnyard jam?

I will argue below that as much as Cage may have wished to see an integration of humanity with nature, he continually fell prey in his thinking to a modernist ontology that separated social affairs from natural ones, and that recapitulated an uncritical understanding of nature (see Goehr). This ontology traces its genesis to the emergence of European experimental science and philosophical reason in the early modern period, and it has been the object of a well-known and influential analysis by Bruno Latour. By placing objective matters of fact in the natural world and subjective matters of value in the social world, this ontology conditioned Cage's understanding of chance and certainty, two terms that—along with their correlates, contingency and necessity—are fundamental to his work and its interpretation. The "nature" category was authoritative for Cage. Figured as chance, it therefore provided him a route to certainty, despite his numerous statements about how it can guide one to the unforeseen. We might say that Cagean multiplicity was underwritten by a mononaturalism that was singular and consistent. Like any good experimentalist of the modern era, he claimed to have attenuated his own role in his musical trials so that we might have direct, unmediated access to this world.

And yet, his compositional practice contradicted this modernist ontology of nature at every turn by actively *forming* that world that he purported merely to discover. At work in his studio, Cage took part in an ecology of entities that mutually enhanced and defined one another through the event of the experiment. In other words, the human never simply "disappeared," and the nonhuman was never simply "revealed." I draw attention to this inconsistency between Cage's discourse and his practice not to highlight a contradiction in his thinking—such contradictions are numerous and not particularly revelatory. Rather, I wish to show that his compositional process was indeed uncertain, but not in the way that he thought it was. Far from operating

in a mechanistic fashion according to the laws of chance, the world responds to its human experimenters in creative, productive ways. Uncertainty, then, is a condition of existence itself, and not simply a property of certain Cagean compositions. Being is an act the outcome of which is unknown.

This essay is structured in two large parts. In the first, I will demonstrate how Cage employed an ontological discourse in a manner consistent with what Latour has called the "Modern Constitution." This discourse, I argue, grounded Cage's claims to aesthetic authority and conditioned his limited conception of pluralism. In the second part, I will detail his compositional practice in one set of pieces, *Music for Piano,* in order to illustrate the ontological indeterminacy enacted in his poiesis. This indeterminacy of being is quite distinct from the conventional, Cagean meaning of that term. If contingency is a necessary aspect of all existence, an ontology attuned to this kind of quotidian risk will take account of how individual entities—humans, sounds, plants, and animals, for instance—are tangled up with others in circumstances that are always shifting. I will conclude by suggesting the modality of improvisation as a useful descriptive frame for analyzing the process of mutual co-constitution forged by the composer and his nonhuman collaborators in these entanglements. The scholarly literature on improvisation is vast and ever growing, and I approach the matter less as a musical process than as a form of everyday encounter, following the example of those scholars interested in emergence, creativity, interactivity, and interanimation (Brown; Hallam and Ingold; Moten; Richards; Sawyer).

CAGE'S MODERNIST LANDSCAPE

The modernist ontology Cage inherited was itself the product of great uncertainty. Many scholars have shown how scientists and philosophers in early modern Europe were concerned with establishing certain knowledge about a world that had been turned upside down by religious conflict and colonial expansion (Asad; Haraway; Jay; Shapin and Schaffer; Toulmin). In response to the uncertainty of diverse beliefs, the methods of natural science, mathematics, and rational philosophy would determine some kinds of knowledge to which all (or at least all

who were modern and European) could agree. Stephen Toulmin, for example, locates a great contrast between the early age of reason in the mid-seventeenth century and the diverse humanism of the sixteenth, when Montaigne claimed (in 1580) that "unless some one thing is found of which we are completely certain, we can be certain about nothing" (42). Humanists like Montaigne embraced the disputability of experience as the condition upon which a tolerant and diverse society is founded. By the 1620s and '30s, however, these attitudes were lost. Already facing the sour conflict that would become the Thirty Years War, political and religious leaders in Europe "no longer saw Montaigne's pluralism as a viable intellectual option" (54), Toulmin writes. In response, then, to earlier doubts about "one thing of which we are completely certain," Descartes's *cogito* offered a firmer answer: "I have mental experiences, so I know my own existence for certain" (42). Reason thereafter grew to become authoritative and universal, and modern experimental science determined what could count as proper evidence in matters of fact. As Steven Shapin and Simon Schaffer have detailed, laboratory science relied on machines to rule out human error, a "neutral" language to report findings, and a public space in which to reveal nature and produce a community of witnesses (Shapin and Schaffer).

Consider briefly another example: Gottfried Leibniz, who, like Cage, was an amateur *I Ching* enthusiast. He dreamed at the turn of the eighteenth century of a "universal characteristic," an analytical language that, in the words of philosopher James Ryan, "would allow fluent and rigorously exact international scientific communication" (60). When a missionary colleague pointed out the similarities between Leibniz's binary mathematical notation (different from the universal characteristic, but which he believed to offer a possible foundation for the natural sciences) and the hexagrams of the *I Ching*, Leibniz thought that this ancient evidence of Chinese science could be used to help convert the modern-day Chinese to Christianity. He believed, after all, that "the fundamental religious idea of God was a demonstrable truth grounded in reason." Daniel Cook and Henry Rosemont further explain, "Leibniz came to believe that if he could successfully demonstrate to both the Chinese and the Europeans—at opposite ends of the cultural spectrum in so many ways—the close resemblances between their theological beliefs, then it would follow *a fortiori* that every other

religious tradition, no matter how different from Christianity, would be amenable to the same consideration and thus increase the chances for universal understanding and peace" (265). This universal understanding would unfold under the banner of ecumenical Christianity, so Leibniz's interest in the *I Ching* was motivated by a believer's drive toward unity, not an anthropologist's search for diversity. As Cook and Rosemont explain, "demonstrating the similarities between Chinese and Christian thought would be an excellent way to prepare the Chinese for conversion to Christianity, which Leibniz always proclaimed was the true religion for all peoples" (265–66; see also Perkins).

Like these scholars of modern thought, Latour has traced the investment in certainty to the seventeenth century, which he pinpoints as the beginning of a great schism between humans and nonhumans. "Out there" is the natural, external world, a realm of objective truth and facts, unchanging and authoritative. Nature is indifferent. We may come to represent it more or less accurately, but its operations remain true regardless of our knowledge of them. "In here," on the other hand, lies the realm of human affairs, marked by negotiation and the fragile contingencies of the social. As philosopher Graham Harman puts it in his explication of Latour, "Modernity is the attempt to cleanse each half of any residue of the other, freeing facts from any contamination with personal value judgments, while liberating values and perspectives from the test of hard reality" (58). But although modernity is ostensibly concerned with processes of separation or "purification," Latour argues, this discourse covers up the reality of how science (and politics) actually works—that is, through the production of "hybrids" of human and nonhuman entities. There were never two distinct ontological zones, he argues, but rather a massive proliferation of interpenetrating hybrids that produce an ideology of separate "nature" and "culture" even as they enact ontologies that are far more complicated.

Central to modernist ideology is the idea that nature speaks for itself, presented through a scientific method that subtracts itself from the equation and allows unmediated access to its object: "Scientists are scrupulous representatives of the facts. Who is speaking when they speak? The facts themselves, beyond all question, but also their authorized spokespersons. Who is speaking, then, nature or human beings?" (Latour 1993, 28). For Latour, there is no such thing as immediacy: no actor, not even a scientist, can disappear. All agents are mediators, and

therefore, human-as-subject and nature-as-object are co-constituted in and through the establishment of something called a fact.[1] Despite this multivalent contingency evident in the actions of modern science, he argues, modernist thinking has persistently effaced the messiness of being in favor of a normative ontology that outlines the limits of the possible. Expanding on Annemarie Mol's notion of "ontological politics," Latour notes, "There is in 'mere description' an overly powerful form of normativity: what *is* defines the common world and thus all that *must* be" (2004, 224; Mol; see also Watson 74 n.5).

Cage inherited this characteristically European, modern ontology, and we can find it expressed in texts produced throughout his long and varied career. Any student of the composer's work knows that the Cage of the 1950s differs significantly from that of the '60s, '70s, and '80s. Although the critically important period of 1948–52 has been understood as the culmination of his aesthetic modernism, it is no different from any other stylistic period when interpreted from the perspective of ontological modernism analyzed by Latour. Through a keen emphasis on compositional detail, musicological writings on this composer have the potential to reduce the question of modernism in his work to a rather thin matter of precompositional charts and mechanistic systems, in contrary motion to the larger trend in modernist studies toward a broader understanding of this epoch's complexity. In bracketing these important studies, I contend that despite the considerable heterogeneity in Cage's aesthetic and social thought, all of his work is conditioned by an understanding of "nature" that is authoritative when set against "society." This mononaturalism, of course, was expressed in many different ways, and, although he explicitly engaged the category of nature—that is, plants, weather, animals, water, and so on—in a number of works, many of them from the mid-1970s, I am more interested in the ways Cage developed his tacit understanding of the natural/social divide.[2] As we will see, Cage's cosmological thinking about the relationship among the categories "human," "nature," and "nonhuman" continually circled around a question he asked in 1961: "Is man in control of nature or is he, as part of it, going along with it?" (1961, 194). The answer to this question is not simple. Cage's response provides a preference but not an answer: "To be perfectly honest with you, let me say I find nature far more interesting than any of man's controls of nature" (194).

In writings from his percussion and prepared piano periods, nature is figured at its most traditionally modernist—that is, as raw sound, material to be increasingly formed (or even "liberated") by the composer. In his early "Future of Music: Credo," for example, Cage wrote, "The sound of a truck at fifty miles per hour. Static between the stations. Rain. We want to capture and control these sounds, to use them not as sound effects but as musical instruments" (1961, 3). Sound recording technologies were integral to the composer's capture of materials, but nonpitched percussion also played an important role in the progressive domination of nonhuman material. Innovation was mandatory: "Percussion music is revolution. . . . At the present stage of revolution, a healthy lawlessness is warranted. Experiment must necessarily be carried on by hitting anything—tin pans, rice bowls, iron pipes—anything we can lay our hands on. . . . In short, we must explore the materials of music" (1961, 87).

Soon, though, Cage's associations with the nonhuman world shifted toward a more accommodating relationship. As he put it much later, "Progress may be the idea of *dominating* nature. But in the arts, it may be *listening* to nature" (quoted in Kostelanetz 2003, 245). Accommodating, yes, but Cage still framed nature as separate from humanity; the two categories remain intact. Following his encounter with Christian mysticism and South Asian aesthetic philosophy in the mid-1940s, Cage adopted his two well-known guiding principles: (1) the purpose of art is to sober and quiet the mind, thus making it susceptible to divine influences; and (2) art is the imitation of nature in its manner of operation (Patterson). Once Cage combined these principles with the study of Zen Buddhism (around 1950), his mature cosmos took shape. Discipline, in the form of chance operations, quieted Cage's mind and opened it up to the environment, where sounds exist according to no human imperative. They are "urgent, unique, uninformed about history and theory, beyond the imagination" (1961, 14).

In his short essay on Cage and nature, Matt Rogalsky remarks on the importance of C. G. Jung's foreword to the Wilhelm translation of the *I Ching*, which Cage esteemed highly enough to recommend to Joan Retallack near the end of his life (Rogalsky). Jung emphasized that a laboratory required restrictions that separated natural phenomena from the world in order "to demonstrate the invariable validity of natural law." If we leave things to nature, he continued, "we see a very

different picture: every process is partially or totally interfered with by chance, so much so that under natural circumstances a course of events absolutely conforming to specific laws is almost an exception" (ii). Cage was fully convinced that, in nature, every process is interfered with by chance, and he set about creating art that imitated its nonordered manner of operation. Complexity would become an important quality of this art, and a sign of nature broadly construed; while conventional understandings of music simplified sound by dividing pitch space and rhythmic time into discrete steps, Cage instead sought to access a smooth field of sonic space uninflected by human laws. Magnetic tape, as Rogalsky point out, "was an important technology for transmuting nature into music" (133). Cage writes that tape reveals "that musical action or existence can occur at any point or along any line or curve or what have you in total sound-space; that we are, in fact, technically equipped to transform our contemporary awareness of nature's manner of operation into art" (1961, 8). Cage enacted this return to natural complexity from (what he asserted were) the false and reductive laws of music theory in other ways throughout his life: the noises of percussion music allowed the composer to access "irrational" or nonordered sound, and his later interest in microtonal pitch space (in such works as the *Freeman Etudes*) could be viewed in a similar manner. Like the continuum of pitch, time was also best left undivided by human rhythmic systems of beats and subdivision. "Out there," in nature, Cage reasoned, time proceeded simply according to the clock, and thus stopwatch time became his preferred method of durational notation.

Although complexity would remain an important quality representative of the way things "actually exist" in reality, Cage depended most extensively on chance as a surrogate for the natural world he wished to experience. Chance functioned in a double capacity: it was a way to remove intention and allow one to become receptive to nature, and it was also simply the way nature works. Let us examine these two capacities in turn. Chance operations were a targeted therapy that removed unnatural impulses toward order and expression, thus allowing composers "to get rid of the glue so that sounds would be themselves" (Cage 1961, 71).[3] Sounds alone, without human interference, were natural. For the Cage of the 1950s onward, *anthropos* became an entity to be eliminated. In a letter to the musicologist Paul

Henry Lang in 1954, Cage wrote that "'art' and 'music,' when anthropocentric (involved in self-expression), seem trivial and lacking in urgency to me. We live in a world where there are things as well as people. Trees, stones, water, everything is expressive. I see this situation in which I impermanently live as a complex interpenetration of centers moving out in all directions without impasse. This is in accord with contemporary awarenesses of the operations of nature. I attempt to let sounds be themselves in a space of time" (in Kostelanetz 1991, 117–18). A mind that has been emptied by chance operations, Cage argued, would generate an experimental action that "does not move in terms of approximations and errors, as 'informed' action by its nature must," but rather "sees things directly as they are" (1961, 15).[4] The giving up of intention leads to the prize of direct, undistorted experience of the world; it "leads to the world of nature, where, gradually or suddenly, one sees that humanity and nature, not separate, are in this world together; that nothing was lost when everything was given away" (1961, 8).

In addition to serving as a technique for silencing the ego, chance was also the manner of operation of nature itself. That means that when we hear a piece composed using chance operations, or a piece of indeterminate music, we are—according to Cagean aesthetics—hearing the rhythm of nature, the speed and flow of natural events that are not related to one another except by their co-occurrence in time and space. The result is an aesthetics that is not concerned with representing sensations, but rather with reproducing the dynamics of natural processes (Herzogenrath, 223). As Cage told Daniel Charles in 1970, "The world, the real is not an object. It is a process" (Cage and Charles, 80). This is nature veiled as a kind of (a)structural process that has been harnessed through techniques of chance and then employed to order or choose events. Shultis calls this "a structural connection between the making of music and the natural world" (87; see also Retallack 1994).

For a time beginning in the 1960s, Cage seemed to change his tune. In his "Diary" of 1965, he wrote, "Art's obscured the difference between art and life. Now let life obscure the difference between life and art. Fuller's life is art: comprehensive design science, inventory of world resources (if enough mined copper exists, re-use it, don't mine more: same with ideas). World needs arranging" (1969, 19). Indeed, the Cage

of "Diary," soaked in the rhetoric of Buckminster Fuller and Marshall McLuhan, was committed to the human technocratic arrangement of natural resources; he was full of suggestions like the following (again, borrowed from Fuller): "We should use above-earth energy sources exclusively: sun, wind, tides, and algae. The nations don't seem to know this" (1981, 184). In this period, Cage was less concerned with eliminating the human ego in favor of natural processes than in using human enterprise to restore natural resources that have been depleted, and to generate plans for a sustainable future. The "only chance to make the world a success for humanity," he wrote, "lies in technology" (quoted in Crohn Schmitt 1982, 102).

In his techno-environmentalist years ("We've / poisoned our food, polluted our air" [1969, 18]), Cage seemed to backtrack on the strict separation of human from nonhuman that marked his work up to this point. But the separation still stands—humanity has messed up the planet (which is "not us"), and we must fix it. As he put it, "all technology must move toward the way things were before man began changing them" (1969, 18). Indeed, following his introduction to the work of Henry David Thoreau in 1967, Cage seemed to lose faith in humanity's ability to restore balance. As Ingram explains, "Cage . . . had come to espouse the view, commonplace in many forms of radical environmentalism, that human interventions in nature are inevitably invasive and destructive, and consequently that the best solution to environmental problems is to leave the natural world alone" (572; see also Crohn Schmitt 1993, 178).

So, despite this brief period of ecological confusion in Cage's worldview, he largely maintained Latour's Modern Constitution: nature on one side, humanity on the other. This consistency is confirmed by an exchange that he had with Retallack just a few months before his death, when he commented on the music of Tan Dun, in which he heard the "voice of nature":

> JC: And the curious thing that makes it audible as having something to do with nature is that it is microtonal. And this of course, as I've told you, has been recently on my mind. Not *as* nature really, but as the part of sound that was beginning to take my ear. As it gets microtonal it gets away from our scales, hmm? And our rules, etcetera. I think that's why . . . why it seems so close to nature.
>
> JR: You're thinking of "nature" as opposed to culture?

JC: Yes.
JR: What "we" haven't constructed.
JC: As opposed to language, for one thing, and repetition and variation. When you hear sounds that have microtonal relations that are unfamiliar, you tend to think away from law toward nature, I think (Retallack 1996, 187).

In Cage's cosmos, thinking away from law toward nature will take one closer to a universal ground for action. "We must begin constantly from zero" (quoted in Retallack 1996, 143). Ground zero produces a particular kind of music, according to Christian Wolff, who wrote in 1957, "One finds a concern for a kind of objectivity, almost anonymity—sound comes into its own. The 'music' is a result existing simply in the sounds we hear, given no impulse by expressions of self or personality" (24). It is significant that Cage's aesthetic innovations most commonly associated with aesthetic postmodernism—that the work is an open-ended, authorless, changing event that creates unique experiences for each listener—in fact harbors a covert modernism: we are all free to form our own individual, "subjective" experiences of this natural event because it simultaneously defines the value-free space of objective fact: anonymous, nonexpressive nature.[5] Latour would call this a kind of mononaturalism that underlies multiculturalism.

In sum, Cage imagined a cosmos cleaved in two by a great divide. On one side were noises, sounds-in-themselves, chance, chaos, nonintention, nonorder, and multiplicity. This nonhuman reality is the way things truly are; it is objective, static though ever changing, and not expressive of anything other than itself. On the other side were the human laws of order, intention, hierarchy, desire, judgment, and history. This second side of Cage's cosmos is marked by disagreement, reductionism, and domination. Humans are suspended across this great divide; we are surely a part of the first side, according to Cage: "Humanity and nature, not separate, are in this world together" (1961, 8). At the same time, however, we constantly need to be pulled out of our habits and histories, which keep us mired on the second side, behind the veil of Maya. The means for effecting this relocation, for Cage, is discipline—not the kind of ordering or law of the sciences (for as Cage states, "a measuring mind can never finally measure nature"), but, rather, a discipline that sobers and quiets the mind, thus making it susceptible to the nature of which we are already a part (1961, 8–9).

In the "Lecture on Nothing" (ca. 1949) discipline takes the form of structure, which Cage describes as "a discipline which, accepted, in return accepts whatever" (1961, 111). Finally, however, Cage would settle on chance operations, the asking of questions, as his chosen discipline for allowing himself to "wak[e] up to the very life we're living, which is so excellent once one gets one's mind and one's desires out of its way and lets it act of its own accord" (1961, 12). As Konrad Boehmer noticed long ago, Cage's efforts to escape the disputed world of politics "created the impression that the exclusive use of chance absolved the author of all historical obligations, against which he had in fact already theoretically turned" (64).

One gets the sense that this escape from the political, social side of Cage's cosmos to the apolitical, natural side does not occur once and for all. Rather, it is an escape that must be continually reenacted—the composer never gave up chance operations, after all. So, even if one successfully makes it out of the all-too-human side of Cage's cosmos and into the right and proper side of nature, there persists a danger of sliding back. In this sense, humans can never entirely erase the great divide, for it is re-performed every time one opens up oneself to the natural world, leaving behind the false world of disagreement and desire, but also bringing it along as a dangerous supplement. The problematic of the great divide pervades commentary on Cage's work.[6]

According to Latour, "Nature is not a thing, a domain, a realm, an ontological territory. It is . . . a way of organizing the division . . . between appearances and reality, subjectivity and objectivity, history and immutability. A fully transcendent, yet a fully historical construct, a deeply religious way . . . of creating the difference of potential between what human souls were attached to and what was really out there. And also, as I have shown elsewhere, a fully political way of distributing power in what I have called the Modernist Constitution, a sort of unwritten compact between what could be and what could not be discussed" (2010, 476). Likewise, nature is not an ontological zone in Cage's work, but a specifically modernist way of organizing the division of subjectivity and objectivity. For him, nature is indisputable. There is nothing new about this, according to Donna Haraway: "In the fabled country called the West, nature, no matter how protean and contradictory its manifestations, has been the key operator in foundational, grounding discourses for a very long time. The foil for culture,

nature is the zone of constraints, of the given, and of matter as resource; nature is the necessary raw material for human action, the field for the imposition of choice, and the corollary of mind" (102). The nature of chance appears to be an embrace of uncertainty, for (Cage tells us) we do not know what will happen in a situation of indeterminacy. And yet, there is no arguing with nature, and the more we seek to order what is essentially unordered, the more we are behaving in a manner contrary to nature's wishes. Nature—whether figured as noise, chance, nonintention, or multiplicity—becomes the universal authority that grounds Cage's practice, and it is precisely the *certainty* of nature's authority that underwrites his aesthetic position. Ian Hacking sums up this paradox of the certainty of chance in reference to the ascendency of probability in the nineteenth century: "The more the indeterminism, the more the control" (2).

Nature's spokespersons, like Cage, ventriloquize the objective world of nature, dictating right actions while giving the impression that they are merely following a path of transcendental truth. In Mol's words, "They displace the decisive moment to places where, seen from here, it seems no decision, but a fact" (80). The work of Haraway and others suggests that the Cagean discourse of self-abnegation—which we are accustomed to associating with his borrowings from Asian philosophy—reproduces an all-too-familiar dynamics of power. Haraway writes, "This self-invisibility is the specifically modern, European, masculine, scientific form of the virtue of modesty. This is the form of modesty that pays off its practitioners in the coin of epistemological and social power" (23–24; for more on this point, see Piekut 2012).

Like those early modernists of the seventeenth century, Cage wanted to eliminate something of the confusion of multiple perspectives and belief systems. In the mid-1940s, he later commented, "I observed that all of the composers were writing differently. If art was communication, we were using different languages. We were, therefore, in a Tower of Babel situation where no one understood anyone else. So I determined either to find another reason or give up the whole business" (quoted in Kostelanetz 2003, 43). Cage's search for a solution to the Tower of Babel situation was a quest for certainty, for first principles.[7] In "Defense of Satie" (1948), he writes in a tone reminiscent of our early modernists: "Now I would like to ask and answer the questions: What kinds of things in art (music in particular) can be

agreed upon? and What kinds of things can be not agreed upon?" (1991, 78). In that essay, which predates the composer's embrace of chance, the answer to the first question involved time and duration; because duration is the sole musical property shared by sound and silence, it is the only right and proper means of organizing music. The certainty of this position is evident in Cage's dismissal of Beethoven, who wrongly structured his music according to the laws of harmony. Cage writes, "I answer immediately and unequivocally, Beethoven was in error, and his influence, which has been as extensive as it is lamentable, has been deadening to the art of music. . . . Beethoven represents the most intense lurching of the boat away from its natural even keel" (81). That antepenultimate word—natural—signals the path that Cage would take with respect to his certain foundations. In a few years, duration would gradually be replaced in his compositional discourse by chance (nature's manner of operation) as the first principle for determining right and proper aesthetic actions.[8]

For Cage, nature provided a ground for aesthetic principles that was unassailable: there was one nature, the nature of chance, and thus the correctness of his views was given and absolute. Realizing this authoritative role of nature for Cage puts a new spin on the rhetoric of pluralism and tolerance associated with his cultural politics, for his modernist worldview allowed little room for a diversity of approaches to right and proper actions. Take, for example, the way Cage praised Satie and Webern for structuring their music according to duration; the difference between their respective soundworlds, he argued, demonstrated the kind of diversity that was possible once one agreed upon a universal ground (in this case, duration). Again, this demonstrates the power of Latour's Modern Constitution and its structuring presence in Cage's thinking: Nature is objective and unchanging, diversity is built on top of it (Cage 1991, 84).[9]

Cage once nutshelled his philosophy as follows: "Get out of whatever cage you happen to be in" (1973, 212). The cage (small "c") under discussion here is the cage of nature; the nature of Cage (big "C") occupied this truly privileged position located beyond social affairs, where it could authoritatively ground his aesthetic procedures. But, writes Latour, "it is no longer possible to build the cage of nature—and indeed it has never been possible to live in this cage" (2010, 484). He means that there has never been a separate, nonpolitical realm of

nature, and this reality—driven underground by modernist ontology—can no longer be ignored in the face of catastrophic interventions by nonhuman entities into human affairs. And it turns out that Cage has never lived in his cage of nature, either. If we look past Cage's discourse, we find that his practical collaboration with "nature" is shot through with hybridization and interpenetration—more of the latter than even he realized. Far from a simple interaction of two distinct ontological zones, Cage's compositional process takes the form of mutually constituting agencies. Let's take a closer look at how this works.

LAB NOTES

Cage began composing his *Music for Piano* series in 1952 (see Francis, 61–77; Pritchett). He was searching at the time for a way to create music more quickly than was possible with the more laborious chart process of works like *Music of Changes* (1951). In *Music for Piano*'s eighty-four pieces, he developed what James Pritchett calls the "point drawing technique" to place on a page of staff paper points representing musical events in terms of pitch and time of attack. Cage determined the location of these points by observing the imperfections in a sheet of transparent paper.[10] Pritchett's overview of this process again makes clear the transparency with which nature was purported to emerge: "In the new systems that Cage developed, all of the points in the space were equally possible; pitch and time were treated as the continua that they truly are" (92). Given that Cage's experimental action "sees things directly as they are," one might wish to witness, with the composer, that single moment when nature is laid bare. At what point in the process of composing *Music for Piano* does this originary moment occur? Although we might discover that "nature always slips out of reach in the very act of grasping it" (Morton, 19), the question is nonetheless useful to investigate.

Although obvious, it might be necessary to point out that a whole series of mediations precedes our originary moment of Cage holding his blank sheet of imperfect, transparent paper.[11] This series includes the squirrel who finds and stashes an acorn for the long winter, but who unfortunately forgets the location of his booty, which soon enough begins to sprout into an oak sapling. This oak sapling might grow in a state-managed forest in the Pacific Northwest, transforming sunlight,

water, and nitrogen into wood fibers and lignin, before being harvested by the hands and machines of a multinational timber company and chopped into chips, which are in turn digested and steamed to isolate the fibers (now combined with cotton and plastic) in a watery pulp. (Some of these fibers might become broken or stuck together, resulting in eventual imperfections in the final product.) This pulp is screened, rolled, heated, starched, dried, ironed, cut, stacked, trimmed, banded, boxed, and shipped to wholesalers through North America, until it finally reaches the hands of Cage through the channels of a local distributor, a corner shop, the exchange of currency.

Yes, there are innumerable translations, abstractions, and mediations that precede our transparent origin, but forget all of these. Cage holds the transparent paper and wishes to make it speak. But there is one more preparatory stage: he has first created a master page of four musical systems, each with space above and below it for ledger lines. In between the staves of each system, he has inscribed a horizontal line "allowing for the notation of noises produced by hand or beater upon the interior (above the line) or exterior (below the line) piano construction" (1961, 60). Now, the origin. No, wait, there is another preparatory step: Cage uses the *I Ching* to execute a chance operation to (pre)determine the number of sounds per page (this decision depends on the desired level of difficulty for each performance). Okay, we have finally arrived at the origin moment: "A blank sheet of transparent paper is then placed so that its pointal imperfections may readily be observed" (60). The paper, apparently, does not give up its secrets very easily. Cage must position the paper in such a way—against a window pane? on a light box? (it is left unspecified)—that the imperfections, which might be so slight as to escape notice under normal conditions, can become *observable.* Next step: "That number of imperfections corresponding to the determined number of sounds is intensified with pencil." Not every imperfection is intensified; instead, the composer *selects* something like a representative sampling, based (one assumes) on a momentarily emergent plan for general timing or density distribution within the predetermined total number of sounds. Moreover, the imperfections, even after being enhanced through Cage's unknown process, do not express themselves, or distinguish themselves, clearly enough, so they must be *amplified,* or reinscribed with a mark from the composer's pencil.

Next, placing the penciled, transparent sheet "in a registered way" on the master page, Cage inks the staff and ledger lines around each penciled imperfection. This action supplies a grid of *measurement* that allows insignificant imperfections to become meaningful through a system of *inscription.* Those marked imperfections that fall within the space of a staff are inked as whole notes with specific pitches, and those marked imperfections that fall within the space between the staves are inked as filled-in noteheads (signifying nonpitched sounds). In the former case, Cage has performed this operation "roughly," because most marked imperfections will fall in the space between lines rather than directly on them. Therefore, in cases where a mark is close to a line, then Cage simply moved it directly onto the line. This stage of the process could be called *quantization:* a continuous sample is restricted to a smaller number of discrete values. Cage then tossed coins to determine the clefs of each staff, and the results of this operation were subsequently inked into the transparent, imperfectly marked sheet of paper.

In the final stage, Cage employed the *I Ching* to determine the timbre of each imperfection-now-note. The composer divided the oracle's 64 possibilities into three groups: normal (played with the keys), muted (with a hand on the string), and plucked. For each note, then, a number between 1 and 64 is generated through a series of coin tosses. If (for example) it is between 1 and 5, the note will be played normal; if it is between 6 and 43, it will be muted; and if it is between 44 and 64, it will be plucked. In this manner, Cage places his total number of imperfections-now-notes into a weighted *distribution* of possible timbres. (He performs the same process to determine whether each pitch is natural, sharp, or flat.) The results of this distribution—articulation markings—are written on the score for each note. The score is complete.

But what then happens to this score? Most of the pieces in *Music for Piano* can be performed in any duration—the placement of notes in time being relative, one system might last ten seconds or ten minutes. Furthermore, most of these pieces can be performed with any other(s), overlapping in time and/or separated by silence. Once a producer settles on the duration of the performance and the number of performers, and assembles the appropriate number of instruments in a venue, a concert can take place. The collected performers, joined by

means of shared time (stopwatches), do their best to render Cage's imperfections-now-notes into sounds at the appropriate moments. Listeners hear these sounds themselves.

This is what it takes to "let sounds be themselves." Sounds *are* themselves, yes. They push back, they surprise, they do far more than their inscriptions can indicate. But as this narration of one ostensibly simple compositional process indicates, they require much work on the part of Cage and others in order to exist. Instead of merely presenting us with natural things as they truly are, Cage is embroiled at every stage of their transformation: observation, selection, amplification, measurement, inscription, quantization, and distribution. To be clear, however, I am not arguing that Cage "made up" his results. The world is never simply revealed, but it is also never simply invented. Of the many actors in this experiment, two stand out: Cage and the imperfections, which function as chance operators (and thus, in Cage's cosmos, as representatives of nature). To gloss Latour, in the course of the experiment Cage and the imperfections "mutually exchange and enhance their properties," he helping the imperfections to define themselves, and these imperfections helping him to create a new work (1999, 124).

Every entity is an actor to the extent that it *changes* some other entity during their interaction; there can be no transparent actors—not even that transparent paper—that disappear in the experiment. Therefore, in any successful experiment, the list of actors drawn up before the event is different from the list of actors after it. To again adapt the language of Latour, "This is . . . why the list drawn up after the experiment needs no addition of Nature, or society, or whatever, since all the elements have been partially transformed: a (partially) new [Cage], a (partially) new [imperfection], and a (partially) new [audience] are all congratulating one another at its end. . . . [A]ctors *gain* in their definitions through this event, through the very trials of the experiment" (1999, 126). Cage, that faithful student of changes, was attuned to the ways that the environment could change the composer, but he was less attentive to the ways that the composer changed the environment, to the impossibility of liberating "'raw' sounds outside the entanglement of man-made systems" (Boehmer, 67).

What this example precisely demonstrates is the entanglement of all kinds of entities. In other words, we begin with a printed score on

our music stand and end up in the mouth of a scatterbrained squirrel. In the meantime, we've visited the bureaucracies of the U.S. Forest Service, loggers' unions, wood chippers, the midtown concert scene, and the pages of the *I Ching*. What kind of network is this? We have traced a path that is certainly not simply natural or social. This path is far more risky—we do not know where it will lead.[12] The modernist ontology of nature and society fails to account for the transformations that define this—and indeed, all types of—encounter. This failure reveals the weaknesses both of conventional accounts of science as discovery and of more recent critiques that frame nature as mere social construction. In both of these approaches to experiment, Latour writes, "Nothing new has happened. Either experiments simply reveal Nature; or alternatively society, or biases, or theoretical blind spots betray themselves in the outcome, over the course of an experiment. Nothing more happens in the history of science than the discovery of what was already there, all along, in nature or society" (1999, 126). The composition of *Music for Piano* was not a discovery or an uncovering of the world. It was an event that created new versions of all the actors involved in its performance.

Every stage of this creative process is imbued with contingency—*it could have been otherwise!* How many sounds should be chosen? Are the imperfections observable? To what extent does the sample size matter? What is an appropriate system of measurement? How many discrete steps of value should be employed? How should qualities be distributed in a natural way? Cage fixes steps, leaves others open to statistical variation, controls this parameter while opening up that one. At the same time, wood pulp and its chemical transformation into paper mediate the composer's relationship to his source of employment: he cannot keep up with quick commissions from choreographers when he employs only the complicated aesthetic processes of works like *Music of Changes*. But even this wood pulp cannot help without first receiving help of its own in the form of pencil markings (intensification) and, eventually, pen inscriptions. These human and nonhuman actors (and, of course, many more) are thus held together in a contingent, temporary ecology.

The dynamism of Cage's references, of the chain of translations he creates in *Music for Piano*, provides a striking contrast with the stark determinism of nature in his compositional discourse. Despite his deep

involvement in nothing less than an ontological duet, Cage presents himself as nothing more than nature's spokesperson. There are no hidden meanings here, he tells us. The view he held of his role in an overpopulated world makes this clear: "But I have no illusions about the role I'm to play in this realm. It will probably be a rather humble role. The ecology, I firmly believe, can assert itself all by itself" (Cage and Charles, 235). His experimental action "sees things directly as they are: impermanently involved in an infinite play of interpenetrations" (Cage 1961, 14). The world, in other words, simply is; *it could not have been otherwise!* As theologian Jeremy Begbie has noted, Cage's model of the cosmos seems to exhibit "a distinct unease about the relation of the composer to the constraint of nature" (192). In presenting himself as a transparent spokesperson, then, Cage covers up his own effectivity in the face of his nonhuman collaborators. But what of those nonhumans and their effects? Let us turn to these in conclusion.

In his dissertation, David Patterson includes an intriguing remembrance from the sculptor Richard Lippold, who told him that the Cage of the 1940s "hated nature. At Black Mountain College [summer 1948], he wouldn't go on walks or anything. His excuse was that the sun burnt his skin—from the freckles, or something like that. His interest in nature was very, very remote. When he moved to the country [August 1954], he was forced to deal with it, and it led to his interest in mushrooms. . . . Then he got so absorbed by hunting mushrooms that it never bothered him to be out in the sun or anything like that. But at the beginning he was very much an aesthete in terms of nature" (27–28). It is tempting to see this aesthete Cage as gradually transforming himself into the new, environmental Cage that Ingram and others have described in detail. But, as I hope to have shown, they are the same. The aesthete Cage and the environmentalist Cage both think nature is objective, beyond dispute, and separable from the uncertainties of human affairs.

But there is a third Cage: the composer. We might even call him a "compositionist," to take Latour's term for those trying slowly to build the common world of the future: "[C]ompositionism takes up the task of searching for universality but without believing that this universality is already there, waiting to be unveiled and discovered" (2010, 474). Cage-the-composer enacted new hybrid worlds in his studio, and

these fabrications—because they were made—were always subject to revision. "For a compositionist, nothing is beyond dispute. And yet, closure has to be achieved. But it is achieved only by the slow process of composition and compromise, not by the revelation of the world of beyond" (2010, 478). Cage thought he was removing himself from the compositional process in an appeal to the universal authority of direct reality. He thought he was unveiling a world beyond dispute, but he was in fact participating in the creation of this new reality, disputable at every stage. In other words, this compositional process was contingent, but not in the way he thought. Cage's enacted contingency took the form of an ontological indeterminacy, not simply an imitation of nature in its manner of operation. "Nature" need not come into it. Instead, he participated in a network of entities—some human, some not. They all had their effects: sounds changed Cage, Cage changed sounds. The outcome of these interactions was unforeseen.

Although I have argued here that we must not allow Cage's agency to disappear from our view of his human–nonhuman collectives, that he was not simply a modest witness who revealed nature while only being affected by it unidirectionally, one might pursue this argument to a more radical hypothesis: Cage's work dramatizes the indeterminacy of the world to a much greater extent than he knew. At issue is not just his agency but the agency of his nonhuman collaborators. On this point, he does a disservice to the nonhuman world that he so wished to be changed by. As Timothy Morton observes, Cage's submission to chance required a mechanistic understanding of the universe: "The musical perceptions of John Cage . . . evoke a communitarian suburban or libertarian form of quiet that is also static in a political sense—there is no chance of progress, just an endless application of laws" (102). In other words, even though he was committed to freeing his nonhuman collaborators from human intention, Cage could only grant them a single manner of operation—chance alone. And yet the world makes a much more uncertain contribution than the mere application of laws of chance, and a properly realist account of Cagean musical indeterminacy would situate it in a fundamental ontological indeterminacy that takes seriously the agency of all entities—entities tangled up in a truly alien menagerie whose being persists and changes in ways that can be random, ordered, linear, nonlinear, or possibly structured according to emergent rules beyond human comprehension

(Bogost; Connolly). In this wider horizon, Cage's understanding of nonhuman agency as chance-determined appears both limited and surprisingly anthropocentric. The set of mediations that preceded his encounter with sounds themselves—including (but certainly not limited to) squirrel to nut, nut to tree, tree to timber, timber to fiber, fiber to imperfection, imperfection to chance operator, chance operator to sound being itself—enfolds many entities in different moments of intention and non-intention, planning and disruption. The indeterminacy at work here is expressed on several levels at once: first, we cannot determine in advance how these entities will come together in a network; second, we cannot determine in advance how any single contribution—made with intention or without—will become efficacious in a dynamic assemblage; and third, we will never fully determine how nonhuman entities relate to one another.

Acknowledging the strange agency of nonhuman entities should be distinguished from mere anthropomorphism. And anyway, as Jane Bennett has argued, a strategic use of the animist perceptive mode can lead to more sophisticated understandings of material complexity: "A touch of anthropomorphism . . . can catalyze a sensibility that finds a world filled not with ontologically distinct categories of beings (subjects and objects) but with variously composed materialities that form confederations" (99; see also Latour 2010, 481–82). To concentrate on "the distinctive capacities or efficacious powers"—the distributed, entangled agencies—of all material configurations is also to refuse the absolute divisions between subject and object, culture and nature, that are taken for granted in modernist thinking.

One of the virtues of Cage's work is that it shows us that another world is possible. Although his modernist politics of nature was premised on a quest for ontological certainty, his compositional process continually demonstrated the ontological contingency of all world making. In this regard, there is nothing special about Cage's cosmos; ontologically speaking, he is interesting not for his exceptionality, but for his exemplarity. But the environmental movement for which Cage felt some sympathy might gain inspiration from his unwitting lesson: all futures are up for grabs. The risk of operating in this arena of ontological indeterminacy was not a quality that interested Cage; he much preferred the language of acceptance, openness, and so on. And yet, risk is perhaps the predominant theme in this time of crisis, and it

belongs in the conversation. To this end, I'll conclude with a little risky speculation.

Risk, to quote urban studies scholar David Brown, "repositions a vital informant of twentieth-century forms and expressions, chance, from a structuring device, or operation, to an unanticipated variable, or stimulus" (128–29).[13] Moving from structure to stimulus, mechanism to vitalism, *chronos* to *kairos:* this change describes precisely the difference between indeterminacy and improvisation. In a risky world, good and bad surprises do not simply occur; they are produced through the improvisations of innumerable actors, each enmeshed in networks of weaker or stronger associations that exaggerate or attenuate the consequences of these improvisations. If this is true, are there theoretical opportunities to be seized by taking improvisation—not chance—as not exactly nature's manner of operation, but rather, as the world's manner of emergence?

On August 29, 1952, sitting in the audience at the Maverick Concert Hall in Woodstock, New York, one might have heard a number of things during the premiere of *4′33″*: wind stirring in the trees, raindrops gently falling on the roof, and, eventually nervous giggles and other human vocal interventions (Gann). If one was sitting toward the back, one would have been positioned outside of the hall, whose four large barn doors had been thrown open for the performance. One also might have heard a faint buzzing from a beehive out in the woods just a few yards away, the sound of a "buzz-run" being performed by scout bees to warm up the muscles of their lazy colleagues so that they would be ready for a group flight to a newly discovered pollen site (Zuk, 206). These are just bees being themselves. Following Cage's example, one might ask: was the sound of this buzz-run created with intention? A better question is the following: If Darwin was correct, and the sound of the buzz-run is the result of millennia of natural selection, how is contingency expressed inside the hive? (And this is the same as asking how contingency is expressed inside of *4′33*," since *4′33″* is an occasion to hear the sounds of its environment.)

The answer has something to do with the difference between chance and risk. "What was so radical in Darwin's discovery," writes Latour, was "that each individual organism, *without* a Blind or Intelligent Watchmaker, *without* an optimum, *without* a plan, *without* a cause

(final or efficient), *without* any Providence of any sort (religious or rational), had to face the vertiginous risks of reproduction" (2009, 469). Cage and Darwin both believed in contingency, in the "necessity of contingency," to use Quentin Meillassoux's rich phrase.[14] For Cage, contingency offered a structure of the way things truly are. For Darwin, contingency offered an unanticipated variable, or stimulus, leading to the way things would become. For the bee, the world is full of these risks, variables that lead to creative, buzzing futures (as Whitehead, riffing on James, would put it, "a buzzing world, amid a democracy of fellow creatures" [50]). Evolution occurs in the gap between cause and consequence, where uncertainty is transformed into risk, then opportunity, then advantage. Acting inside that gap necessitates improvisation to bridge temporarily the perforations between existing and emerging entanglements. Indeed, recent biological research has stressed the improvisational character of nonhuman cognition, detailing many varieties of spontaneous, adaptive response to changing environmental conditions (Shaviro). Though it rarely uses the term "improvisation," this research portrays a world that is nonlinear and rarely predictable in a determinist way. Cage may have sensed this when he commented that improvisation is made possible by "a faulty relationship between cause and effect" (Cage and Cope, 21), but the dynamics and implications of this faulty relationship remain unrealized in his thought.

As Latour writes, "Each individual organism is alone with its own risk, goes nowhere, comes from nowhere: it is creativity all the way down" (2009, 470). If improvisation is an action that combines known and unknown, or intention and disruption, or planning and surprise, or order and disorder, or repetition and change, then any entity is both a result of previous improvisations and a basis for future improvisations: it is improvisation all the way down. The path between cause and consequence is never straight, yet it never deviates in the same way. Cage's ontological politics can't seem to account for this creativity born of risk, or for the uncertainty of worldly improvisations. Limited in his thinking to the determinacy of chance, he couldn't track the indeterminacy of improvisation, which highlights the instability of causality. Bennett writes that "biochemical-social systems can sometimes unexpectedly bifurcate or choose developmental paths that could not

have been foreseen, for they are governed by an emergent rather than a linear or deterministic causality. And once we see this, we will need an alternative both to the idea of nature as a purposive, harmonious process and to the idea of nature as a blind mechanism" (112). Indeed, entities do not simply bear the indisputable necessity of chance, but rather seize opportunities afforded by unanticipated variables in order to make new futures and new worlds.

Improvisation is a way of going from nowhere to nowhere, an exploration of the possibilities found in the "faulty relationship," the little gap, between causes and consequences that, in one context, we call evolution. This is how we might conceive of improvisation as the world's manner of emergence. Making this observation is not the same thing as advocating improvisation over indeterminacy, except in descriptive terms: an improvisational ontology provides a more accurate, more realist account of the world. The difference between this account of ontology and the kind of ontological politics practiced by Cage (and other modernists) is that an improvisational ontology, born of risk, refuses the precompositional step of dividing the world into the categories of nature and culture. Although his ontological politics promised something different, Cage's compositions did not imitate nature in its manner of operation. They did, however, join with the world in its manner of emergence. Recognizing this difference provides a way to conceptualize improvisation in Cage's poiesis that moves beyond unresolved conversations about self-expression, memory, and taste (Feisst). We arrive at this new concept of improvisation in his poiesis by looking at how he related to his nonhuman collaborators, and how they, in turn, related to him. Cage himself unconsciously pointed to this opening by referring to some of his most explicitly eco-titled works—*Child of Tree* (1975), *Branches* (1976), *Inlets* (1977), and *Pools* (1978)—as "improvisations," or "music of contingency." These pieces are not particularly noteworthy, except for the ways that they dramatize what Cage (and all of us) had been doing all along: risking new worldly improvisations with uncertain futures.

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Notes

I am grateful to several colleagues who generously read earlier drafts of this essay: Eric Drott, Phil Gentry, Bill Girard, Roger Moseley, Rachel Mundy, and James Webster.

1. Latour's treatment of modernity is not without its faults. In a cogent critique of his work, Harding highlights the salient issue: "The big news Latour's account brings is not that 'we' have never been modern, but that bourgeois, Western men who get to construct philosophies of science and political philosophies have never achieved that status to which they aspired. The rest of us always suspected not only that women and the West's Others already were not modern; worse, we never would be, at least not in the ways the Enlightenment's ideal Rational Man could be" (54); for other thoughtful critiques, see Elam; Gaonkar; Redfield.

2. See his *Song Books* (1970), *Score (40 Drawings by Thoreau) and 23 parts* (1974), *Child of Tree* (Improvisation I) (1975), *Lecture on the Weather* (1975), *Branches* (1976), *Inlets* (Improvisation II) (1977), *Pools* (1978), *Litany for the Whale* (1980), and *Ryoanji* (1983–85).

3. See also Bernstein on this point: "Cage sought to withdraw his own subjectivity from the creative process through the use of chance and indeterminacy" (210).

4. See also Hayles: "Given a head start by subversive intentionality, chance has a chance to outrun intention and thereby open us to the world as it is, not merely as we think it will or should be" (231).

5. For another treatment of Cage's authoritarian modernism, see Taruskin.

6. For example, Crohn Schmitt's (1982) perceptive essay on the way nature works in Cage's aesthetic continually demonstrates and replicates a certain confusion in Cage's thinking: we *are* one with nature, or we *must become* one with nature. The former implies that humans exist on an equivalent plane with nonhumans, that all entities are interpenetrating and perhaps even co-constitutive; the latter implies that humans exist on a plane distinct from nonhumans, but that we can and must imitate the chaos of nonhuman reality.

7. The phrase "quest for certainty" comes from James Dewey, who, despite painting post-Cartesian philosophy with a rather broad brush, nonetheless identified a crucial impulse in modern thought. It must be noted that modernist thinking was not solely marked by appeals to the certain authority of logic and the scientific method; the skeptical tradition is evidence of this heterogeneity of thought. For an explication of this point, see Jay, chap. 2.

8. Not unrelated here is the function of time in Cage's cosmos. It is a modernist, clock time that unites a freely interpenetrating multiplicity of centers. In the composer's later anarchist politics, the one (only) thing to be agreed upon is what time it is. "The one thing that they would be in agreement about would be something that everyone is in agreement about, even the masses. . . . And that is, what time it is. They would agree that the clock is correct" (Retallack 1996, 50–51).

9. This treatment of nature extends a previous argument about the precise relationship between indeterminacy and its futures. To what extent was Cage invested in outcomes that were truly unforeseen? In *Experimentalism Otherwise,* I set aside his rhetoric about accepting the unforeseen, and instead looked at how actual events seem to provide a dissonant countermelody to Cage's main tune (as it was expressed in lectures, writings, and interviews, and subsequently repeated in much scholarship since). Indeterminacy, it turns out, was not only about contingency, but also about certainty. Cagean "tolerance" was extended only to the unforeseen actions of those individuals who had already internalized Cage's worldview—the free choosers who always choose "correctly." In other words, it seems that admission to the Cagean arena of indeterminacy came with a cost, namely, the forfeiture of those substantial beliefs that a critic less sympathetic to Cage might call the very basis of diversity (see Piekut, 2011, 20–64).

10. Pritchett asserts that "the points were generated by observing and marking minute imperfections in the manuscript paper," but Cage explains in *Silence* (1961, 60–61) that the imperfections were found in a sheet of transparent paper. Cage's method for determining the number of points on each page of *Music for Piano* varied, especially for the first few installments in the series. The following narrative is based on Cage's account of composing numbers 21–52.

11. Hayles also briefly touches on the prehistory of the imperfections.

12. I am riffing on Latour 2003, 36. Latour reframes Ulrich Beck's concept of "risk" in terms of "networks."

13. Brown is building on a statement of Butch Morris: "Risk, not chance." I was led to this discussion by Citton.

14. Like Latour, Meillassoux is a student of contingency, even if he follows a different (questionable) path by denying the necessity of relationality and embracing instead the notion of primary and secondary qualities of things-in-themselves. In the end, Meillassoux radicalizes the skeptical position by concluding that we can have absolute knowledge of the world, but this is an absolute knowledge of the openness of possibility, or the necessity of contingency.

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