

Introduction: Conserving Active Matter and the Historian

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Abstract

What contribution can a historian make to conservators' thinking about active matter? The historian might be able to bring a long-lens perspective to the problem of activity by locating current discussions in the millennium-rich global literature on ruins and ruination. Everywhere we find ruins we are seeing a conservation discourse. The historian can also help ground the current discussion of active matter by identifying forgotten or overlooked presentations of the activity of matter, demonstrating their connection to one another, and suggesting reasons for the eclipse of this approach. Recovering the history of active matter offers a bridge to non-European traditions of thought in which matter's activity was never doubted. This turns the table on the presumed normativity of European—in fact, one strand only of European—views of matter. With this comes the possibility of a new kind of conservation thinking that is both global and true to Europe's own diverse heritage. Finally, reapproached through the lens of quantum physics, active matter offers a way to engage profitably with a range of questions that have been generated by the quantum revolution. A quantum theory of the object (QTO) could anchor conservation within a human sciences of “becoming” and “process.”

All things are full of gods
—Thales of Miletus

Before we begin, we need to object: Is there not something fundamentally paradoxical about conserving active matter? Don't the terms

pull in different directions? We will leave the paradox for later and the definitions for a moment. Instead a story, and a very familiar one, that introduces conserving active matter not as an abstraction but as something important to us all: near at hand, and close to heart.

At the end of book 5 of *The Odyssey*, the hero has washed ashore on the island of the Phaeacians. Exhausted from his swim, he hauls himself up the beach and collapses in a close-grown thicket, but not before burying himself under a pile of dead leaves to protect against cold.

As when a man buries a burning log in a black ash heap
in a remote place in the country where none live near as
neighbors,
and saves the seed of fire, having no other place to get a light
from, so Odysseus buried himself in the leaves.¹

“Saving” the fire from going out, saving his life from expiring—this, surely, is an act of conservation. But the fire, like the sleeping body, remains active. It is “banked,” covered with ash, slowed, stabilized, managed. But it is alive.

In what follows I will speak as a historian who lives in an institute with philosophers, art historians, archaeologists, anthropologists, and materials scientists and has been immersed for ten years in the questions of conservators and cultural heritage scientists. “Conserving,” “active matter,” and “conserving active matter” are not terms that historians think much about. Talking with conservators and with my colleagues from other disciplines, I’ve come to see their importance—not just for conservators but also for historians. Nor are these but the inevitable benefits of a cross-disciplinary conversation that, like a fascinating dinner party conversation, may leave a happy feeling the next day, but not much else of substance. No, as I hope to show, these terms take us to very important issues, ones that historians could—perhaps even *should*—address.

Activity, Ruins, Conservation

Wolfgang Schäffner would have us pay attention not only to the history of materials but to the way that this particular history intertwines with other histories. Walter Benjamin made the association for all time between cast-iron architecture and the *passages* of Paris (and his imagined alter ego, Carl Roseman, took this one logical step further and annexed the architecture of New York’s SoHo as well). Schäffner points

out how those nineteenth-century materials shaped the vision of the new field of conservation as it was then developing. With iron shaping its horizon, it is no surprise that conservation would view the stability of matter as a good. (There is also a long history behind this, as we will see below.) In the same way, if conservation were beginning right now as a field, it might more intuitively respond to the pervasiveness of activity.²

But, as it stands, “activity” is not how conservation as a profession has mapped its territory. The International Council of Museums–Committee for Conservation in 1984 defined the work of “preservation” as “action taken to retard or prevent deterioration of or damage to cultural properties by control of their environment and/or treatment of their structure in order to maintain them as nearly as possible in an unchanging state.”³ The American Institute for Conservation defines the profession of conservation as one dedicated to the “preservation” of cultural heritage and “preservation” as work “that minimize[s] chemical and physical deterioration and damage and that prevent[s] loss of informational content.”⁴ Granted that these kinds of professional definitions are the supertankers of the world of ideas: slow moving and hard to maneuver. The fact that “slowing,” “stabilizing,” “minimizing,” and even “managing” change—once upon a time the goal was “arresting change”—are, of course, ways of dealing with activity without daring to speak its name makes our point.⁵ Key terms related to activity are heavily value laden. Change is “degradation.” The change set in motion by the material constitution of the object is “inherent vice.”

But maybe things are beginning to change. *Conservation of Cultural Property—Main General Terms and Definitions*, published by the Republic of Italy in 2012, defines “alteration” as “change in condition, beneficial or not, intentional or not”; “aging” as “natural alteration over time”; and “deterioration” as “gradual change in condition that reduces significance or stability.”⁶ Though even here, we have to note, “activity” still roams undefined.

Ivan Gaskell and Anne Eaton put “activity” under the analytical philosopher’s loupe. They see it as something that can be imposed on matter from without, as something that comes from within, and as something that comes from within but can be triggered by something coming from without. Activity could interact with matter to create new matter, could interact with matter to destroy matter, and could trigger random behavior by that matter. What they do not find is biologically inactive material that is yet capable of generating activity from within itself. Gaskell and Eaton point to the frontier between “biologically living” and nonliving active matter as marking both the zone of greatest uncertainty and

where the future of active matter will play out. Achim Menges and the Berlin group presented pine cones as a readily grasped example of the activity of nonliving matter—dead cells opening and closing. Even in this case, however, Gaskell and Eaton note that there remains the triggering work of moisture in the air, however minimal. That they would argue that only a god can create from nothing might, in practice, only mean that for everyone and everything else, activity has a context.

Philosophers look at the natural activity of matter—always declining from a higher energy state to a lower one—and see it as bound up with our understanding of life itself. Humans, for example, have tended to experience activity as a negative: closely related to decay, dissolution, and death, though Yuriko Saito’s exploration of the Japanese *wabi* aesthetic reminds us that this needn’t be considered a universal disposition. For anyone encountering change, but especially for those who do not like its effects, conservation can be an assertion of the values of life. So, medicine, whether practiced by a doctor or a shaman, is a form of conservation. History, whether practiced by a poet or a priest, is a form of conservation. Architecture is a form of conservation. And so on. If entropy is the background condition of all things, then the effort of “conservation” to slow its course could be another way of describing the work of *cultura*, the Latin term for the human intervention in the natural world. This intervention suggests that “culture” and “conservation” have long been connected. Maybe, even, we could formulate a strong argument that culture is actually *made* by acts of conservation, both material and mental. That’s how important conservation is.

“Active matter” encourages a new way of thinking about conservation by putting the emphasis squarely on activity and not its evaluation. Another thing we learned from *Conserving Active Matter* was that in the world of contemporary art conservation these questions were already being asked—but without the language of “active matter” to connect them to other fields of inquiry. Chris McGlinchey casts his essay not only as a first-person report from the field but as a report from the field set like a jewel into a fragment of a *Bildungsroman*. He is the young scientist blithely oblivious to change, even when pointed out to him by conservators, who then grows through experience into the wise head who can reflect on a complexity he never imagined, but that he has come no longer to perceive as a threat: “The tolerance for authenticity can be variable and arguments for what exactly is authentic, complex.” With works such as Tania Bruguera’s *Untitled (Havana 2000)*, the activity of matter, which had stood as a threat to the human and the work of humans, and had been either repressed or denied, was

now embraced. What would this mean for a professional practice that was dedicated to defending the prospect of permanence against the sharp, eating teeth of time?

Once we stop to think about it, we see that the impermanence of things and the corresponding need to conserve are a fundamental human experience. We could even describe hominins as the tribe that conserves. A million years ago in what is now South Africa, a hand ax was made by our ancestors. And not long after, it was reknapped, or repaired, to maintain its usefulness.⁷ But the significance of the encounter with activity, and of the preservationist response, can perhaps be most clearly discerned in the endeavor to preserve not tools only, but memory itself. The erection of menhirs and dolmens across pre-literate Europe and of pyramids just on the other side of literacy in ancient Egypt are the biggest, and oldest, representations of this desire to defeat the force of change, decay, entropy, or as we might say, matter's activity. Mesopotamia's kings, building with mud brick that they knew eventually to decay, sought futurity by stamping their names on the bricks and leaving in the foundations of the temples they erected but knew would collapse texts urging their successors to rebuild them and perpetuate their names. Around the same time, in Middle Kingdom Egypt, a poet set out to argue that words made for a more enduring monument than stone because nothing lasted longer than a human memory that could be passed along from generation to generation.⁸ Alain Schnapp reminds us that Pindar's Sixth Pythian Ode resumes this theme, for which Horace provided Europe, at least, with its canonical formulation: "I erect a monument more permanent than bronze" (*Exegi monumentum aere perennius*). Our records from one of the other ancient civilizations, China, show the same feelings. Stephen Owen sees the *Analects* of Confucius as the moment when the past became distant and needed to be sought after. "He said, 'I am not someone who was born knowing it; I love the past and am someone who seeks for it earnestly.'" The "poems of memory" sprung from this. They are efforts at conservation—yet efforts that reinscribe loss within every attempt at remembrance.

Hold with the past, don't lose the past;
 If you lose the past, your will easily breaks;
 If you lose the past, even the sword snaps;
 If you lose the past, the zither too laments.
 And the Master's tears for the loss of the past
 In those days fell streaming in torrents.¹⁰

I knew about ruins, and I knew about their study. But I never realized that the discourse of ruins, which continued unabated into the nineteenth century, at which point industrial modernity, rather than antiquity, became its focus, was a way to discuss the dialectic of matter's apparent stability but inherent mobility. Carolyn Korsmeyer's essay takes up their challenge and explores the implications of different kinds of ruins. Alva Noë's essay goes a step further, asking whether death—or "ruination"—is not just a different way of talking about living. In wrenching around our perspective, Noë brings us back to Buddhism. Lurking in the background of Yuriko Saito's discussion of Japanese aesthetics of degradation (*wabi*) is the very different ontology, or understanding of Being, that came from Buddhism, even though it was a fourteenth-century Japanese Buddhist priest who acknowledged that "people *commonly* regret that the cherry blossoms scatter or that the moon sinks in the sky, and this is *natural*."¹¹

Which means that wherever we find ruins depicted or invoked, whether in image or in word, we find ourselves in a conservation discourse. And since there is such an expansive literature of ruin, from all places of human habitation and, seemingly, from all times, we need to acknowledge that preservation is a fundamental human feeling, experience, need.

If we look closely into this discourse of ruins, and even if we never stray from its high road—documents like Hermannus Posthumus's 1536 *Landscape of Ruins* or Sir Thomas Browne's 1657 *Hydriotaphia, Urn Burial* or Percy Bysshe Shelley's 1818 "Ozymandias"—what we find is that the "ruins lesson" is, in the end, always about time's passage.¹² Leonardo da Vinci, he of flying machines and armored vehicles, was a contemporary of the Frisian Hermannus Posthumus and like him a reader of Ovid's *Metamorphoses*, the same lines from which they both quote: "O time, devourer of things! O envious age! Thou dost destroy all."¹³ William Shakespeare, he of Hamlets and Falstaffs and Pucks, was also a reader of *Metamorphoses*.

When I have seen by Time's fell hand defac'd
 The rich-proud coat of outworn buried age; . . .
 Ruin hath taught me thus to ruminat—
 That Time will come and take my love away.¹⁴

Or:

To ruinate proud buildings with thy hours,
 And smear with dust their glittering golden towers;
 To fill with worm-holes stately monuments,

To feed Oblivion with the decay of things

 to spoil antiquities of hammered steel
 And turn the giddy round of fortune's wheel.¹⁵

Sherri Irvin reflects on a class of contemporary artworks whose subject is ruination and that *exemplify* their subject by ruining themselves in the course of their display-life. If Fluxus works from the 1960s expose some *aporie* of active matter, they do so by exemplifying transience, fragility, and lack of self-regard. But Irvin's objects of inquiry are not "about" transience. They are about decay. And they *are* decay. Irvin's analysis helps us understand the astonishing staying power of the discourse of ruins. Like Zoe Leonard's *Strange Fruit*, but at a very, very much slower pace, the ruins of some man-made things allow for an intergenerational philosophical experience. Their power lies in the fact that, like the neutron star that remains after a supernova, when all else—people, history, even myth—is gone, time remains. And unlike those early photographs whose necessarily long exposure had the effect of making activity vanish, ruins magically do the reverse: they accentuate it. Hence, Marguerite Yourcenar's essay on conservation bears the title *That Mighty Sculptor, Time* (1984). How important to us is this struggle with *Tempus Edax Rerum*? We could even write an equation to state its worth in monetary terms. It is the cost of climate control (structures, equipment & utilities) + insurance + security + conservation services (people & equipment) ÷ number of objects in a given collection.

Just beyond, and a constant threat to the strongest of minds, lurks nostalgia, or the interiorization of this experience of time's passage registered on external things. As the famous archaeologist Sir William Matthew Flinders Petrie wrote, in a blurring of archaeology and subjectivity, "We dwell upon those portions of the past, those days at Athens, or Florence, or in the Forum, as on a treasure; they are a portion of our life crystallized into the structure of our thoughts—a haven of the imagination."¹⁶ This is Robert Pogue Harrison's very point when he talks about the "humic" layer as holding "in its conserving element the unfinished story of what has come to pass." Burial, he writes, does not mean only inhumation; "it means to store, preserve, and put the past on hold." And, once so preserved, "dead etymons, latent meanings, and lateral connotations lie buried in the roots and phonemes of our living words, where they carry on an active afterlife. Our psyches are the graveyards of impressions, traumas, desires, and archetypes that confound the law of obsolescence."¹⁷

Historians work on time all the time. But sometimes they forget to think about what that means. Listening to conservators can bring back the philosophical significance of what we are doing. So, for instance, while Cesare Brandi's *Teoria del restauro* (1963) is the classic text of modern art restoration, he will not be read by historians. And yet his chapter titled "The Role of Time in a Work of Art" could easily be read by history students as a lesson in what makes historical evidence. For example, he describes the phenomenon of patina as "the sedimentation of time on the work." So bound up are they that Brandi forbade the removal of patina or any other trace of the object's passage through time.¹⁸ Conservation treatment occurs, he went on, in "the second historicity" of the object. This is what Yourcenar means when she writes in the very first sentence of her essay, "On the day when a statue is finished, its life, in a certain sense, begins."¹⁹ And with this we are teetering on the very brink of seeing conservation as a way of exploring "the social life of things."²⁰

Active Matter in the History of Thought

Introduced by conservators to the problem of the activity of matter, the historian might naturally be tempted to wonder whether there was a history of this way of thinking. What said historian might find is some scattered comment on "hylozoism" designed to wrap up in a nice, neat package a whole series of thinkers who in a post-Newtonian age have come to seem heterodox and marginal and just wrongheaded. And yet.

Thales of Miletus's famous comment about the pervasiveness of "gods" is a very old and very poetic way of talking about the pervasiveness of activity in a surrounding material world that need not be considered distinct from our subjectivity. In his essay for this volume, Guido Giglioni outlines a trajectory of more recent thinkers who struggled with the reality of an interpenetration of matter and spirit, from Aristotle's *hylê* (fourth century BCE), Galen's *dunamis* (second century CE), Paracelsus's matrices (d. 1541), and Petrus Severinus's *spiritualis materia* (1571) through to Francis Glisson's *vita materiae* (1677). Alongside the philosophical and medical tradition of animated matter there is the equally robust alchemical tradition.²¹ Nor should we underestimate its appeal at the heart of phenomena like the revival of antiquity. When Marsilio Ficino brought the *Corpus Hermeticum* from the ancients to his fellow Florentines in the age of Lorenzo the Magnificent, he also passed along Hermes's catechism: "Is God then in

matter, O Father? Where could matter be placed if it existed apart from God?”²² A version of this same question lurked in the many pages and almost endless debates of the councils of the early church before returning with a kind of vengeance in the Reformation-era conflict over the Eucharist. Lee Palmer Wandel reminds us how central to Protestantism was the rejection of “transubstantiation,” with its inherent doctrine of living matter. The sharper split between matter and life effected by Martin Luther plays in the language of theology the role René Descartes would play, philosophically, in the seventeenth century, in fostering a hard dualism. The “spirit of capitalism,” to look to a context not explored in our volume, could turn out to have as much to do with dualism and its discontents as with double predestination. Rabbi Judah Loew of Prague’s Golem was not a commentary on these contemporary debates, but the mass of clay that became animate when a sacred text was placed in its mouth also belongs to the rich history of active matter.

The “new science” is often identified as the moment when dualism hardened into a victorious orthodoxy that squeezed the activity out of matter, but we should be careful about seeing this as an “either/or.” While it was Galileo Galilei’s enemies who feared for the “imperfections” of God’s creation made visible by his telescopic observation of the moon in 1610, it was the scientist who embraced activity. In the words of Francesco Sagredo from the first day of the *Dialogue Concerning the Two Chief World Systems* (1632): “I can only hear with greatest reluctance that the properties of the unchangeable and unchanging are considered something noble and perfect and, in contrast, mutability is considered something imperfect. I consider the earth to be extremely noble precisely because of this, of the changes that take place on it, and the same is true of the moon, of Jupiter and other planets.”²³

Baruch Spinoza’s blurring of ontology and activity could have been a comment on Thales. *Deus sive natura*, “God or Nature,” he wrote, and with this flourish dualism was undone, or would have been, if Christianity, which still guarded over ontology like an only child, had been able to let it pass. But it couldn’t, and the marginalization of Spinoza and his followers only solidified the orthodoxy of dualism.²⁴ We would do no violence to the past to redescribe the various controversies sparked by the pulsar-like appeal of Spinoza at different times and in different places, such as the “pantheism” controversy in late eighteenth-century Germany, György Lukács’s recruiting of Spinoza (and Friedrich Wilhelm Joseph Schelling) to the anti-dualist goal aimed at by Karl Marx, or the Louis Althusser–Gilles Deleuze reading of Spinoza in late twentieth-

century France, as chapters in the history of thinking active matter.²⁵ In fact, the passage in which Kant defined active matter as an impossibility, cited above from his *Critique of Judgment*, came in a section devoted to attacking Spinoza.

Yet, however we have gotten there, if we look to the nineteenth century in Europe on the eve of conservation's professionalization, it is clear that a dualist ontological orthodoxy had arisen—and was already taken for granted. We can see this clearly when we delve with those critics of this regime who, looking back, point to what they take to be their nemeses. For Goethe, it is Newton who is the great upholder of dualism. For Schelling, it is Kant. For Marx, it is Hegel. For Heidegger, it is Descartes. “Active matter” as a term of art may have been brought to our attention by materials science, but paying attention to it—another argument for the value of interdisciplinary conversation—makes visible a major fault line in the history of knowledge.

Johann Wolfgang von Goethe's struggle with the philosophy of Isaac Newton is famously played out in terms of his color theory. But it is in his notion of morphology that he strikes out most decisively against a rigid dualism of forces acting and acted upon. Goethe sees a complex interplay between internal and external agents of causation, much as Galen and the Galenists had struggled to explain the individuation of matter as life.²⁶ The most profound taking up of Goethe's term was Ernst Haeckel's *Generelle Morphologie der Organismen* (1866), which began with a long citation of Goethe on its flyleaf, and others introducing the parts of the book and at the head of *every* chapter. Haeckel deploys morphology in support of Darwinism—but also to attack dualism and defend a conception of active matter.²⁷ He finds in Anaximander, Heraclitus, and Empedocles the teaching that “nowhere in the world exists absolute rest, and that all standing-still is but apparent, we are compelled everywhere to assume a perpetual change of matter, a constant variation of form.”²⁸ For Schelling, the whole burden of Johann Gottlieb Fichte's interpretation of Kant's transcendental defense of the possibility of scientific knowledge reified a split between the thinking subject and everything else. Much of Schelling's early work, through his 1809 treatise on freedom, is about peeling back idealism so as to recover a unity of thinking and feeling that was lost with the dualism of Descartes and Kant. Marx accused Georg Wilhelm Friedrich Hegel of “failing to overcome the duality of thought and being, of theory and practice, of subject and object,” and his dialectic, conceived of as an instrument for “the ending of a rigid confrontation of rigid forms is enacted essentially *between the subject and the object*.”²⁹

Finally, Martin Heidegger's magnum opus of 1927, *Being and Time*, points the finger of blame at Descartes. It is his attempt to defend the certainty of the thinking being ("Cogito ergo sum") that for Heidegger crystallizes the path wrongly taken. But for Heidegger the problem goes even deeper and even further back. Indeed, one could argue that Heidegger's self-proclaimed *Destruktion* of Western philosophy is about unravelling the historical foundations of dualistic thinking. He calls it the history of Being, and in this narrative Being loses its way with the departure of philosophy from Ionia and "Presocratic" thinkers such as Anaximander and Heraclitus. In this volume, André Laks explores the notion of "Presocratic" and then grapples with the way "Becoming" has been attached to the legacy of these Ionian thinkers, sometimes at the expense of their own dualism. The story of active matter before the twenty-first century's "Active Matter" can, then, be run from Thales's gods-drenched landscape of the early sixth century BCE to Hermann Usener's discovery in late nineteenth-century Bonn that there were gods for every moment of need (*Augenblicksgötter*).³⁰

Friedrich Nietzsche, a decade removed from his lectures on "Preplatonic Philosophy," went so far as to identify the struggle *against* active matter as coterminous with the broader history of (European) culture. His point is that modern (European) culture was the product of an enormous effort to neutralize and, thus, overcome a feeling of powerlessness vis à vis nature. Francis Bacon, Descartes, Newton, Kant—the whole edifice of "science" that put human beings in control was an effort at rewriting a still-fearful reality.

Because it was thought for many thousands of years that *things* (nature, tools, belongings of all kinds) were also alive and animate, with the power to injure and to elude human purposes, the feeling of powerlessness among humans was much greater and much more common than it need have been. . . . But because the feeling of powerlessness and fear was in a state of almost perpetual excitation for so long a time . . . the feeling of power has become their strongest inclination; the methods they discovered to create this feeling just about constitute the history of culture.³¹

If Heidegger's was the high philosophical attack on Western dualist accounts of being, Georges Bataille's was the lower. From his perch atop the masthead of *Documents*, Bataille assailed Plato and the theory of ideas that exercised influence through his works and the teachings

of his Academy. In his essay, “The Academic Horse,” Bataille juxtaposed ancient Gallic and contemporary African depictions of horses to undermine the superiority of Greek art. Debunking idealism was also the subject of another essay, on gnosticism. Bataille identified in the “base materialism” of the gnostics a means of assaulting the abiding dualist ontology. “Base” invoked the Western hierarchy that saw all things material as base. But he then worked to subvert the hierarchy by showing that matter, even the basest matter, was not so passive after all. “In practice, it is possible to see as a *leitmotiv* of gnosticism the conception of matter as an *active* principle having its own eternal autonomous existence as darkness.”³²

If we return now from Bataille to Fluxus, we can see the latter’s relationship to surrealism extending deep into its philosophical commitments. Its attack on the dualism underpinning “high” art is an ontological challenge that emerges clearly through the matrix of issues that confront conservators of Fluxus art.³³ Perhaps it is no coincidence that when giving an example for how “diagonal science” could connect the human and natural sciences, Roger Caillois chose active matter.³⁴ Jennifer Mass takes the biomedical language of conservation—“bronze disease,” “ultramarine disease,” “glass disease”—and gives its history from Pliny to now.³⁵ Conservation as a field was born in the same nineteenth century as modern medical positivism, and both were dedicated to purging an inherited and, they believed, mistakenly applied set of terms to describe the lives of inorganic things—until scientists discovered a few years ago that it actually *was* a fungus that created the copper oxalate alteration sometimes found on ancient Egyptian artifacts. It may not actually be the bronze that is animate, but this is a tale worthy of *Documents*.

Around the same time, but in the postrevolutionary Soviet Union, Lev Vygotsky developed cultural historical activity theory—essentially a representation of the philosophy of history of the young Marx (“Theses on Feuerbach,” “German Ideology”) in terms of activity. It had its roots, according to a recent student, in Goethe’s rebellion against the abstraction and empiricism he associated with Kant and Newton. The “morphology” that he developed in his plant studies enabled him to skirt the dualisms that these predecessors had relied upon to establish certain knowledge. In this genealogy of activity, Hegel learned from Goethe, and Marx reformed Hegel. And if Stalin’s purges extinguished cultural historical activity theory as historical interpretation, it did reemerge in the 1960s as a form of psychotherapy, and there is even the suggestion of a further, and wider, rehabilitation of activity.³⁶

In France, in the 1930s and 1940s, André Leroi-Gourhan developed his own approach to material culture that was heavily influenced by the nineteenth-century naturalist and antiquary Georges Cuvier. He borrowed from Cuvier the notion of “*mécanique vivante*” to describe what he saw as a very blurred boundary between matter and activity. Georges Canguilhem, around the same time, also talked about how “the first tools were no more than prolongations of human organs in motion. Flints, clubs, and levers prolong and extend the arms’ organic movement of percussion.”³⁷

To end this very brief flying overview of alternative histories of matter, let us note Carlo Ginzburg’s turn back to that same Cuvier, whom he describes “as a new species of antiquarian,” in the new introduction to the second edition of his *Night Walkers (Benandanti)*. Cuvier’s use of morphology to identify species and their changing relationships leads Ginzburg back to Goethe, whose development of this analytical framework he describes as Goethe’s real gift to the history of knowledge. In other words, once we start taking active matter seriously, we begin to see that others have too.³⁸

Activity and Deprovincialization

From the perspective of Indigenous peoples, however, all this might seem like a long story about getting back on the highway after having taken a wrong turn. Historians listening to Indigenous voices might have come to see the robustness of active matter thinking before their very eyes.³⁹ As Aaron Glass observes in his introduction to the essays in this section of the volume, for Indigenous North Americans—and, with qualifications, this could stand for the broader category of Indigenous peoples worldwide—the narrative is flipped. Their conceptual vocabulary was, and remains, more like what we have been finding in the Presocratics or Spinoza or Schelling or even Heidegger. For Indigenous peoples, matter has long been viewed as possessing active properties. Sometimes forms, such as ritual objects, required periodic change over the course of their lives. Other objects were active because they were believed to situate spiritual power or agency. And then there were objects that were active, not because of *what* they were made of, but *how* they activated networks of humans.

Jamie Jacobs and Sven Haakanson give us two slightly different examples of humans activating matter. Jacobs explains that for the Haudenosaunee people wampum was valued for the hardness of its elemental

calcium but that this hardness only mattered because of the messages invested in it by living people who, like those ancient Mesopotamian kings, sent them into the future confident that their descendants would eventually be on the receiving end. Haakanson's tale of the *angyaaq*, or open boat, of the Sugpiat people of Kodiak Island in the Aleutians is a tale of research, with archival and museum collections providing the past's knowledge, stored against malign fate, that enabled Haakanson to resurrect an extinct cultural form and, through that form, to reconstitute a human nexus and a social practice.

Rose Evans and Kelly McHugh focus on the kind of activation that can happen in a museum setting. Evans's memoir tells the story of how a conservator in New Zealand from within the Indigenous community could bring community values into the theory and practice of conserving that community's heritage. Back in North America, McHugh shows us how community values could be incorporated into the stewardship of Native objects, especially by museum conservation departments. For our purposes, the case study she chooses to illustrate the way principles are put into practice could not be more appropriate: a sculpture with the title *Always Becoming*. For conservators, she writes, it is a lesson in learning to accept "change as inherent and beautiful" and "implementing this Indigenous practice of 'active' or relational conservation" (267). We could think of this as defining "care" as a form of preservation.

Historical and anthropological approaches braid together. Ittai Weinryb, in his introduction to the essays from the History working group, presents a different active matter spectrum. It is composed of sourdough starter, a twelfth-century European depiction of God creating the world, and a thirteenth-century missionary account of fetish gods of the Black Sea steppes. From the perspective of the history of objects, we still find ourselves asking about the ways in which activity is both in the thing and in the human relation to the thing. Bruno Latour's actor-network theory might come to mind here for some; Lewis Hyde's *The Gift*, for others.⁴⁰ Henry D. Smith II and Marco Leona argue in their study of artificial colors in later nineteenth-century Japan that the "'activity' of materials must always go beyond materiality itself, and take into account the changing meanings assigned to those materials, and the ways in which they are chronicled historically" (378). We can read this as an argument for "collaborative conservation" of a different kind. When dealing with a deeper past for which there are no living interlocutors, the conservator can partner with those able to make the past speak in languages that we can still understand if we listen carefully, whether these be historians, anthropologists—or poets. To return

a last time to Robert Pogue Harrison, he suggests that conservation needs to work along the full spectrum of meaning making. “The dead speak from beyond the grave as long as we lend them the means of locution; they take up their abode in books, dreams, houses, portraits, legends, monuments, and graves as long as we keep open the places of their indwelling.”⁴¹

For Spike Bucklow, the dead speak from within the very walls of churches. He finds active matter where we might now expect it—in a medieval East Anglian partnership of physical labor and communal ideal—and where we might not—in the limestone (chalk and flint) walls that brought an ocean’s activity from deep time to stand side by side with living medieval Englishfolk. In all these forces upholding the church’s walls Bucklow sees a “poetic boundary crossing” and “the natural interactions between relatively fluid materials.” He argues that if conservation attached itself to chemistry at the start of the twentieth century, in the twenty-first its partner and guide will be ecology. And as we look to this moment from the vantage point provided by active matter, we can see how historians can learn the same lesson from listening to conservators of kayaks and conservators of rood screens.

If the differences that separate “fine art” and “ethnographic” conservation disappear when viewed through the prism of activity and active matter, then maybe there are also lessons to be learned from how other, distant cultures think about conservation. This means more than simply adding Indigenous American or Japanese or Indian ontologies of matter to a Greco-Euro-American “default” mode. Moving from different ontologies to different conservation practices means allowing objects to live different kinds of social lives. Outside Europe there were cultures of conservation whose grounding ontologies were, and remain, nondualist. Looking out from the workshops and studios of Taos, Kyoto, and Delhi, it is Euro-American conservation that could seem exceptional. One of the immediate outcomes of our project in colliding ontologies and crossing diagonals is the “provincialization” of Western conservation history.⁴² Looking at this, the historian might wonder whether there are similar lessons to be learned in the way the past can be grasped from those not operating within the modern, university-driven practice of history.⁴³

Recognizing what is provincial in what is so easily taken as the default mode, the assumption that conservation simply is what happens in Euro-American contexts, enables us to identify the *de-provincializing* turn in conservation—“collaborative conservation” coming from the “ethnographic fringe” to change the way Old Master paintings, or

ancient sculpture, get conserved—with the same move Bruno Latour described as anthropology “coming home from the tropics” in *We Have Never Been Modern* (1991). The publications of the past two decades devoted to alternative, nondualist approaches to ontology only make clearer the stakes of his argument.⁴⁴ For Latour, the claim of “modern” is built on a dualism insistently dividing modern from premodern even at the expense of ingesting a host of paradoxes, but also a modern “us” from a distant, premodern “them” that fails by *not* being dualist.⁴⁵ Without being aware of, or intending to situate, conservation at the core of either modernity or his proposed nonmodernity, Latour’s argument does just that. He describes “intentionality,” a key term in conservation theory and practice, as a “notion” that transforms a distinction, a separation, a contradiction, into “an insurmountable tension between object and subject.” The moderns looked out and “were always struck by the diffuse aspect of active or spiritual forces in other so-called premodern cultures. . . . Spirits and agents, gods and ancestors, were blended in at every point.” The future, he writes, involves taking this sphere into account. A conservator of Indigenous materials, such as Kelly McHugh in this volume, could have written the following sentence of Latour’s: “[T]he paradigm of the knowledge of objects has to be replaced by the paradigm of mutual understanding between subjects capable of speech and action.”⁴⁶

And time itself is at the heart of one of Latour’s key examples of the paradoxical nature of the claim to be modern. He notes that while “the moderns indeed sense time as an irreversible arrow,” they also “want to keep everything, date everything, because they think they have definitely broken with their past.” The more dramatic the ruptures—Latour nods to the political revolutions of the eighteenth and nineteenth centuries—“the more they save; the more they capitalize, the more they put on display in museums.” Conservation and collection become, like ruins, ciphers for transience; archives, for all their vastness, indices of absence. “Maniacal destruction,” he writes, “is counterbalanced by an equally maniacal conservation.” In the very next sentence, Latour recruits Leopold von Ranke and the passions of archival scholarship to this desperate psychological crabwalk. The past reconstituted “as it actually was” is both nevermore and ever insurgent. “Historical reconstitution and archaism are two symptoms of the moderns’ incapacity to eliminate what they nevertheless have to eliminate in order to retain the impression that time passes.”⁴⁷

Objects As the Poetry of Time

Latour's recruiting Ranke for a lesson about conserving makes me ask: Can historians learn about time from conservation? Historians have only recently begun to take objects seriously as historical evidence. Conservators know a lot about objects. But it isn't from how conservators currently think about objects that historians stand to learn the most. It's from how conservators *could* think about objects.

Karen Barad focuses our attention on the question of ontologies in conflict. Writing about space, Andrew Pickering notes that "a taken-for-granted ontology of neutral space (the 'featureless container of events') fosters a certain class of 'modern' sciences and of engineering projects, and these reflect the ontology back to us as self-evidently true." Change the ontology and you change "how we think," not only "about space, but about how we go on in the world."⁴⁸ Similarly, Latour names one part of his critique "Variable Ontologies."⁴⁹ It is in the disagreement between Werner Heisenberg and Niels Bohr that Barad sees that conflict of ontologies. Where Heisenberg argued that measuring disturbs the existing reality, Bohr's point was that measurement fails in the face of a deep indeterminacy. Barad concludes that "[w]hat he is doing is calling into question an entire tradition in the history of Western metaphysics: the belief that the world is populated with individual things with their own independent sets of determinate properties."⁵⁰ With Bohr, individuals do not exist, and thus intentionality does not exist; "the very binary between 'interior' and 'exterior' states needs to be rethought."⁵¹ Barad tells us that she wants to understand the implications of quantum physics for the epistemology and ontology of the old Newtonian world. As we have noted, the field of conservation has relied, since the nineteenth century, on that same Newtonian epistemology and ontology. What are implications of a different ontology—whether from "Indigenous peoples" or materials scientists—for conservation knowledge and practice?

Let me begin my answer with a provocation. If we follow the argument of this essay to its natural end point, we arrive at what we might call the *quantum theory of the object* (QTO). In *The Order of Time*, the physicist Carlo Rovelli describes matter from the perspective of quantum physics.

The hardest stone . . . is in reality a complex vibration of quantum fields, a momentary interaction of forces, a process that for a brief moment manages to keep its shape, to hold itself

in equilibrium before disintegrating again into dust, a brief chapter in the history of interactions between the elements of the planet, a trace of Neolithic humanity, a weapon used by a gang of kids, an example in a book about time, a metaphor for an ontology, a part of a segmentation of the world that depends more on how our bodies are structured to perceive than on the object of perception—The world is not so much made of stones as of fleeting sounds, or of waves moving through the sea.⁵²

Rovelli’s point is that from a quantum perspective, nature is not about objects (or subjects) marked off from one another; rather, it describes a world of relations, where the reality lies in the relations themselves. “Individual objects *are* the way in which they interact. And since they interact with us, then we as observers are part of this same reality, not just when we are doing work in the laboratory, but all the time.”⁵³

In this world, because objects are relations, they are also events.

The quantum world is more tenuous than the one imagined by the old physics; it is made up of happenings, discontinuous events, without permanence. It is a world with a fine texture, intricate and fragile as Venetian lace. Every interaction is an event, and it is these light and ephemeral events that weave reality, not the heavy objects charged with absolute properties that our philosophy posited in support of these events.⁵⁴

“Heavy objects”—elsewhere Rovelli refers to them as “entities with definite properties or unique facts.” Properties are “bridges between objects,” and “objects are nodes where bridges meet.” Rovelli is aware of, and calls attention to, the way in which quantum theory challenges Western philosophical presuppositions about subjects and objects.⁵⁵ But he might have been addressing conservators directly when he wrote, “The unambiguous description of an object includes the objects to which it manifests itself”—and we are among those other objects.⁵⁶

Rovelli began from quantum physics and we from conserving active matter. But we have arrived at the same place. Conservators, like historians, may think that the things they hold in their hands are made of matter. But what Rovelli teaches us, so succinctly, is that matter is itself a chronograph. When all else is gone, as with distant ruins, what remains is time.

What might this QTO look like? Rovelli actually starts us down this path. “Take an object,” he begins. “This chair that I see in front of me. It is real and stands before me, objectively, no doubt about it. But what does it mean, exactly, that this whole is an object, an entity, a chair, real?” A chair is defined by function and has characteristics, but always relative to us observers. Thus, color, he explains, is not *of* the chair, but “comes from the encounter between the frequencies of light reflected from the surfaces of the chair and the particular receptors in human retinas. It is not about the chair; it is a story between light, retina and reflection.” We could, Rovelli continues, think similarly about what holds a chair together of its parts. “If we look for the chair in itself, independently of external relations, and especially of its relations to us, we struggle to find it.”⁵⁷

One relation of the chair that Rovelli does not consider is time. If an object is just duration, then instead of talking about media (wood, metal, ceramic) we would talk about time signatures—how they are active, their way of activity, and their rate of activity until they are active no more. Like muscles in the human body, one kind of object might be classified as “fast”—these could include holograms, as in Marc Walton, Pengxiao Hao, Marc Vermeulen, Florian Willomitzer, and Oliver Cossairt’s essay—or “slow”—such as the metal soaps described by Francesca Casadio, which do not “cease to be in flux” even centuries later—and others very, very slow, like the boulder overhanging a hillside-hugging cornice. This problem seems to have fascinated the children’s book author William Steig, as he examines it from two different vantage points, the tragic and the comic, in *Sylvester and the Magic Pebble* and *Solomon, the Rusty Nail*. It was also significant for Nelson Goodman, who drew no metaphysically significant distinction between objects and events, treating both as entities of the same kind: an object would simply be a “monotonous” event; an event would be an “unstable” object. George Kubler groped toward finding time in objects; he ended up, instead, finding many different ways of placing objects in time.⁵⁸ Another way of saying this is that it comes down to the way we conventionally measure and frame process. Arguably, we humans have tended to make our own lives and self-understanding the measure of the processes we label events.⁵⁹

With time replacing matter, and longer time framing become acceptable, things can become events, and as they become events, they also become historical, that is, entangled with all the distinct components we associate with events. As Casadio points out in her story about the “lives” of lead soaps in painted canvases, with this step the convenient

but oversharpest dualisms by which we navigate our world in motion fall away. So, in Rovelli's account, the object is also the "gang of kids" who might once have used it as a weapon, it is "an example in a book about time," it is "a metaphor for ontology," and so on. Without a hard line between subject and object, active and passive, intentional and accidental, there is also a flow between foreground and background, text and context, cause and effect.⁶⁰

Some historians, reading these paragraphs, might think about Friedrich Engels's re-presentation of dialectical materialism: "that the world is not to be comprehended as a complex of ready-made *things*, but as a complex of *processes*."⁶¹ Others, who know something about Buddhism, might think here, with Rovelli, about Nāgārjuna.⁶² For still others, what Fernand Braudel argued seventy years ago might come to mind. His *The Mediterranean and the Mediterranean World in the Age of Philip II* (1949; 2nd edition 1966; translated into English 1972) is organized into three very different scales of retelling: that of the very, very slow, the slow, and the relatively fast: geological time, cyclical economic time, and human time, the last only looking like a conventional "event." This is much closer to the quantum conservator's approach—or Cesare Brandi's way of doing history—than, say, that of a political or military or diplomatic historian.

At this point the boundary between conservation and history begins to blur. But so, too, that between conservation and "historic preservation." Recent developments in urbanistics have recast the city as an event rather than an object. What this has meant is imagining different uses for streets, spaces, and institutions at different times of the day for different types of residents. In Mexico City, for example, Laboratorio para la Ciudad tried to find ways to make space more malleable and adaptable to the changing needs of citizens. As this happens more and more, we will be drawn further into thinking about objects, even mega-objects such as cities, as events.⁶³

If we might have earlier casually described conservators as historians of the object, seen in terms of active matter—the quantum realm—this becomes a formal definition: like historians, conservators will be telling stories about events. Like conservators, historians will recognize that events come in different shapes, sizes, and materials.

The QTO emphasizes activity and change, relations and process, and eliminates any metaphysical separation between mental and physical worlds. It reinforces the sovereignty of time in the realm of conservation and thus makes clear the priority of time to treatment. Change out the word "becoming" in the following sentence for "conservation"—a

perfectly legitimate move in the spirit of Rovelli—and a vast field for human understanding opens before us.

Becoming is also the mediation between past and future. But it is the mediation between the concrete, i.e. historical past, and the equally concrete, i.e. historical future. When the concrete here and now dissolves into a process it is no longer a continuous, intangible moment, immediately slipping away; it is the focus of the deepest and most widely ramified mediation, the focus of decision and of the birth of the new.⁶⁴

In this vast field, Robert van Langh's trial balloon about postponing treatment for a generation in order to amass more knowledge about the object takes us to new meaning. Conservation as a whole, not just the project called *Conserving Active Matter*, is about research. And research is driven by questions asked in the present for the sake of the future. Van Langh's suggestion may sound utterly fantastical, yet it closely follows the serious suggestion of the British philosopher and archaeologist R. G. Collingwood. In a speculative essay dated February 1939 devoted to sketching the principles of a future archaeological practice, Collingwood proclaims that no physical labor should be performed by an archaeologist before

he can answer the question "what historical problems lead you to that site, why do you think you can solve them there, and how exactly do you mean to go about it?"; unless, every time he orders a new trench to be opened or even a single shovelful of earth to be moved, he is prepared to explain, in terms of historical questions and their possible answers, exactly why he is doing it; unless his record shows that, instead of nibbling away at his site like a small boy with a cake until nothing is left, he is capable of saying "now I have answered the questions I came here to answer, and we are going home."⁶⁵

Finally, the QTO also has implications for the person of the inquirer, whether historian or conservator or archaeologist. Yannis Hamilakis argues that archaeology was born in the same nineteenth-century moment as photography (and, we might add, the natural sciences and the museum) and that it worked to produce a clearly defined scientific discipline by excluding everything that complicated this picture.⁶⁶ The view of matter as dumb and passive, patiently waiting to be acted

upon—like the cast-iron architecture studied by Benjamin—also evacuates the agency of the human actor (photographer, archaeologist, conservator, historian).

Wanting now to extend archaeology's purview into those very excluded complexities, Hamilakis reaches for his Bergson. In the work of Henri Bergson, as readers of Proust well know, "every perception of a present moment is replete with memories. . . . Past and present thus are not successive moments in a line but rather coexist side by side." Crack open the meaning of time, he writes, and the human inquirer finds herself grappling with all those hard-to-hold memories. Bergson for archaeologists leads Hamilakis to envision an archaeology reborn "as a multi-temporal, corporeal, and sensorial practice." Can we see the implications of Bergson for conservators in what Hamilakis imagines for archaeologists? "Such a new discipline," he continues, "will be attentive to the sensorial lives of things as multi-temporal entities. It will be an undisciplined discipline, not only because of the risky and unpredictable nature of the sensorial, but also because of the activation of the political lives of matter."⁶⁷

Turning back to physics and the QTO, Anthony Aguirre has explained that, from this perspective, objects are collections of information applied to atoms, atoms which themselves are "'made' of a quantum state, which is itself a sort of informational entity." And information is itself something that lives as much in the mind of the observer as outside it. "Familiar properties like color, utility, and beauty," he writes, "are human constructs that no single atom has, and even more primitive notions like motion, solidity, locality, or change are ways that observers or agents choose to break up and describe the cohesive whole that is reality." But at the same time, Aguirre cautions, what we might think of as *our* ideas and *our* thoughts are shared across people, space, and time. His real target is dualism: "*objective* and *subjective* should perhaps not be considered two sides of a coin, but rather two ends of a continuum."⁶⁸

The antidualism of the QTO sends us to Schelling, again, and his 1802 *Lectures on University Studies*. In the eighth, "On Philosophy and the Positive Sciences," he argued against the blinkering impact of professional disciplinization on the project of knowing and the project of being human. He argued that "[h]istory is neither a purely rational process subject to the concept, nor is it purely irrational; rather it combines necessity in the whole with the appearance of freedom in the individual."⁶⁹ Making sense of the causal relationship between external conditions and internal impulsion is a riddle that has to be seen as a

whole, whether we are talking about the lives of rocks or parliaments or proletarians or paintings.

This is hard stuff. To return one last time to Rovelli. The concluding sentence in the passage we cited reads, “The world is not so much made of stones as of fleeting sounds, or of waves moving through the sea.” This isn’t physics or chemistry or history. It’s poetry. Giving a lecture, “Conservation of the Future,” at BGC in March 2015 as part of Cultures of Conservation, Paul Eggert began with a reading and interpretation of Thomas Hardy’s “The Self-Unseeing.”⁷⁰ Hardy was an architect who did historic preservation before he returned to his native Dorset and wrote novels that were a form of historic preservation. The poem moves with economy between these vocations in the way that past and present can live together only in the realm of art. It’s why Goethe the poet was attracted to morphology, and Haeckel the morphologist to Goethe.⁷¹

It is at the very end of Goethe’s *Faust Part II* that we are introduced to Lynkeus, whose namesake was the far-seeing lookout on the mythical *Argo*. We meet him on his high tower, looking into the distance, admiring nature’s beauty and proud of his vision. But then he sees material destruction, too—the burning of a hut and its inhabitants—and laments that his ability to see means also that he cannot avoid seeing loss. Nor has he the power to preserve all that he sees. The tension cannot be resolved, only recast in a whisper of melancholy.

Something lovely to behold
Has vanished like an old tale told.⁷²

Is this the conservator of the future? With talent and training to look closely, the conservator can see ever more deeply into the wonder of the world and also comprehend its ceaseless activity. But to grasp this whole and give it voice, the new Lynkeus will need the soul of a poet.

NOTES

I am grateful to Francesca Casadio, Jim Coddington, Ivan Gaskell, Aaron Glass, Soon Kai Poh, Sarah Scaturro, Jessica Walthew, Marc Sebastian Walton, and Glenn Wharton for reading and commenting on earlier versions of this essay.

1. Homer, *Odyssey*, lines 488–91.
2. Kishkik, *Manhattan Project*; Schäffner, “Active Matter,” 4–6.
3. “Restoration” involved “action taken to make a deteriorated or damaged

artifact understandable, with minimal sacrifice of aesthetic and historic integrity.” “The Conservator-Restorer.”

4. “Conservation Terminology.”
5. As is almost always the case, change is coming from what is often perceived as the periphery of the field. From the perspectives of First Nations and contemporary art, activity is a more common category to think with. See, for instance, Clavir, *Preserving What Is Valued*; Muñoz Viñas, *Contemporary Theory of Conservation*.
6. *Conservazione dei beni culturali*, 9.
7. Chazan, “Technological Trends,” 719. I thank Nathan Schlanger for pointing me in Chazan’s direction.
8. For this see Schnapp, *Histoire universelle des ruines*, chap. 1, and the chapters in Schnapp et al., *World Antiquarianism*, devoted to ancient Egypt and Mesopotamia, 121–59.
9. Confucius, *Analects*, 7.19, quoted in Owen, *Remembrances*, 13.
10. This is taken from “Autumn Meditations” by Meng Chiao (751–814), quoted in Owen, *Remembrances*, 18.
11. Kenkō, *Essays in Idleness*, 115, quoted in the chapter by Yuriko Saito in this volume.
12. Stewart, *Ruins Lesson*.
13. Leonardo, *Thoughts on Art and Life*, no. 101; Ovid, *Metamorphoses*, 15:234–36: “Tempus edax rerum, tuque, invidiosa vetustas, omnia destruitis vitiataque dentibus aevi paulatim lenta consumitis omnia morte!”
14. Shakespeare, “Sonnet 64.”
15. Shakespeare, *Rape of Lucrece*, lines 944–47, 951–52.
16. Flinders Petrie, *Methods and Aims in Archaeology*, 189.
17. Harrison, *Dominion of the Dead*, x, xii.
18. Brandi, *Teoria del restauro*, 27, 35, 44.
19. Yourcenar, *That Mighty Sculptor*, *Time*, 57–62.
20. Kopytoff, “Biography of Objects.”
21. See, for example, Chang, “Alchemy as Studies.”
22. Quoted in Yates, *Giordano Bruno*, 34.
23. Galilei, *Dialogue*, 58–59, translation slightly emended.
24. Israel, *Radical Enlightenment*, part 2, “The Rise of Philosophical Radicalism”; Mulsow, *Enlightenment Underground*.
25. For example, Lukács followed an account of a world transformed by dialectic with the following statement: “It might look as if this would take philosophy back to the great system-builders of the beginning of the modern age. The identity, proclaimed by Spinoza, of the order to be found in the realm of ideas with the order obtaining in the realm of

- things seems to come very close to this point of view. The parallel is all the more plausible (and made a strong impression on the system of the young Schelling) as Spinoza, too, found the basis of this identity in the object, in the substance.” Lukács, “Reification and the Consciousness,” 142–43.
26. For Goethe’s notion of morphology and, in particular, its utility for historical thinking, see Miller, “Tentative Morphology,” 74–77; Miller, “Goethe and the End.”
 27. Very clearly, in the foreword: “Die vorliegenden Grundzüge der ‘generellen Morphologie der Organismen’ unternehmen zum ersten Male den Versuch, diesen heillosen und grundverkehrten Dualismus aus allen Gebietstheilen der Anatomie und Entwicklungsgeschichte völlig zu verdrängen, und die gesammte Wissenschaft von den entwickelten und von den entstehenden Formen der Organismen durch mechanisch-causale Begründung auf dieselbe feste Höhe des Monismus zu erheben, in welcher alle übrigen Naturwissenschaften seit längerer oder kürzerer Zeit ihr unerschütterliches Fundament gefunden haben.” (The existing basic features of the “general morphology of organisms” undertake for the first time the attempt to completely drive out this hopeless and fundamentally wrong dualism from all areas of anatomy and evolutionary history, and raise up the entire science of the developed and emerging forms of organisms through mechanical-causal justification to the same fixed height of the monism in which all other natural sciences have found their unshakable foundation for a longer or shorter period of time.) Haeckel, *Generelle Morphologie*, 1:xiv–xv.
 28. “Professor Haeckel on Darwin,” 537.
 29. The words are those of Lukács in “What Is Orthodox Marxism?” 16, and “Reification and the Consciousness,” 142.
 30. For Usener’s notion of *Augenblicksgötter*, see his *Götternamen*, chap. 16.
 31. Nietzsche, *Dawn*, 21–22.
 32. Bataille, “Bas matérialisme,” translated in Bataille, *Visions of Excess*, 47. This paragraph draws on my “Visions of Juxtaposition.”
 33. On Fluxus and conservation, see Hölling, *Object—Event—Performance*.
 34. Caillois, “New Plea,” 346: “Productive exchanges between the human sciences and the natural sciences can be established and developed. The dialogue should be even broader and include the physical sciences. Crystal, for example, has properties akin to those of living matter. For one thing, it can scar over a break through heightened regenerative activity, in much the same way that a lobster regenerates its claw or a Saurian its tail; for another, it can gradually eliminate foreign bodies accidentally trapped in its well-ordered, homogeneous substance.”

35. For more, see Mass's contribution to the website accompanying the *Conserving Active Matter* exhibition, 2022, <https://exhibitions.bgc.bard.edu/cam/>.
36. Blunden, *Cultural Historical Activity Theory*, 2–3, 31.
37. Cited in Schlanger, *André Leroi-Gourhan on Technology*.
38. Ginzburg, "Medals and Shells."
39. Robert Macfarlane, in the English Faculty at Cambridge, has done just this already. *Underland*, 111–12.
40. I am grateful to Jim Coddington for pointing this out to me.
41. Harrison, *Dominion of the Dead*, 153.
42. Burawoy, "Provincializing the Social Sciences," 508–25; Chakrabarty, *Provincializing Europe*.
43. Miller, *History and Its Objects*, 14–15.
44. A list of such publications could include Graham Harman's *Tool-Being: Heidegger and the Metaphysics of Objects* (2002), Andy Clark's *Natural Born Cyborgs* (2003), Jane Bennett's *Vibrant Matter* (2010), and Terrence Deacon's *Incomplete Nature* (2012).
45. Latour, *We Have Never Been Modern*, 11–12, 53, 99.
46. *Ibid.*, 58, 128, 60.
47. *Ibid.*, 69. Latour animates what Pierre Nora had already noted: "As traditional memory fades, we feel obliged religiously to accumulate the testimonies, documents, images, and visible signs of what was, as if this ever-proliferating dossier should be called on as evidence in some tribunal of history. Hence the inhibition against destroying, the retention of everything." Preface to *Rethinking France*, xxv–xxvi.
48. Pickering, "Space," 2, 7.
49. Latour, *We Have Never Been Modern*, 85.
50. Barad, *Meeting the Universe Halfway*, 19.
51. *Ibid.*, 23.
52. Rovelli, *Order of Time*, 99. A similar account of "the event" is in Dewey, *Logic of Inquiry*, 222–23: "On the other hand, a mountain, which to the layman is a standing symbol of permanence, is to the geologist the scene of a drama of birth, growth, decay and ultimate death. Unless the difference between existential change as barely existential and as subject-matter of judgment is borne in mind, the nature of event becomes an inexplicable mystery. *Event* is a term of judgment, not of existence apart from judgment. The origin and development the Appalachian Mountain Range is an event, and so is the loosening and rolling of a particular pebble on a particular ledge on a particular foot-hill. There may be a situation in which the latter sort of episode is much more important in judgment than is the history of long duration: as, for example, when a

rolling pebble is the ‘cause’ of a sprained ankle. In the story of the cyclical weathering of the mountain, the roll of the pebble would hardly be *an* event at all; it would be but a specimen, unnoted in itself, of a *kind* of thing that is significant only *en masse*. An event is, strictly that which comes out; that which issues forth; the net outstanding consequence, the eventuation. It involves a teleological concept; it is capable of description-narration only in terms of a delimiting beginning, an interval and a termination.”

53. Rovelli, *Helgoland*, 74.
54. *Ibid.*, 85.
55. *Ibid.*, 142–45, and the notes there.
56. *Ibid.*, 88, 117.
57. *Ibid.*, 145–46. Compare this with Heidegger’s very similar description of a chair in *Prolegomena*, § 5.a, 37–40.
58. George Kubler, *The Shape of Time: Remarks on the History of Things* (New Haven, CT: Yale University Press, 1962), 84–85, 96–97.
59. Steig, *Sylvester and the Magic Pebble*; Steig, *Solomon, the Rusty Nail*; Nelson Goodman, *Structure of Appearance*. For this language as a way of framing performance art, see Hillier, “Objects as Events.” I thank Ivan Gaskell for this reference.
60. Everyone has their favorite theorist of entanglement. No bibliography would be complete without Thomas, *Entangled Objects*; Hodder, *Entangled*; Deleuze and Guattari, *Thousand Plateaus*.
61. Friedrich Engels, “Ludwig Feuerbach and the End of Classical German Philosophy,” quoted in Lukács, “Reification and the Consciousness,” 199–200.
62. Rovelli, *Helgoland*, 149–58. See also Nāgārjuna, *Mulamadhyamakakarika*.
63. For more, see the website of Laboratorio para la Ciudad, accessed August 11, 2021, <https://labcd.mx/>.
64. Lukács, “Reification and the Consciousness,” 204.
65. Collingwood, *Principles of History*, 65.
66. Oliver Wendell Holmes talked about photography in just this way in 1859: “Form is henceforth divorced from matter. In fact, matter as a visible object is of no great use any longer, except as the mould on which form is shaped.” Quoted in Solnit, “Annihilation of Time and Space,” 17.
67. Hamilakis, *Archaeology & the Senses*, 122.
68. Aguirre, *Cosmological Koans*, 350, 352.
69. Schelling, *Lectures on University Studies*, 75–76.
70. Eggert, “Conservation and the Future.”
71. It may also explain why the most poetic of our era’s great historians cares about morphology. Ginzburg, “Medals and Shells.”
72. Goethe, *Faust: Part Two*, 11336–37.

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