

Peter Galison

## Introduction

Reason stakes a bigger territory than the enclosed yard of universal rules. Nature expands over a far larger region than an eternal category of the natural. And history—our understanding of the past—refuses to be confined to a pasture of narrow-gauge claims to an unencumbered truth of how things happened. From start to finish, the essays collected here will not be boxed in by such putatively eternal categories. These reflections do more than that: they will not even stay within the more expansive categories themselves. Time after time, our co-authors productively step over the lines separating reason, nature, and history, and return with gains from those trespasses.

## Reason Expanded

Leibniz had great hopes for his *characteristica universalis*, his formal system of thought that would provide humankind with a passe-partout. But the key jammed in the locks of the great vaults of knowledge that Leibniz had hoped to open, and successive generations—not least the logical positivists—ultimately found their magic key wasn't as magic as they had hoped. For Susan Neiman, Immanuel Kant's picture of reason has much more to offer, especially if it is not taken as a dogmatic system or one accounted for and dismissable by its historical surround. Kant recognized that reason itself had a history, and that we have long been prone to searching desperately for certainty where it does not exist. A right conception of reason, a wider one than formalism allows, would be liberating ethically and politically.

Indeed, in quite practical matters of ethical judgment, a sharp divide between natural and ethical orders is, as Nancy Cartwright argues, hard to sustain. Track a causal chain backwards from, say, a mistreated child within the protective services, and you may get to blame a social worker. But it will not go far in preventing future incidents, even some just like the one in question; it also blurs the boundary of "natural" and ethical inculcation. Treat the system as a system designed to prevent certain kind of occurrences and you might do better. But here too the natural order (mechanisms or systems) is not outside of ethical reasoning (preventing harms).

In many ways, Philip Kitcher, Cartwright, and Neiman are on the same side; all argue that it is a fool's errand to search, perseverally, for a pure, Leibnizian reduction of ethics to a calculus. Kitcher takes the story through another chapter,

recalling how Gottlob Frege and his followers hoped that his version of calculation would one-up Leibniz's. Through formalizing logic, Frege hoped, he could distill all meaningful philosophical questions to calculations. Kitcher notes that, in the many decades since, some philosophers have held onto reduction-to-calculation as an ideal, others as something that might be true in principle (though not available in fact) and yet others have thought that logical reduction is a practical program to be pursued. This just won't work even in its most abstract formulation: even if we could reduce ethics to calculation, it would resemble nothing so much as the inhabitant of Searle's Chinese room: translating by rote, without understanding. An ethical reasoning without understanding, as Kitcher sees it, isn't ethics at all.

Scientific rationality often claims abstract virtues other than calculation—not least, objectivity. Grappling with the historical development of objective depiction presented by Lorraine Daston and Peter Galison in their *Objectivity* (where they tracked the way that many scientists began supplementing idealization with a mechanical form of objectivity in the mid nineteenth-century and then supplemented that, in the mid-twentieth century, with the possibility of relying on trained judgment), Simon Goldhill and Robert Richards offer their own expert judgment on the distinctiveness of their areas of inquiry. Richards stresses that idealized depiction of creatures and plants persists powerfully into the contemporary period, often bypassing the more mechanical, self-abnegating ideals of other sciences. Similarly, Goldhill argues that in archaeology, the site explorers never entirely wanted to leave the picture; they never got, never read, or never obeyed any injunction to self-abnegate.

Our philosophical-mythological stories, with Heraclitus on one side and Parmenides on the other, offer us ways of thinking about the logic of the world: infinite change, infinite sameness. David Nirenberg takes this long and much discussed contestation between repetition and difference, capturing in his marvelously titled "Love =" our constant tendency to cross from talk of the essence of philosophy to talk of the nature of love and its deep link to sameness. We may start with reason, but seem hell-bent to head for its limits.

Reason never stops with rules alone; we need, as so many of our authors insist, a more capacious category than a rule-driven rationality. Speaking of medieval miracles, Carolyn Bynum follows Lorraine Daston's focus on the historical shift from miracles as evidence for the sacred to the hunt for evidence of miracles. Bynum extends that inquiry into miracles even further. She uses this history of absent evidence to inquire into the nature of history writing more generally. Myths are not only miracles, though myths can contain them. With Wendy Doniger as our guide, we can come to see myths as always shrugging off, even defying reason. Myths, she argues, instantiate intuition as perhaps nothing

else, all the while throwing sand in the eyes of evidence. Reason, expanded reason as a form of navigating the world, is elbowed out by rules, by rationality.

## Nature Enframed

Literature and science frame nature, one way or another, on a microscope slide, a diorama, a zoo, a garden, a mathematical model. Marina Warner reads and re-reads “Abd Allah of the Sea” as a tale or myth—but also as a stunning display of maritime marvels, like the sponge, that could elicit pleasure and good luck. Sponges might be tokens, but they were at the same time “useful” as a transformer of seawater into glass. Observing nature, even through stories, can be the most patient non-event (an ant’s hesitation) or the most astonishing revelation (of the magical powers of the sponge).

The sciences constantly impose grids: of methods, observations, and models. Sometimes those grids are too confining. Deborah Coen follows the turn-of-the-twentieth-century naturalist, Adele Field, as she painstakingly monitored the ant farm colonies behind glass. Field was convinced that only her new and uniquely tenacious form of close, long-running, and individually-focused ant observation could reveal the nature of the insects’ coordination.

To what extent is the nature of our knowledge of nature fundamentally brought into question even at the highest level of the physical sciences? Gerald Holton sets Albert Einstein in the cross-fire of an all-out, years-long battle between the German physicist Max Planck (who defended Einstein’s work from early days) and the Austrian polymath physicist/philosopher/psychologist Ernst Mach (whose work was inspirational to Einstein in his critique of absolute space and absolute time). Mach insisted that we humans were inextricably present in our science, and it is we who ultimately must arbitrate our knowledge through our own senses and perceptions. Planck, by contrast, wanted nothing to do with such perceived anthropocentrism, insisting that the deeper, absolute truths of physics ought be discoverable by any species in any far-flung corner of the universe. A rather more direct, less philosophical form of enframing occurs as the national and international regulatory agencies struggle to limit environmental degradation. Here Dominique Pestre argues within the expanding economic sphere, that the very act of defining the harms of pollution leads to a vision of problems as “solved” if those harms can be appropriately compensated. But that compensation is quickly folded into the cost of doing business, and that homo economicus march accelerates with Growth towing Gaia into the troubled era of the Anthropocene. Horst Bredekamp presents a different sort of knowledge in exploring the value of forged scientific documents in the now notorious case of Galileo’s *Sidereus Nuncius*.

In different ways, we are all too aware that it is not given to us to see nature simply through direct observation nor through our theories. Glenn Most takes a simply stated but difficult to parse sentence from Heraclitus: “A nature tends to hide,” and works at extracting its meanings. For the Greeks, Most tells us, nature (*phusis*) is not a nature that pre-exists humans, but instead a widespread character of things, as applicable to a city as to a mountain. But even if the world becomes ever more visible to us, the nature of things is not on the surface, as *phusis* hides. This ancient preoccupation with the extricability of knowledge continues. In fact, a good example can be found in the twentieth century, when scientists from a variety of disciplines wondered whether our description of nature is ever fully given by a theoretical scheme—or does a scheme, like quantum mechanics, actually produce, in some limits, classical physics? That is the question Sylvan (Sam) Schweber poses. Dubbed “emergence” and argued for in different ways, the idea that concepts can break out from a starting framework has many forms. Could the ordinary inorganic laws of the universe give rise to life? Can the laws and properties of physics ever account for why they are the way they are and not otherwise? In our current disciplinary division, it is clear these sorts of questions lie on the boundary of physics, philosophy, and theology.

One could come to the question of framing nature from the opposite angle: not, What do we impose on nature? But instead, What are *we* as minds? It is one of the pleasures of this collection of essays that we can bring together William Wimsatt and David Shulman, who pose this question very similarly, though in staggeringly different contexts. Wimsatt, thinking of the United States between 1979 and 2014, wants to know whether we should treat robots as people, in cognition, consciousness, and gender. Shulman, addressing the study of nature in sixteenth-century south India, wants to know how in that period and place stars, mountains, and rivers came to be conscious, loquacious, and gendered. Both expand nature, historically and conceptually, beyond an assembly of silent objects brought together for scientific inquiry.

## History Refracted

For the authors of this volume, asking about reason means pursuing a wider field than a rule-structured rationality and addressing nature as more than mere objects, ready for science. In a very similar spirit, the third cluster of essays take an expansive, and critical, look at the project of the writing of history itself.

Peter Galison and Robert Pippin argue, along different lines, against a reductionist history. For Galison, the immense productivity of local history is something to celebrate, its particularity, its texture, its fluid back-and-forth between social,

ethical, and intellectual developments. At the same time, he warns that the supposition that local histories exhaust what we want to know can be very dangerous: history unfolds on a myriad of scales that do not collapse only to the micro. Look only at the local and you can miss the effects of mass actions of communication, transport, and societal mobilization. Pippin too sounds a cautionary note about the ways that disciplines, even, *especially*, some of the new inter-disciplines, can all too easily slide into an imperial mode; neuroaesthetics, for example, professes to shunt aside the unfolding of values and meaning from the history of art, and in its place to see nothing but neuronal paths that respond only to symmetry or a particular juxtaposition of colors.

Historical scale can be judged with different metrics. For Anthony Grafton, who here is interested in the historical interpretation of Spinoza, the problem has to do with a too-small intellectual contextualization of the great philosopher. Over the years, Spinoza explainers have zeroed in on a small group of radical and rather marginal figures, ignoring works by more mainstream and trilingual scholars. Broadening the context—looking out, intellectually—significantly enriches our understanding of who Spinoza was. Grafton is an historian who uses philosophical texts to explore the development of pre-modern thought. Daniel Garber, reciprocally, is a philosopher keen to use history to broaden our grasp of how values change in philosophy. In particular, Garber takes on the crucial early-modern question of how novelty itself came to be both an enticing promise and a dire threat to a secure grasp of the world. But whether seen from history or seen from philosophy, both authors urge us to open up our inquiry to the evolution of questions about what counts as knowledge.

Very much in the spirit of Lorraine Daston's work, two of our essayists, Rivka Feldhay and Michael Gordin, use literature as a refracting lens through which to view historical understanding. Feldhay starts with Dostoevsky's 1872 novel *Demons* (famously badly translated as *The Possessed*), the great novelist's reading of the battle between conservative and revolutionary. No one comes out looking too good: the various revolutionary nihilistic and absurd ideologies are pitted against a hapless and ineffectual elite utterly unable to cope with a destructive wave about to crash on them. But her analysis goes further: how could one read the early Zionists' Hebrew translation of the novel, how could young socialist-Zionist intellectuals map *their* struggles, how could the post-Holocaust generation eek out meaning from the *Demons*? Here we have history translated and calibrated over and again: A post-1947 generation reading, a 1920s generation reading, an 1872 novel analyzing an incipient political showdown. Like Feldhay, Michael Gordin also begins with an old Russian book and uses it to extricate historical meaning, starting from a bizarre excerpt from Turgenev with a large black crab, a spiritualist, and a gambling scene in Baden-Baden. But from there, Gordin is off

to the races, seeing through this marginal black crab into a Russian world of intermixed religion, science and politics.

Seeing philosophy through history, seeing history through literature—these are just the sorts of things that Lorraine Daston has been after for a good long time. Andrew Abbott puts Daston’s own writing under the metaphor microscope, as he explores, in line with Daston herself, how the once unified category of nature is re-understood through historical and theoretical analysis. One could take a step further, throwing into relief the choice not just of metaphor, but of writing itself. Here, Carla Nappi writes (I would rather just refer you to the piece) an onomatopoeic sound-word performance of drums, bells, and cymbals from the Qing period that pushes us to wonder about the far limits of what writing can do. History read, history heard. We are learning these days a great deal about how to situate written history and written sources with other forms of learning.

Now, how could one end otherwise but through a reflection on citations and notes? Ingrid Rowland quite beautifully captures the loose, oral history of quotations. Even as Athanasius Kircher self-celebrates citing Plato (“there is nothing more beautiful than knowing everything”), Kircher is reinterpreting and re-ascribing. Beyond the irony of not quite knowing the “knowing everything,” Rowland points allusively to the always interpreted, always re-worked nature of history. Finally, Caroline Jones’s essay is on note-taking, from Pascal, through Benjamin and Hans Haacke, to the prodigious, hand-inscribed records of thoughts and readings that Lorraine Daston has kept most all of her career. Notes are an appropriate point at which to end these essays, for these jottings are memory aids and inspirations, self-directed admonitions, plans, and acknowledged debts to other scholars. They are, in pithy, fragment form, the very stuff of why and how, for hundreds of years, we make, re-make, and extend reason, nature, and history.

A final note from Wendy Doniger:

The essays in this volume are framed by two poems, Amy Edith Johnson’s Processional Poem, “If we could know,” which also furnished the title of this volume—“What Reason Promises”—and Hans-Jörg Rheinberger’s Recessional Poem, “Stilleben, ca. 1660–1670,” a meditation on margins and the center, on the tension between the image and the thing itself, another slant on the problem of perception and observation that is one of the themes of this collection of essays. The penultimate contribution is a personal tribute from Norton Wise to Lorraine Daston, finally letting the cat out of the bag, for, though this is *not* a Festschrift (Ceci n’est pas une Festschrift), it is, of course, inspired by the work of Lorraine Daston.