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Rules and Rivals: A Review Essay

Lorraine Daston, ***Rules: A Short History of What We Live By***, Princeton, NJ: Princeton University Press, 2022, 359 pp., $39.95 (hardcover).

Lorraine Daston, ***Rivals: How Scientists Learned to Cooperate***, New York, NY: Columbia Global Reports, 2023, 157 pp., $17.00 (paperback).

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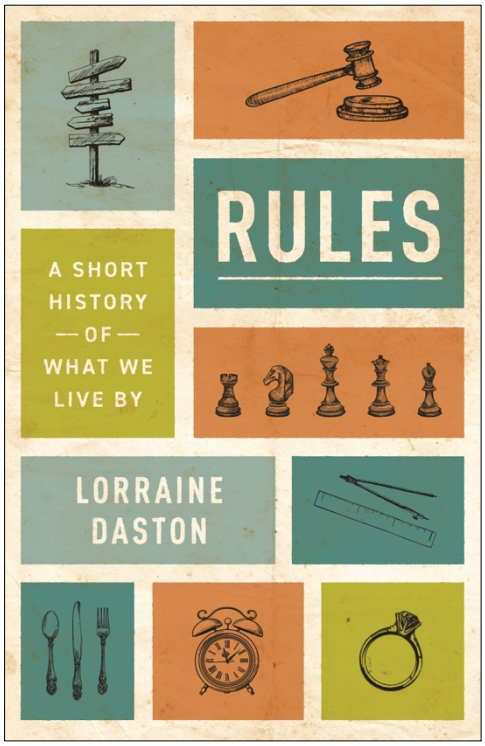


Historian and philosopher of science Lorraine Daston describes her multidisciplinary tour de force, ***Rules: A Short History of What We Live By***, as "a short book about a vast topic": the "hidden history of rules" (p. 1). As she conceives it, the topic is vast indeed: stretching from the ancient Greeks to computer geeks, with detailed scrutiny of rules of art, science and craft, Benedictine monasteries, early cookbooks and textbooks, rules of war, fashion, unruly streets of Enlightenment Paris, politics of spelling, gaming, natural law, laws of nature, Old Babylonian cuneiform tablets, algorithms, and more. Originally developed as the Lawrence Stone Lecture at Princeton University, the book is luminously illustrated with images of period artifacts. It warrants studying, not just reading, although *Rules* is eminently readable and deeply engaging.

Rules are ubiquitous: "We are, all of us, everywhere, always, enmeshed in a web of rules that supports and constrains" (p. 1). Rules make communication, culture, society, and rationality possible. The universality of rules does not, however, imply uniformity across cultures or within them; Daston's exploration of their variety focuses primarily on Western traditions. She maps the meanings of rules in three semantic groupings: (1) tools of measurement and calculation, (2) models or paradigms, and (3) laws.

In contemporary discourse, Daston notes, the term is primarily associated with (1) and (3), whereas its etymology in European languages is more closely associated with (2). Originally "rule" meant canon or paradigm: "a model taught by practice rather than precept" (p. 11). That meaning held well into the 18th century; then, Daston reports, its meaning flipped. Rule (*kanon, regula*) now "means exactly the opposite" (p. 11). She claims its original meaning has effectively become "extinct" (p. 6).

Assessing whether this inversion is a lexical fluke or a matter of historical significance provides the narrative arc of Daston's account. Her probes reveal that, while algorithms are as old as arithmetic, they were seldom invoked as significant constituents of rules in intellectual discourses, even in mathematics, until the late 19th century. She maintains, however, that "by the mid-twentieth century they were powering the computer revolution and conjuring dreams of everything from artificial intelligence to artificial life. We are now all subjects of the empire of algorithms" (p. 7). Explaining how this communicative revolution occurred provides the meat of Daston's feast, but to grasp its significance requires further definitional distinctions.

According to Daston, rules are "thick" or "thin" in form, flexible or rigid in application, and general or specific in jurisdiction. Thick rules contain details, caveats, and exceptions, but their specificity does not entail rigidity. They anticipate special circumstances and adaptations. Within Daston's taxonomy, the Rule of St. Benedict (Benedict of Nursia, 480–547 CE) exemplifies the form of governance by thick rules, which function as models or paradigms. Within Benedictine monasteries, detailed rules order, routinize, and govern every aspect of monastic life, but they also anticipate and provide for exceptions. The role of the abbot, who is usually elected, is expected to model the practice of Christian virtue for members of the order and to exercise wisdom and discretion in granting exceptions to the rules and in dealing with lapses. By contrast, thin rules, exemplified by algorithms, are succinct, specific, and rigidly applied; they assume a predictable, stable world. During crises, thin rules often thicken, but if rules change too often or too fast, they lose credibility.

Daston also distinguishes between laws, rules, and regulations. Here we are in familiar territory. Laws are general and authoritative; they have broad jurisdiction and aspire to universality. Rules are more specific and limited in jurisdiction. Regulations are local, action-oriented, focus on specific details, and are frequently experienced as adversarial; they only succeed when they become internalized as social norms. Regulations have increased enormously in the last 500 years due to the expansion of trade, urbanization, and the rise of nation-states.

Contra the microspecificity of regulations, there is a category of rules that claims greater dominion than any nation. They assert universal, uniform, and enduring authority. According to Daston, "These are rules that purport to hold everywhere and always, guarantors of ultimate justice and ultimate order" (p. 213): (a) "natural law," whereby a supreme being is the source of moral authority; and (b) "laws of nature," which derive their authority from empirical observation. There are fundamental conflicts between the two concepts. Yet, over time, "laws of nature" became the operative metaphor for discussing natural regularities amenable to measurement. The mediators of this rapprochement, Descartes, Boyle, Newton, and Leibniz, strategically framed their claims about laws of nature in various disputable theological terms. After 1660, an image of an orderly, rule-governed, mechanical cosmos became ascendant, with the deity as the "first cause" or "divine clockmaker" and nature as its mechanism. The two forms, despite fundamental differences, then evolved in tandem to support the thinning of general laws based on a limited number of fundamental principles applied universally, uniformly, and immutably.

The historical trajectory has involved a movement from thick to thin rules. Daston illustrates this shift with rich granular examples. Some of these are developed into detailed micro–case studies, and all are punctuated with discerning wit. She contends that algorithms became "the thinnest laws of all—and

thin rules in turn became the model of all rules" (p. 84). Indeed, she points out that there is now an emerging academic discipline that is so thin that it has no theory and no conventional disciplinary boundaries: data science. But, she notes, algorithmic reductionism is relatively new. Algorithms appear in the earliest written documents from ancient Mesopotamia, where their primary function was didactic. Until the 20th century, the word meant providing step-by-step instructions to solve a specific problem. Depending on the culture and context, these instructions could involve art, cooking, how-to manuals, and more.

In retrospect, the slimming of algorithms and the rise of the "empire of algorithms" may seem inevitable as the world became more integrated by travel, trade, and colonialism. Perhaps, but Daston maintains the shift required a transformative intervention, which took place in the late 18th century. She characterizes it as "mathematical Taylorism *avant la lettre*" (p. 105). When the demand for calculation grew, a division of labor was introduced into computation, whereby the process became mechanical, even before there were reliable calculating machines. Mathematicians and managers reduced complex algebraic equations into numerical versions, and then into rote operations. This division of labor transformed computation into piecework in which the rules of calculation were "sliced into the smallest possible steps" (p. 121) so that they could be performed by low-paid, semiskilled workers. By the 1920s, this monotonous, repetitive work, whether done by hand or calculating machines, was usually performed by women, who were called "computers" or "calculators," whether they used machines or not.

Calculating machines were initially intended to assist human intelligence, not to replace it. Unlike humans, however, machines doing repetitive work did not get bored, tired, sick, or join unions, and they were less prone to error. As the scale of computations grew and computer technology advanced, programming became more complex, opaque, and proprietary, so Daston notes that "the shift from mindless machines to machine minds made sense" (p. 149).

She observes, "Now, as then, it takes mental vigilance to be able to follow even the thinnest of rules without understanding them" (p. 150). One distracted click and havoc can follow: Stocks can tumble, reputations can be ruined, etc. The difference between then and now, however, is that now we are all "computers": "users" disciplined not only by algorithms but also by "terms and conditions"—rules—unilaterally imposed by private entrepreneurs who own the computer platforms that provide the infrastructure for global communications.

Daston points to an additional force fueling the movement from thick to thin rules, "distrust in discretion" (p. 270): loss of trust in public institutions and each other. In theory, algorithms remove the need for discretion. They both *assume* and *impose* "a world without anomalies or surprises" (p. 271). Daston describes the empire of algorithms as a "dreamworld" constructed on "islands of uniformity, stability and predictability," never fully realized but occasionally approximated for a time. These islands foster visions of "rules without exceptions, without equivocations, without elasticity" (p. 273).

The thin rules of these dreamworlds deal with social context by ignoring it; however, "disruptive details and special cases, inevitably" (p. 271) emerge. When they do, the thin rules of dreamworlds can provide no rational grounds for legitimizing discretionary actions. No clockmaker, natural law, or abbot can

come to the rescue because "making the world safe for algorithms turns out to mean freezing context: a world without anomalies or surprises" (p. 271).

Daston cites the COVID-19 pandemic as one such anomaly. The public health emergency required a rapid but—due to the quickly evolving science, inconsistent—thickening of rules and regulations. This, in turn, activated existing distrust of governments and expertise, which rendered the crisis amenable to politicization, propaganda, and conspiracy theories.

Daston offers no panacea, "no rules to help us reason about rules," which might make the empire of algorithms more tractable and humane (p. 274). Nevertheless, she does not abandon her readers in a wilderness of unreason. She is a co-author, with Peter Galison (2010), of *Objectivity*, which critically interrogates that vaunted scientific ideal. Her vita also includes a collaborative study of applied rationality, *How Reason Almost Lost Its Mind: The Strange Career of Cold War Rationality* (Erickson et al., 2013), which examines unsuccessful attempts by experts to articulate "rational" grounds for the U.S. Cold War policy of mutually assured destruction (MAD). Discovering and exploring the limits of knowledge is Daston's forte, which she practices constructively and reflexively.

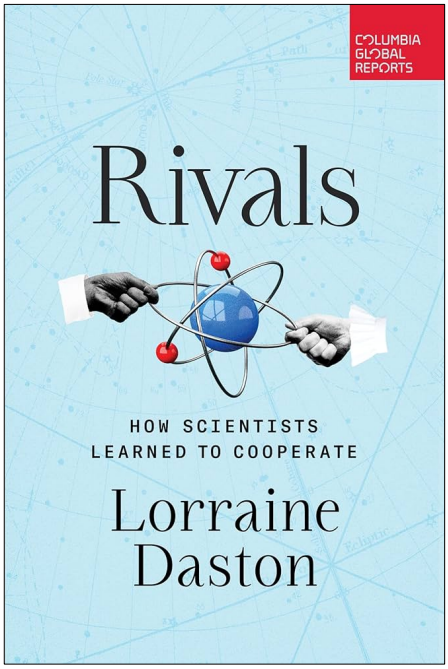
Instead of the elusive idol of objectivity, she and Galison (2010) recommend the epistemic virtue of the trained scholarly judgment developed within communities of inquiry. That virtue is achieved by internalizing and practicing the distinctive ways of seeing and interpreting that have achieved credibility within a specialized field—in their case, the history and philosophy of science. Daston applies that approach to *Rules*.

It leads her to reappraise the value of rules-as-models or -paradigms. In her judgment, this neglected form encompasses the most "subtle and nimble rules of all," which can "bridge the ancient philosophical opposition between universals and particulars" (p. 272). In contrast to the rigidity of algorithmic rules, she reminds readers that "ambiguity in a model is a feature not a bug" (p. 272). The thickness of models and paradigms can cultivate the creative synergy necessary to anticipate special circumstances and adaptations. In the quest for contemporary models that can enable reason-based discretion, however, Daston warns against slipping into "the murky regions inhabited by intuition, instinct, and inspiration, all opaque to critical scrutiny" (p. 274).

The story that Daston tells—thinning of rules, emphasis on efficiency, glossing of cultural context, rise of individualism, and distrust of public institutions—can be read, at least in part, as a critique of capitalism, technocracy, and "digital colonialism" (my words, not hers). I highlight that interpretive thread because of the originality and clarity of her vision and the urgency of the present moment. Yet, Daston is no polemicist. She says little about economics directly, despite her creative use of Taylorism and a few references to Adam Smith. Moreover, some of her examples focus on countercurrents, including her colorful tales of fierce resistances to standardization of languages; positive outcomes of capitalistic and nationalistic competition among major European cities that served as catalysts for developing sanitation systems, well-lit streets, free-flowing traffic systems, parks and promenades; and a nascent French fashion industry aggressively undermining repressive, government-imposed sumptuary regulations.

There is, however, one troublesome category of rule that Daston leaves virtually unaddressed: censorship. She mentions it only briefly and tangentially in her discussion of Jesuit casuistry. Censorship rules can take many forms: religious, state, military, market, pressure group, and even fear-imposed self-censorship. They can operate formally or covertly. Censorship is frequently an amalgam of (2) law and (3) model or paradigm, since it is both constitutive and regulative. It persists in the contemporary world despite laws and international accords protecting free expression. Virtually every nation authorizes censorship during wartime. Censorship regulations have often been among the thickest of rules, with enforcement protocols even thicker, especially in authoritarian regimes where the practice of censors is "if in doubt, repress." In some contexts, however, censorship protocols can also serve as guides: models that inform and instruct members as well as reinforce group solidarity, much like the Rule of St. Benedict.

This exclusion is puzzling but does not diminish Daston's daunting achievement. A short book, which had its genesis in a lecture, can cover only so much, and what she covers gifts the reader with some of the treasure of a lifetime of deep learning, which is conveyed in the fluid prose of a talented raconteur. All of which makes it impossible for any reviewer to do full justice to the book. *Rules* models the epistemic virtue that Daston and Galison (2010) advocated in *Objectivity*: it shows as well as tells. Few scholars ever achieve a level of fluency whereby form and content so seamlessly merge. In the spirit of T. S. Eliot's (1919) "Tradition and Individual Talent," reading *Rules* is an occasion for awe and delight in the fact that we are part of the same academic guild, if not discipline, as Lorraine Daston.



Like *Rules,* ***Rivals: How Scientists Learned to Cooperate*** had its inception in a lecture series: the Menahem Stern Lectures at the Israeli Historical Society. *Rivals* examines the long struggle, spanning more than three centuries, to create an international scientific "community" committed to the discovery of truth. According to Daston, these efforts have faced recurrent obstacles posed by "savagely competitive" (p. 60) national and individual rivalries. She describes *Rivals* as offering a "bird's-eye view" (p. 14) of the evolution of this vision from the early modern Republic of Letters to the digital age. Despite its brevity, Daston's signature thick descriptions of specific historical successes and stalemates anchor and enrich *Rivals.*

Nurtured in the revolutionary spirit of the Enlightenment, the Republic of Letters rejected traditional social hierarchies, valorized hierarchies of talent, cosmopolitanism, self-rule, and freedom to criticize competing views. Its advocates conceived of ambitious transnational collaborations across Europe and, in some cases, beyond. These early initiatives faltered due to the inability to sustain collaborations at a distance. Daston elegizes this period as "Pen-Pal Science" (p. 20).

By the latter half of the 19th century, however, advances in transportation and communication made face-to-face collaboration feasible, and science became "a world project" (p. 56). Collaboration still faced significant challenges, especially in making standards agreed on by a small number of elite scientists binding on the field at large, including for future generations. Organizers used the Universal Postal Service, founded in 1874, as a template for creating the infrastructure for their initiatives. By necessity, the Postal Union had pioneered strategies for constraining national sovereignty by encouraging backstage collegial brokering of compromises by task-oriented specialists. In Daston's words, "It aimed at internationalism without nations—except when it came time to pay the bill" (p. 66).

Face-to-face interaction proved to be an essential constituent for the crystallization of international scientific cooperation. While formal scholarly sessions were generally intense, occasionally heated, and sometimes even pugilistic, the addition of social amenities—meetings in capital cities, fancy hotels, nine-course meals, and boozy conviviality—played a constructive role in promoting collegiality by bridging national differences and soothing the wounds inflicted by critical intellectual assaults in formal sessions. Despite the distress of subsequent generations of academic budget managers, according to Daston, the verdict of history is that these amenities have contributed to the advancement of science.

The heady early 20th-century scholarly internationalism, based on friendly international competition, did not survive the devastation of two world wars. When international scholarly cooperation was revived after 1945, organizers sought a new form of legitimacy and autonomy, which Daston characterizes as "Governance without Governments" (p. 85). Where earlier efforts referred to scientific communities in the plural, the post-1945 successor used the singular. And where the earlier movement was antidisciplinary, the later version identified its constituents as representatives of disciplines, not nations. The new initiative also placed more emphasis on narrow Anglo-French designations of "science" rather than the more inclusive Germanic *Wissenschaft* (learning) of earlier collaborations.

Daston characterizes the triumph of the singular "scientific community" as a "deceptive singular . . . [which] hides a multitude of disciplinary diversity, with mores that run the gamut from disciplined cooperation to cutthroat competition and almost everything in between" (p. 111). It is a defensive term that "materializes only in adversarial situations" (p. 111). I would add, it also has PR cache as a strategic incubator of scientism.

Governance within disciplines (i.e., establishing technical and ethical standards, choosing journal editors, inaugurating and monitoring peer review) has generally remained under disciplinary control. "Governance without governments" (p. 85) is, however, an elusive ideal. Research, especially international research, is expensive. Daston points out that governments "not only decide what research will be done, whether on cures for cancer, missile defense systems, or putting humans on Mars. They will also dictate how it will be done, through an ever-denser web of regulations" (p. 126). She concludes, "He who pays the piper plays" (p. 126).

Daston contends, "Science has never been an island" (p. 124). Yet, she notes, "Scientists have never ceased to imagine themselves as autonomous, if not as autarchic" (p. 124). The desire to collaborate is fueled by the view that science and scholarship have their own transnational objectives and standards.

International collaboration has endured because "national rivalries for international prestige harmonize beautifully with scientists' own rivalries for international recognition" (p. 126). Scientific internationalism sets epistemic standards for that recognition "thereby manufacturing universalism through uniformity" (p. 121). Nonetheless, Daston acknowledges that "standards don't just flatten the world; they steady it" (p. 122).

Daston concludes *Rivals* by chronicling the explosive growth of the global scientific community in the last 75 years as measured by numbers of researchers and countries engaged in research, public investments in research, and numbers of scholarly journals. Today, she notes, there are more active researchers than in all previous generations of human history added together, and the rate of growth is accelerating. She reports that in 2014, there were 28,000 peer-reviewed journals in English alone (p.114). The rapid expansion has rendered the post-1945 concept of a singular scientific community not only deceptive but also anarchistic, as international collaborations face formidable new challenges, including maintaining standards and ensuring accountability in a community of millions, the emergence of predatory journals and publishers eager to exploit the growing largesse, fraud and scandals within the community, and the impossibility of sustaining the essential glue of face-to-face collegiality. Indeed, Daston concludes that the scientific community is currently undergoing an "earthquake, the digital revolution that promises to remake science just as thoroughly as the early print revolution did" (p. 124).

Daston registers her concern about the effects of the digital ascendency, but, given the limited historical parameters she set for *Rivals*, she does not directly address them. That is a story for another day, or book. However, if we circle back to *Rules*, it is possible to locate some applicable resonances. Accordingly, Daston tells us, we are all already subjects of the digitally enabled "empire of algorithms" (*Rules*, p. 7) whether we are digital users or not. The thin rules that govern this empire are "rules without exceptions, without equivocations, without elasticity" (*Rules*, p. 273). They ignore context, assume a world without "anomalies or surprises" (*Rules*, p. 271), offer no rational grounds for dealing with disruptive events or special cases, and provide no basis for making discretionary decisions. In short, the empire of algorithms does not seem to be equipped to deal with the earthquake of disruption that it is precipitating.

In response, Daston suggests reinvigorating the models, paradigms, and thick rules that have gotten the human species, in all its diversity, to this moment in history. It is a modest proposal compared to some of the Faustian dreams of the sages of Silicon Valley, but she makes a compelling case for it.

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