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Popularizing, Moralizing, and the Soul of American Science

The formidable amount of work contained within the pages of John Burnham's *How Superstition Won and Science Lost: Popularizing Science and Health in the United States* remains as daunting today as when it was first published in 1987-- evidenced not least by the fact that it contains 91 pages of endnotes in eight-point type. The text likewise bursts beyond the bounds of the standard-issue format of academic monographs in the history of science, whether then or now. In a conventional treatment, an author examines one scientific discipline (or, perhaps more accurately, one sub-discipline); restricts the temporal scope to no more than a generation or two (although less would not be unusual); focuses on a well-defined research cohort and those with whom its members are allied or at odds (with works centered on a single individual also common); and a scope that is kept contained within the laboratory (or the pages of specialist journals). Burnham obliterates these norms in *How Superstition Won and Science Lost*, a work that encompasses three separate areas of specialist expertise -- the natural sciences, health sciences, and psychology; sweeps across the nineteenth and twentieth centuries and also expounds at some length about the scientific revolution of the early modern era; incorporates a heavily-populated roster of individuals too large to recall after a first reading; and aims at nothing less than producing the definitive analysis of a "struggle. . . [that] was an important determinant of American culture."[1]

I first encountered *How Superstition Won and Science Lost* when I was about half-way through my doctoral training at UC San Diego (where I would earn the first Ph.D. in History/Science Studies granted by the newly-minted interdisciplinary graduate program there in 1993). On the one hand, to read it through was a reassuring experience: it was a book that took seriously the history of American science with the public in view; it entertained questions about the circulation of scientific knowledge across different domains; it directly addressed the nature of scientific authority; and it gave extensive consideration to popularization – areas in which I was intensely interested, and for which little relevant literature existed. Burnham's text sprawled across an unusually wide ambit of topics to be contained within a single volume: the professionalization of science, newspapers, the warfare thesis and American religion, elementary education, the nature study movement, editorial ventures such as Science Service, advertising, amateurs, skepticism, high school science, hygiene instruction, the environmental movement, museums, magazines, books, radio, television, and more. In doing so, this work counteracted the hyper-specialization that makes it difficult to pursue wider-angle views that take in the cultural history of science, and not just the history of scientists. Alongside issue #1 on "Historical Writing on American Science" in the recently resurrected journal *Osiris* in 1985, I found *How Superstition Won and Science Lost* to be a welcome sourcebook and hypothesis-generator about the relationships between the American scientific community and the nation's citizens.[2]

It was much less satisfactory, however, to read through the chapters and find how incurious

the book was about these topics. The surfeit of items had not been gathered together to establish a thickly descriptive examination about science and its publics, but instead to serve as cross-corroborating evidence to be referenced for Burnham's main argument: that twentieth-century scientists had turned their backs on what he characterized as the moral commitment of their nineteenth-century predecessors to use popularization to speak directly to the general public and to destroy false claims and error. These later cohorts of reprobates, in Burnham's telling, had allowed media outlets to promulgate degraded forms of popularization that trafficked in sensationalism and other forms of distortion in the pursuit of commercial profit. Burnham's historical account largely reserved agency for the scientific community, (hapless) educators, and media personnel; his "American public" was relatively passive and undifferentiated, serving more as a backdrop to the actions of others than forces in their own right. That the public, once again, had been relegated to the sidelines of history of science was unsurprising to me at the time – a default stance in history of science scholarship that has proven stubbornly resistant to change – but it was nonetheless a disappointment. The lesson I took from this authorial choice was not that American culture had come up short, but that history of science had. If I was going to be able to make headway in re-conceptualizing what I would come to call "science in the American vernacular," it seemed that the way forward was not by means of the kind of preoccupations about elite authority that exercised Burnham, but instead in bringing interdisciplinary perspectives to bear that dismantled the validity of the deficit model of the public mind and of the one-way flow of scientific information – as did work in cultural studies, the sociology of knowledge, discursive analysis, feminist epistemology, and popular culture studies.[3]

In re-visiting *How Superstition Won and Science Lost* for a second look, the vexation I felt years ago for the ground it broke and the ground it refused to yield remained. This time, however, I was struck more forcefully by Burnham's treatment of his scientific figures and his media targets than by the submergence of the public. In the nineteenth-century men of science portion of the book, amidst the collection of observations by individuals in and outside of science that Burnham assembled to speak for the times, a recurring figure stood out, one who perhaps could be assigned the status of heroic exemplar: E.L. Youmans. Youmans, who founded *Popular Science Monthly* in 1872 and served as its first editor, was a relentless promoter of science as the apotheosis of modern life, a fierce defender of scientific naturalism in the face of opposition, and a thought leader who served as "Interpreter of Science for the People" (the subtitle of John Fiske's 1894 biography).[4] Youmans finds favor with Burnham for his hybrid status: by combining his wealth of scientific knowledge with his skill in communicating with the public, he is the man of science as popularizer *par excellence*. There is even more to this approbation: Youmans is clear that men of science are allied with and inhabit the sphere of "cultivated people" who are "the intelligent and influential [members of the] American public," and he steadfastly believed that science should be identified "with both high culture and social improvement of all kinds."[5]

Recognizing Youmans' importance to Burnham in the first half of his book as a fervent believer in the religion of science who relentlessly sought converts amongst America's finest helps to clarify the vehemence with which he denounces those who in the second half of the book are Youmans' counterparts in terms of their elite scientific, cultural, and professional

media status – but who conduct their lives in ways that are inverse to his example. Burnham argues that by the 1970s "science was in retreat" courtesy of, in part, "the chic intellectuals [who] turned their skepticism against the late-nineteenth century ideal of science, not against superstition, mysticism, and commercial exploitation" and those others who expressed a "hunger for wonders" and waged "angry warfare against a whole style of life in which rationalism and science were inextricably associated with the upper part of the social hierarchy and with civilized behaviour." As one example of how professional scientists were complicit in undermining truth, Burnham contends that psychologists, "instead of regrouping for the grand battle" against the nonempirical and the irrational, instead "joined the enemy or at least collaborated in the name of eclecticism . . . Even the editors of *Psychology Today* were publishing papers debunking science and objectivity."[6]

In re-encountering Burnham's assessments, I was intrigued by how closely the text fits within the rhetorical genre of the American jeremiad – a conclusion also reached in Nancy Tomes's insightful discussion in this Focus section, which states it directly in its title: "An American Jeremiad: John C. Burnham and the History of Science Popularization."[7] In encountering the air of fire and brimstone in this second look, I found it hard to escape the feeling that Burnham's militant excoriation was directed not only at professional scientists but also at historians of science who were experimenting with the kind of interdisciplinary "science studies" that was emerging in the late 1980s. The historiographic breadcrumb trail that Tomes points to in her essay is instructive in this regard.

The American jeremiad terminology casts back to the prophetic condemnations of

contemporary sin and covenant-breaking contained in the biblical Book of Jeremiah, and specifically references the body of literature that emerged from sermons preached by the second generation of New England Puritans, in which contemporary congregations were called to account for and repent from the depravity of their declension from the purity and holiness of the founding generation. In a startlingly- like manner, *How Superstition Won and Science Lost* recounts the virtuous past forged by the nineteenth-century's men of science, individuals who viewed scientific life as a "calling" and who promoted "the religion of science . . . with evangelical fervor" in order to bring "enlightenment by exposing everyone to the truth, that is, by popularizing science." Burnham situates the betrayal of the founding generation as emerging in the 1890s with the increasing power of what he repeatedly characterizes as the "yellow press," and which he contends initiated changes that "signalled the beginning of the end."[8]

As the twentieth century proceeded, Burnham contends, "the retreat of the research elite from the arena of popularizing" destroyed the scientists' covenant with the public, a violation that would be compounded by scientists turning a blind eye to the reality that "the influence of journalists" who had replaced them as popularizers "was altogether corrupting, turning high culture into trivial news items." The declension extends on into the post-World War II era, when, as one example, "the increasing presence of television after the 1950s oppressed and counteracted all serious attempts to popularize science" and therefore contributed to the retrogression of science in the next decades. Burnham argues that after World War II, there were few scientists worthy of the name to be found, as more and more they "were behaving like mere technicians." No longer responsive to the ideal of science as

a calling, these individuals displayed "a failure of nerve," and in consequence "few practitioners stood up to speak for science or the religion of science." And, as he asserts in his closing, "science probably did not exist any longer on the popular level."[9] The destruction of the temple of science had left the American people to wander through its ruins with no way to revive its true spirit.

What is striking about this foreclosure of redemption is that this is *not* how American jeremiads are designed to conclude: the invocation of condemnation and lamentation are intended to empower the congregants to go forth and repair the breach and reclaim the original promise. In reflecting on the general framework of *How Superstition Won and Science Lost* before I picked it up again to re-examine in the present, I certainly remembered Burnham's negative evaluation of the twentieth-century scientific community and of the scientific media, but could not recall what he suggested as a remedy. I was brought up short when I realized that I had *not* forgotten what solution he proposed in response to his diagnosis, as it was the case that no discussion of solutions had been offered: Burnham's overwrought narrative ends trapped in the present. I was left with a question that is one that I have struggled with over the course of my professional life: when we write the history of science, who are we writing for, who should we be writing for, and toward what ends?[10]

Burnham's only objective may have been to document his judgment that the "triumph of superstition . . . [was] signalled by the retreat of broad, well-educated missionaries of science from the field of popularization" and to say nothing more.[11] Perhaps by design, the agonistic

form that he pushes to the limit offers little room to entertain other perspectives. And yet, who speaks for nature, how scientific knowledge is legitimated, how scientists and publics engage: these remain in need of critical consideration today, but not with the shortcomings that foreclosing discussion in search of the last word entails.[12] Nevertheless, however we assess the arguments and moral certitude advanced in *How Superstition Won and Science Lost*, Burnham was right to undertake a critique of scientific authority and democratic realities in the vernacular, and for his text to remind us that much remains at stake.

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[1] John C. Burnham, *How Superstition Won and Science Lost: Popularizing Science and Health in the United States* (New Brunswick: Rutgers University Press, 1987), p. 6.

[2] Sally Gregory Kohlstedt and Margaret Rossiter, eds., "Historical Writing on American Science," *Osiris*, Second Series, Vol. 1 (Philadelphia: History of Science Society, 1985).

[3] Katherine Pandora, "Knowledge Held in Common: Tales of Luther Burbank and Science in the American Vernacular," *Isis*, 2001, *92*:484-516. Some contemporary texts from these perspectives that I was studying in my coursework and dissertation reading include: Nancy Cartwright, *How the Laws of Physics Lie* (Oxford: Oxford University Press, 1983); Carlo Ginzburg, *The Cheese and the Worms: The Cosmos of a Sixteenth-Century Miller* (New York: Penguin Books, 1982);

Ruth Hubbard and Marian Lowe, eds. *Woman's Nature: Rationalizations of Inequality* (Oxford: Pergamon Press, 1984); Evelyn Fox Keller, *Reflections on Gender and Science* (New Haven: Yale University Press, 1986); Warren Susman, *Culture as History: the Transformation of American Society in the Twentieth Century* (New York: Pantheon, 1985); Steven Shapin and Simon Schaffer, *Leviathan and the Air-Pump: Hobbes, Boyle, and the Experimental Life* (Princeton: Princeton University Press, 1986); Jean Lave, *Cognition in Practice: Mind, Mathematics and Culture in Everyday Life* (Cambridge: Cambridge University Press, 1988); Lawrence Levine, *Highbrow/Lowbrow: The Emergence of Cultural Hierarchy in American Culture* (Cambridge: Harvard University Press, 1988); Sharon Traweek, *Beamtimes and Lifetimes: The World of High Energy Physicists* (Cambridge: Harvard University Press, 1988); and Lynn Hunt, ed. *The New Cultural History* (Berkeley: University of California Press, 1989).

[4] John Fiske, *Edward Livingston Youmans: Interpreter of Science for the People* (New York: D. Appleton and Company, 1894). For a brief modern biographical discussion, see Mark Pittenger, "Edward Livingston Youmans," *American National Biography* (New York: Oxford University Press, 1999).

[5] Burnham, *How Superstition Won*, pp. 24, 9, 30.

[6] Burnham, *How Superstition Won*, pp. 261, 18, 115. Interestingly, I would suggest that in these sections of the book Burnham is foreshadowing the "science wars" of the 1990s, particularly as represented in Paul Gross and Norman Levitt's *Higher Superstition: The Academic Left and Its Quarrels with Science* (Baltimore: Johns Hopkins University Press, 1994).

[7] Tomes also points out historian Neil Harris's use of the term in his 1988 book review in *Science*. Sacvan Bercovitch's *The American Jeremiad* (Madison: University of Wisconsin Press, 1978) is the foremost interpretation of the genre; historiographic debate on the American jeremiad's context commenced with historian Perry Miller, *The New England Mind: From Colony to Province* (Boston: Beacon Press, 1953).

[8] Burnham, *How Superstition Won*, pp. 7, 23, 163.

[9] Burnham, *How Superstition Won*, pp. 249, 163, 249, 177, 251, 250, 190, 162.

[10] One place in which I have addressed these questions is a series of posts on science and popular culture at my blog, *Petri Dish: Labnotes on Science, Culture & History*: "Trying to make the (seemingly) ephemeral visible," May 12, 2008; "Of crocodelephants and category confusions," May 30, 2008; and "Flotsam and jetsam and historical memories," June 19, 2008. https://www.katherinepandora.net/petri_dish/ See also a related discussion in Katherine Pandora, "Amateurs," in Bernard Lightman, ed. *A Companion to the History of Modern Science* (Chichester, West Sussex: Wiley-Blackwell, 2016).

[11] Burnham, *How Superstition Won*, p. 4

[12] For an historiographic analysis on the issue of science and its publics, see Katherine Pandora and Karen Rader, "Science in the everyday world: Why perspectives from the history of science matter," *Isis*, 2008, *99*:350-64.