Modern Intellectual History (2024), **21**, 489–501
doi:10.1017/S1479244324000039

CAMBRIDGE UNIVERSITY PRESS

REVIEW ESSAY

Merchants of Certainty: Reconsidering Scientific Credibility and Prestige

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Michael Gordin, *On the Fringe: Where Science Meets Pseudoscience* (New York: Oxford University Press, 2021)

Andrew Jewett, *Science under Fire: Challenges to Scientific Authority in Modern America* (Cambridge, MA: Harvard University Press, 2020)

Audra Wolfe, *Freedom's Laboratory: The Cold War Struggle for the Soul of Science* (Baltimore: Johns Hopkins University Press, 2018)

(Received 25 December 2023; accepted 8 January 2024)

At the California State Polytechnic University in San Luis Obispo, where I teach, the subjects traditionally defined as "science"—physics, chemistry, biology—make their institutional home in the College of Science and Mathematics. The history department, on the other hand, is housed in the College of Liberal Arts, alongside philosophy, English, psychology, and the umbrella "social sciences" of sociology, anthropology, and religious studies, to name a few. Why, one might ask, have these fields been organized this way? What exactly distinguishes science from the liberal arts? Meanwhile, within the College of Science and Mathematics, highly credentialed professors offer courses in astronomy and chemistry, but not astrology and alchemy. Why not? My students might respond that the answers are obvious: alchemy is not *real* science, of course, and whereas science is objective and empirical, the liberal arts are subjective and interpretive. But where did these distinctions originate? Who determines and maintains them? What, if anything, can the history of these categories tell us about the waxing and waning of scientific authority in the twentieth century?

These are not new questions, but recent scholarship in the history of science has tried to tease apart these old, knotty problems in intriguing ways. Michael Gordin's *On the Fringe* and Andrew Jewett's *Science under Fire* both explore, in different ways, histories of exclusion. Gordin assesses two centuries of internal demarcations between respectable science and pseudoscience, while Jewett examines intellectual contests over the legitimacy of social-science expertise in the twentieth-century

United States. Audra Wolfe's *Freedom's Laboratory* captures airborne epistemological disputes about science and grounds them firmly within the complex politics, diplomacy, and material interests of the Cold War. Wolfe details the deliberateness with which natural scientists molded, enhanced, and promoted their own self-image and prestige through new forms of Cold War diplomacy. Securing the reputation of science as free inquiry immune to political meddling was, at key moments, a CIA-funded operation.

All three works conjure up older historiographical specters, from Karl Popper's concept of falsifiability to C. P. Snow's *The Two Cultures* to Daniel Kevles and Paul Forman's influential debate over scientists' postwar agency and self-awareness. These older pioneers of science studies have now themselves become subjects of historical scrutiny. Yet the knottiness remains. The high-stakes science controversies of the twenty-first century that infuse these three recent works with urgency also condition the authors' argumentation. All three challenge popular mythologies of scientific objectivity and tease out the political implications of competing views of scientific legitimacy, but seem wary, in an age of climate change denial and anti-vaccine activism, of treading too harshly. None seem eager to rehash the science wars of the 1990s, an era now consigned to obligatory references in later chapters, with little resolution.

For undergraduates who are struggling to evaluate competing claims of expertise, or who are puzzling over the boundaries between science and nonscience, parsing these distinctions can be baffling. My students often conclude, after an hour of discussion, that the discipline of history should not be considered a science. Gordin, Jewett, and Wolfe likely agree. But they might respond with follow-up questions of their own. Is *science* always a science? Who gets to decide?

Demarcation and its discontents

"There is no such thing as pseudoscience," Gordin argues at the outset of *On the Fringe*, "just disagreements about what the right science is" (vii). Because science is inherently adversarial, constantly adjudicating winners and losers among competing claims, its discards become "fringe" outliers by default. Rejected claims and methodologies may end up derided as "pseudoscience," but they are a natural and predictable by-product of the practice of modern science.

Perhaps this observation of inevitability is meant to be reassuring, an indication that the existence—and even the persistence—of pseudoscientific ideas need not be a cause for panic. As Gordin has observed elsewhere, "fringe theories proliferate because the status of science is high … They are a sign of health, not disease."[1] Of course, even if pseudoscience "is not a real thing," as Gordin contends, as a pejorative *accusation* it can have very real, discrediting consequences. In this slim volume, which distills many key insights from Gordin's earlier work, his focus is the history and taxonomy of these consequences. To do this, he sorts fringe doctrines into discrete "families": vestigial sciences that have since been superseded

[1]Michael Gordin, *The Pseudoscience Wars: Immanuel Velikovsky and the Birth of the Modern Fringe* (Chicago, 2012), 210.

https://doi.org/10.1017/S1479244324000039 Published online by Cambridge University Press

by more recent research; hyperpoliticized sciences; counterestablishment sciences; and sciences claiming "extraordinary powers of mind," such as studies of ESP and spiritualism (14).

Gordin begins, logically enough, by introducing readers to the concept of falsifiability, Karl Popper's answer to the "demarcation problem" of scientific legitimacy. If a given claim can potentially be proved wrong by new evidence, Popper argued, then the claim can be considered scientific. Popper's motivation in developing this demarcation test was neither abstract nor apolitical; he was on a mission to discredit Marxism and Freudian psychoanalysis. (According to Popper, Freudianism was so slippery and flexible that it could accommodate challenges without yielding any of its central contentions.) Gordin summarizes a litany of critiques of Popper's formulation: counterevidence may itself be unreliable, for example, and falsifiability isn't easily applied to "historical" natural sciences such as geology or evolution, where it is impossible to "run the tape again" (7). And as Popper himself acknowledged, falsifiability meant that a scientific theory could never definitively be proved true. "The best scientists can achieve is *not yet false*," Gordin observes, noting that few contemporary scientists regard their work in these terms (8, original emphasis).

Gordin proposes that Popper's falsifiability demarcation has remained popular, despite its limitations, in part due to 1980s legal contests over Darwinism and creation science. In a key 1982 lawsuit, philosopher of science Michael Ruse invoked Popper's falsifiability test and other criteria to argue that creationism was not science. The judge assigned to the case, William Overton, agreed. Just as Popper had invoked falsifiability to discredit psychoanalysis and Marxism, Ruse and Overton drew on falsifiability to exclude creationism from the respectability of science. In Gordin's telling, the intellectual genealogy of demarcation and falsifiability is intertwined with political efforts to label and exile unpalatable claims.[2]

Gordin demurs from providing his own demarcation standard, preferring instead to glean insights from the case studies of the ensuing chapters. He begins with "vestigial sciences," those "theories and beliefs that once counted as science but were rejected" (16). He reminds readers that despite their popular image as fraudsters, alchemists helped develop foundational techniques of modern chemistry and astrologers amassed extensive astronomical data. Gordin revisits similar themes in his assessment of fringe sciences associated with powers of the mind: ESP, mesmerism, spiritualism, and parapsychology, though he argues that, in these cases, it was skeptics who helped advance experimental practice. In their quest to discredit supernaturalism and other dubious claims, for example, debunkers ended up convincingly demonstrating the placebo effect and introducing randomization into psychological experimentation and analysis. It's a generous framing all around;

[2]Although unmentioned by Gordin, a similar argument was made by Sandra Harding in "Two Influential Theories of Ignorance and Philosophy's Interests in Ignoring Them," *Hypatia* 21/3 (2006), 20–36. Harding argues forcefully that Popper's anti-Marxist vision of falsifiability during the Cold War reinforced philosophers' and scientists' commitment to demarcation and belief in "an autonomous, pure science." Harding alleges that "senior philosophers today who were the students of that midcentury generation" still maintain "a residual loyalty to the emotional power of the demarcation and autonomy ideals—ideals recently challenged by feminist, postcolonial, and postmodernist analyses." Ibid., 21.

https://doi.org/10.1017/S1479244324000039 Published online by Cambridge University Press

Gordin suggests that current scientific knowledge owes a debt to the purveyors of these fringe fields.

Some of Gordin's families are less clearly defined and less well developed than others. A chapter on "hyperpoliticized science," for example, aims to describe scientific claims that act "as arms of a particular ideology," whose acceptance rarely outlasts the life spans of the authoritarian regimes with which they are often associated. But it's not quite clear what distinguishes hyperpolitized science from politicized science, and Gordin acknowledges that his chosen examples don't always match his criteria. The popularity of eugenics transcended the national borders of authoritarian regimes, for example, and Lysenkoism—the Stalin-supported claim that plant heredity could be drastically altered through environmental conditions—persisted for another decade after the death of Stalin. Controversial related fields, such as later iterations of race science and highly contested subfields of evolutionary psychology, receive little attention here.

At the other end of the spectrum are "counterestablishment" sciences, movements challenging mainstream institutions and consensus through the creation of alternative organizations, conferences, and journals. Gordin's framing is similar to what Naomi Oreskes has labeled "facsimile science."[3] Gordin cites phrenology, creationism, belief in monsters and aliens, flat-earthism, and even the arcane field of cosmic catastrophism, a subject of Gordin's earlier work. Though Gordin deliberately excludes medical claims from the scope of his exploration, the omission of the antivaccine movement in these chapters seems a missed opportunity. (When he does mention antivaccine activism, at the very end of the book, Gordin describes it erroneously as "associated with left-wing activists' concern about child health and [dating] back only two decades" (95).)[4]

Gordin is not unaware of the trickiness of these taxonomies. "The boundaries between fringe, fraud, and mistaken science are blurry," he writes (82). After all, many scientific claims have been rejected *without* being labeled pseudoscience. Gordin notes that cold fusion, a polymerized version of water called polywater, and purported evidence of homeopathic "water memory" were all at one time taken seriously by scientists, studied and debated internationally, and eventually rejected. At first glance, all of this would seem to be the normal workings of Popper's falsifiability as demarcation. Why, then, do some discredited pseudoscientific fields continue to attract adherents? Gordin speculates that claims about the natural world easily lend themselves to propaganda, but he has few ready explanations.

Gordin presents instead a series of concluding questions drawn from the titles of two lesser-known nineteenth-century Russian novels: who is to blame, and what is to be done? The answers seem out of reach. Gordin refuses to blame individuals.

[3]Naomi Oreskes, "Systematicity Is Necessary but Not Sufficient: On the Problem of Facsimile Science," *Synthese* 196/3 (2019), 881–905.

[4]Antivaccine sentiment may be as old as vaccines themselves. For a wider twentieth-century US perspective see James Colgrove, *State of Immunity: The Politics of Vaccination in Twentieth-Century America* (Berkeley, 2006). Even setting aside the recent partisan politicization of COVID-19 vaccines, Gordin's characterization runs contrary to historical polling data and political analysis of pre-pandemic state-level contests over vaccine requirements, which have often been spearheaded by right-leaning libertarian organizations.

https://doi.org/10.1017/S1479244324000039 Published online by Cambridge University Press

Even mainstream, credentialed scientists don't always agree on what should be considered legitimate science, he observes, pointing to vehement debates over the merits of string theory. Some bad actors can be easy to identify, but even telltale character traits—obsessiveness and "resistance to disconfirming evidence," for example—can be found among both mainstream and fringe scientists. No one thinks of themself as a pseudoscientist, after all. Instead, Gordin looks to local social and political factors, gesturing toward the example of Naomi Oreskes's and Erik Conway's exposure of antiregulatory political activism masquerading as scientific skepticism in *Merchants of Doubt*. But Oreskes and Conway mete out plenty of individual blame in that influential book. They also warn against unrealistic expectations of scientific certainty, especially in fields like health and ecology.[5]

Gordin's prescription is murkier. "Blaming and debunking do not prevent advocates of marginalized theories from holding fast to their views" (99), he warns, though his book is chock-full of examples suggesting that blaming and debunking can at least reduce new converts and limit damage. The specter of Popper's falsifiability haunts Gordin's analysis and hasn't quite been exorcized. Nor does Gordin see improving science education or peer review as sufficient responses. He suggests instead an easing of the pressure on scientists to constantly publish. It is a curiously restrained conclusion, but Gordin's purpose in this slim volume is not to list policy implications. Pseudoscience is inevitable and often harmless, he shows, but we must pay attention to the persistence of its dangerous fringes.

Scientism and its discontents

In choosing the scope of his topic, Gordin looks only at the natural sciences; he explicitly excludes "arguments over the humanities and social sciences" (viii). Andrew Jewett takes the opposite approach in his ambitious, prize-winning work *Science under Fire*. Despite his broad opening definition of science as "the empirical study of natural phenomena, eschewing supernatural explanations" (5), Jewett focuses almost entirely on an intriguing catalog of contrasting views of secularism, psychology, sociology, expertise, and state planning, stretching from the 1920s to the near present. There is little discussion of the natural sciences at all. It's a surprising omission, given the book's title; one wonders what insights might have emerged had the book been reframed as *Liberal Arts under Fire: Challenges to the Authority of the Social Sciences and Humanities in Modern America*.

As becomes clear through Jewett's narrative, however, his primary interest is exactly this tricky distinction, which he identifies as *scientism*, "the illegitimate extension of scientific methods into domains where critics said they did not apply" (86–7). In searching for the boundary between science and the humanities, Jewett argues that skepticism of science is often rooted in a reluctance to accept and grant authority to unpalatable claims about human nature and behavior. One way to challenge these claims is to contest their scientific legitimacy and to place bounds on what the appropriate provinces of science should be. This assessment echoes Gordin's contention that scientists level allegations of pseudoscience when they

[5]Naomi Oreskes and Erik Conway, *Merchants of Doubt: How a Handful of Scientists Obscured the Truth on Issues from Tobacco Smoke to Climate Change* (New York, 2010).

https://doi.org/10.1017/S1479244324000039 Published online by Cambridge University Press

see themselves or the reputation of their profession as under threat. But whereas Gordin distinguishes pseudoscience from fields that are simply "nonscience," such as religion or the humanities,[6] Jewett demonstrates persuasively how extensively the boundaries of these categories have been contested. Can morality, human behavior, or public policy be understood "scientifically"? Jewett examines debates over these questions in elite philosophical, religious, and, occasionally, political circles. His protagonists include academic theologians, philosophers, literary critics, social and behavioral scientists, and public intellectuals. The emphasis is on ideas rather than reception, intellectual genealogies rather than exhaustive social or political analysis.

Jewett begins his narrative in the late nineteenth century, connecting secularization in public schools, scholarship on "environmental determinants of behavior" (a concept made famous in Clarence Darrow's defense of accused murderers Leopold and Loeb), and John Dewey's contention that humanity required a kind of "mental modernization"—distinct from the rival analyses of Freudianism and behaviorism—to cope with the rapidly changing world of the early twentieth century (34–6).[7] He follows these themes through the 1920s and 1930s, when concerns about modernity and skepticism of the behavioral sciences animated debates among academics and public intellectuals such as Charles Eliot Norton, Lewis Mumford, and Waldo Frank. Jewett pays particular attention to Reinhold Niebuhr, who worried that self-interest could corrupt human reason itself, and Walter Lippman, who feared that understanding human behavior as a "bundle of conditioned reflexes" could promote moral relativism and a tyrannical alliance of government and science (72–3). Throughout, Jewett uses "science" as a stand-in for a mix of secularism, technocratic bureaucracy, social-science expertise, and other visions of modernity that made critics uneasy. His intellectual portraits of individual thinkers are sensitively drawn, but it's sometimes difficult to gauge how consequential these debates were, or how Jewett's overall characterization might look were he to take up critiques of mechanization and depersonalization from less elite corners of American society in the 1920s, such as labor movements challenging Taylorization and the rationalized workplace.

By mid-century, Jewett contends, academic concerns about scientism were fully entangled with familiar Cold War fears of communism, social engineering, and permissiveness. Catholic and Protestant critics of the "cult of objectivity," for example, decried the "extension of scientific methods to the study of human behavior," with B. F. Skinner, Benjamin Spock, and the Kinsey reports all targets. Jewett mostly takes his selected subjects at their word here; there is little consideration of how the elevation of secular social science might threaten the authority and social position of religious leaders, nor does Jewett venture outside this small cluster of arguments to examine how religious and other objections to social science were also invoked in this era to oppose integration (114–15).

[6]On "demarcating science from non-science," Gordin notes, "Scientists rarely spend much energy arguing that the Catholic Church or Vietnamese literature is pseudoscience; they are just *not science*—and devotees of those domains are quite happy with that designation." Gordin, *The Pseudoscience Wars*, 1, emphasis added.

[7]Jewett picks up where Henry Cowles leaves off in his study of the scientific method, which provides a prehistory to Dewey's popularization of the classic five-step model. See Henry M. Cowles, *The Scientific Method: An Evolution of Thinking from Darwin to Dewey* (Cambridge, 2020).

https://doi.org/10.1017/S1479244324000039 Published online by Cambridge University Press

There is also little discussion of the consequences of the atomic bomb for the intellectual and political status of physicists. Jewett asserts instead that "fear of nuclear destruction often reflected a deeper sense that moderns lacked the moral resources to turn their newfound power to the good. As a result, much of the postwar disputation about science's broader meanings focused on the social sciences" (85). Jewett does note, however, that moderate liberal theologians largely respected the natural sciences. In a fascinating chapter about C. P. Snow's 1959 publication of *The Two Cultures*, Jewett argues that the book ultimately hardened the association of science with expert-dominated mass society, at least among the critics and commenters furiously debating its arguments (137). But as Jewett observes, Snow famously critiqued the asymmetrical literacy across the sciences and the humanities, proposing that natural scientists had greater familiarity with literary works and concepts than humanists had with fundamental concepts in physics. It's a characterization that Jewett might have explored even further, particularly in considering that disdain for social science didn't come solely from theologians and humanists, but from natural scientists as well.

By this time, Jewett contends, behaviorists and anti-behaviorists had established an uneasy coexistence. In the field of psychology, the backlash against Skinner's behaviorism elevated the "humanistic psychology" of Rollo May and Abraham Maslow, as therapists increasingly focused on promoting "self-actualization" (176). Conservative anti-secularists, meanwhile, were organizing in opposition. Russell Kirk elevated religious traditionalism, while William F. Buckley objected to secular, rational planning (146). Handwringing over scientism could make for odd alliances. Jewett notes that Kirk cited C. Wright Mills, and William Whyte cited Friedrich Hayek. Mid-century intellectuals' views of scientism and morality didn't always neatly align with their economic convictions.

Jewett's final chapters examine the New Left, neoconservatism, and the origins of science and technology studies. Here again, Jewett invokes "science" as a stand-in for a very wide range of targets—bureaucracy, depersonalization, US military policy, and even the limitations of the War on Poverty—without always demonstrating that his subjects themselves defined "science" in such expansive terms. When Jewett does examine demarcation debates explicitly, the results are illuminating. Herbert Marcuse had encouraged New Leftists to tear aside the facade of neutral scholarship and assert human values. For the radical scientists' organization Science for the People, for example, this meant democratizing the natural sciences and reducing abuses, but not fully abandoning "the methods and worldview of science itself," as Jewett summarizes (192). Noam Chomsky, criticizing the scientism of much Cold War social science, condemned "the desperate attempt of the social and behavioral sciences to imitate the surface features" of the natural sciences, which he thought undermined much-needed scholarship explicitly rooted in morality (193). Elsewhere in the counterculture, however, this kind of demarcation mattered little. New Age spirituality, humanistic psychology, and curiosity about science and technology intertwined on the pages of the *Whole Earth Catalog* and in "groovy" physics research with ties to both the CIA and Esalen.[8]

[8]There is a rich recent literature on US science and the counterculture. See, for example, David Kaiser, *How the Hippies Saved Physics: Science, Counterculture, and the Quantum Revival* (New York, 2011); and

https://doi.org/10.1017/S1479244324000039 Published online by Cambridge University Press

As other activists took up fundamental questions of science and expertise—including black power advocates, feminists, environmentalists, and the antinuclear movement—a rejuvenated conservative movement rallied in opposition, decrying radicalism, secularism, moral permissiveness, and Keynesianism. Some of these neoconservatives were themselves social scientists, though often clustered in what Jewett memorably refers to as "the sciences of inaction": academic disciplines promoting minimal government intervention (217). With this insightful observation, it's surprising how little attention Jewett devotes to examining the elevation of economics in this era, given the field's devotion to modeling and quantifying human behavior in the name of rationality and efficiency. (And of course, not all neoconservative social-science proposals were so hands-off, as the criminal-justice writings of James Q. Wilson—who likewise gets a brief mention in Jewett's account—attest.)

Jewett picks up this theme again in his discussion of the contentious scientific debates between sociobiologists and the leftist scientists of Science for the People, including Richard Lewontin and Stephen Jay Gould. Competing assessments of innate biological difference could have far-reaching social welfare policy implications. Jewett captures the intensity of the conflict, even if the complexity of some of these debates exceeds his brief characterizations. Veterans of Science for the People might take umbrage at being lumped together with "critics of the natural sciences," a considerable oversimplification of the empirically minded arguments of Gould and others (225). Lionel Tiger, who trafficked heavily in provocative conceptions of sexual difference and aggression,[9] is described here only as "a critic of capitalism who believed that the postwar emphasis on the cultural roots of human behavior had allowed American elites to become as manipulative as their Soviet counterparts" (224).

Ultimately, Jewett argues that 1970s debates over scientific authority tended to be connected to specific policies or developments, rather than the kind of "sweeping generalizations about the deleterious influence of science and rationality across the centuries" (227) invoked in the 1950s. It's an odd characterization, for both the 1950s and the 1970s. Specific mid-century contests over arms control, McCarthyist purges, and the role of scientists in setting Cold War policy are largely omitted from Jewett's narrative, which perhaps makes it easier to claim the primacy of other ideological contests. And Jewett largely bypasses the global scope of environmental and ecological movements of this era, the sweeping implications of Thomas Kuhn's analysis of paradigm shifts in scientific knowledge, and Bruno Latour's explosive reconsideration of the social context of scientific authority, which, despite Jewett's later periodization, had already taken shape by the 1970s.

Jewett does address some of these developments in his concluding chapter on the "cultural turn" of the 1980s, during which science and technology studies (STS) began to grow and flourish. The new discipline drew on a host of emerging

David Kaiser and W. Patrick McCray, *Groovy Science: Knowledge, Innovation and American Counterculture* (Chicago, 2016); John Markoff, *What the Dormouse Said: How the Sixties Counterculture Shaped the Personal Computer Industry* (New York, 2005); Fred Turner, *From Counterculture to Cyberculture: Stewart Brand, the Whole Earth Network, and the Rise of Digital Utopianism* (Chicago, 2006); and Eric Vettel, *Biotech: The Countercultural Origins of an Industry* (Philadelphia, 2006).

[9]See, for example, discussions of Tiger's work in Erika Milam, *Creatures of Cain: The Hunt for Human Nature in Cold War America* (Princeton, 2019).

https://doi.org/10.1017/S1479244324000039 Published online by Cambridge University Press

influences: social-constructivist views of science; the "strong programme" of the University of Edinburgh; Sandra Harding's standpoint feminism; Donna Haraway's call for many "situated knowledges"; and key works by David Noble, Stanley Aronowitz, and Steven Shapin. Jewett ranges widely in his portrait of the era, referencing the "science wars" of the 1990s, dystopian visions of artificial intelligence, Herrnstein and Murray's claims of innate racial differences in IQ in *The Bell Curve*, and the competing views of philosophers John Rawls and Michael Sandel. In Jewett's telling, physicist Alan Sokal's 1996 hoax publication of an inscrutable theory-heavy STS essay in *Social Text* is best understood in terms of competing views of leftism, not as Sokal's critique of the scientific illiteracy of humanities scholars in the vein of C. P. Snow.

In reflecting on the legacies of the twentieth century for the twenty-first, Jewett observes cautiously that climate change denialists and antiregulatory conservatives often attack the credibility of scientists by highlighting their susceptibility to social and political "groupthink." Did STS scholarship—with its emphasis on the social determinants of science—contribute to skepticism of scientific authority? Did the backlash against STS engendered by Sokal's hoax fuel a knee-jerk deference to the natural sciences? Jewett identifies the seeds of compelling intellectual contests, but leaves it to other scholars to consider the wider social and political consequences of these elite debates about scientific authority.

Science as Cold War diplomacy … and its discontents?

For the most part, Jewett's narrative prioritizes a succession of fascinating but highly insular critiques and exchanges among elites. Like Gordin, Jewett describes competing views of scientific objectivity and credibility. But as Audra Wolfe points out in *Freedom's Laboratory: The Cold War Struggle for the Soul of Science*, the credibility-enhancing expectation that science is, or at least strives to be, "independent, empirical, and apolitical" has its own long history, one that was shaped and strengthened by Cold War ideology, institutions, and statecraft in the twentieth century. While Jewett tends toward scholarly analysis of personal correspondence and published academic works, Wolfe grounds her discussion of ideas in a Cold War political context, offering a cautionary tale about taking words and institutional missions at face value.

Wolfe documents how, during the Cold War, the CIA and State Department supported a specific kind of "science diplomacy," one that emphasized the United States as a guarantor of scientific freedom, open communication, and evidence-based research shielded from politicization. As part of a larger commitment to forms of psychological warfare, CIA and State Department planners offered clandestine support to numerous private organizations and individuals who promoted this vision. Ironically, their goal was to offer secret government assistance to organizations and individuals advocating for science free from undue government influence.

To illustrate how this particular form of Cold War science diplomacy operated, Wolfe discusses well-known cases of CIA-backed institutions and their less well-known consequences for science. Much has been written about CIA involvement

https://doi.org/10.1017/S1479244324000039 Published online by Cambridge University Press

in the Congress for Cultural Freedom (CCF), for example, but Wolfe recovers the political significance of the CCF's support for scientific exchanges, or the Asia Foundation's endorsement of carefully worded biology textbooks.[10] Wolfe also examines subtle forms of intervention and constraints on activism within organizations such as the National Academy of Sciences and the Pugwash arms control conferences.

In addition to the mapping of organizational relationships, Wolfe also assesses the ideas and agency of the individual scientists involved, including the myriad ways in which social, political, and economic pressures could shape the contours of genuine intellectual and moral debates. Over thirty years ago, Paul Forman and Daniel Kevles raised similar questions about the agency of physicists in a Cold War research landscape dominated by defense funding.[11] Were they dupes of the Cold War state, plagued by false consciousness about their limited agency, as Forman argued? Or were they clear-eyed participants and architects, aware of the benefits accruing from military sponsorship, as Kevles suggested? Though her research area is somewhat different, Wolfe's analysis of science diplomacy tends toward Kevles's characterization, though she rejects early on any quest to identify "heroes and goats," or simplistic divisions between problematic complicity and principled objection.

Instead, Wolfe frames her argument around a revealing mid-century debate between two influential scientists: British crystallographer and communist J. D. Bernal, who argued that science was inherently shaped by social and economic conditions, and US geneticist and socialist-turned-anticommunist H. J. Muller, who proposed that a science free from political interference was not only possible but imperative. It was Muller who quickly attracted support from the CIA-backed CCF, which sponsored his public attacks on Stalinism, Lysenkoism, and Nazi science. And he was not alone. Wolfe shows how, during the first two decades of the Cold War, leading scientists enthusiastically conferred with State Department and CIA officials and easily found a common agenda. Idealism about scientific freedom, with its implicit critiques of Soviet repression, matched government propaganda goals.

Government-sponsored science diplomacy is not the same as government direction of scientific research itself, but, Wolfe argues forcefully, "Historians of science have greatly misread the uses of apolitical science in the Cold War" (13). Promoting the ideal of scientific openness around the globe included sponsoring conferences, publishing journals, and even disseminating textbooks that emphasized inquiry-based learning rather than rote memorization. It also included working behind the scenes to moderate the political activities of arms control organizations and professional societies. An international audience saw only the image of

[10]For earlier literature on the Congress for Cultural Freedom see, for example, Frances Stonor Saunders, *The Cultural Cold War: The CIA and the World of Arts and Letters* (New York, 1989); and Peter Coleman, *The Liberal Conspiracy: The Congress for Cultural Freedom and the Struggle for the Mind of Postwar Europe* (New York, 1989).

[11]Paul Forman, "Behind Quantum Electronics: National Security as Basis for Physical Research in the United States, 1949–1960," *Historical Studies in the Physical and Biological Sciences* 18/1 (1987), 149–229; Daniel Kevles, "Cold War and Hot Physics: Science, Security, and the American State, 1945–56," *Historical Studies in the Physical and Biological Sciences* 20/2 (1990), 239–64.

independent nongovernmental organizations and private individuals, lending credence to US claims of intellectual freedom.

This apparent harmony of interests was challenged by the arms control movement and finally fractured by the Vietnam War. Wolfe highlights the example of Bentley Glass, an outspoken Johns Hopkins geneticist who worked with the State Department, the CIA, and the US Information Agency. He had been a vocal supporter of civil liberties in the McCarthy era, but soon found himself at odds with the increasingly outspoken nuclear activism of both hawk Edward Teller and dove Linus Pauling. Glass's discomfort even extended to the arms control organization Pugwash, whose internal handwringing over disarmament demands and friendly relations with national-security personnel were simultaneously alienating Pauling for opposite reasons. Just a few years later, revelations about CIA support for the CCF, the Asia Foundation, and the National Students Association landed alongside New Left critiques of the military–industrial–academic complex. Wolfe observes that many scientists took the revelations in stride, inured as they were to defense funding and government sponsorship. Some resigned from their CIA-backed posts while still proclaiming their scientific idealism. Others embraced the radical stance of Science for the People, arguing, like Bernal, that science could not be separated from the conditions of its production.

Wolfe's account here is fascinating, even if it occasionally elides some of the complex politics of arms control activism. The significant personal and political costs of Robert Oppenheimer's objections to the development of the hydrogen bomb and Linus Pauling's ardent antinuclear activism merit further attention, as does the creation of the Arms Control and Disarmament Agency, whose name ostensibly invoked disarmament as an international goal. It's also worth emphasizing that despite science diplomacy championing openness and transparency, Cold War secrecy and compartmentalization in this era deeply curtailed the actual free exchange of scientific information. This was true not only internationally but within the United States, as Kate Brown and Alex Wellerstein have explored so effectively.[12]

As Wolfe continues her narrative through the tumultuous era of the Vietnam War, she details how a host of previously submerged concerns finally burst out into the open, powerfully challenging the myths of politically neutral science. Within the typically staid National Academy of Sciences, for example, internal debates pitted those who shared Glass's elevation of neutrality against those embracing J. D. Bernal's earlier vision of the social responsibility of scientists. To further complicate matters, at the very moment when US scientific organizations were grappling with revelations about CIA sponsorship, dissident scientists in the Soviet Union finally latched on to the Western vision of scientific neutrality as a key component of their human rights activism. They entreated their Western colleagues to join them in directly confronting Soviet leadership. NAS leaders, including president Philip Handler, were skittish; they didn't want to discard their own tradition of open exchange by endorsing boycotts, or to abandon their posture of neutrality by condemning the Soviet government. Apolitical politics were tricky.

[12]Kate Brown, *Plutopia: Nuclear Families, Atomic Cities, and the Great Soviet and American Plutonium Disasters* (Oxford, 2013); Alex Wellerstein, *Restricted Data: The History of Nuclear Secrecy in the United States* (Chicago, 2021).

https://doi.org/10.1017/S1479244324000039 Published online by Cambridge University Press

By the 1980s, new epistemological challenges to Cold War science idealism arose alongside concerns about privatization and the politics of research spending. Wolfe, like Jewett, references the leftism of Science for the People, the Edinburgh "strong programme" and its claim that scientific authority derives primarily from social consensus, and right-wing mobilization. In her telling, Sokal's famous hoax was evidence of the long-term seduction of the "postwar language of science and freedom" in the face of these new intellectual approaches (206). Sokal claimed to be critiquing science studies from the left, but Wolfe argues that his actions helped revive mid-century assumptions about science while indiscriminately dismissing STS scholars' critiques. There are other ways to interpret the implications of Sokal's hoax, of course, but Wolfe offers a thoughtful account of the ways in which Cold War rhetoric about scientific objectivity has echoed through the decades.

With such a subtle and complex topic, perhaps it's not surprising that, like Gordin's work, Wolfe's book implicitly raises more questions than it answers. Wolfe conscientiously notes when available evidence is sparse or when key participants—several of whom she has interviewed—are hazy in their recollections of events decades in the past. She treads cautiously in her conclusions, writing ruefully in her Epilogue how leftist critiques of science can be and have been coopted by right-wing movements aimed at dismantling health and environmental standards. She concedes that her own views evolved during the transition between the Obama and Trump administrations, as scientists frantically pushed to preserve government climate data and organized the 2017 March for Science. Her book is a study of the political agendas that shape scientific research and self-image, but Wolfe—perhaps to her own surprise—concludes with a reminder of the value of diplomacy and scientific openness on their own terms.

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Gordin, Jewett, and Wolfe each interpret the long history of contests over scientific credibility and prestige in their own way: Gordin through his elegant discussion of demarcation and the taxonomies of pseudoscience, Jewett through his recovery of the fractious debates among US social scientists in the twentieth century, and Wolfe in her detailed revelations about government-sponsored science diplomacy. All three note the contemporary significance of their chosen topics. For presentists searching for explanations of the current politicization of science, however, these works offer many indirect insights but few solutions. Despite intimations to the contrary in his introduction and conclusion, Jewett's book never really addresses in depth the origins of current conflicts over climate change denialism or antivaccine activism. (His descriptions of debates about secular education, on the other hand, may resonate deeply with twenty-first-century readers.) Nor does Jewett take up assessments of the influence and professionalization of economics, despite its relevance to his focus on social science and the quantification of human behavior and decision making. Gordin, in turn, sets aside the social sciences entirely (though he does cheekily compare economics to astrology, noting that, like modern-day economics, astrology in its peak era "was no less venerable for the fact that people attacked its assumptions and decried its false predictions" (17)).

Gordin observes that political power inevitably seeks out propaganda tools, including science, but his reflections here are brief.

Wolfe's approach is both narrower and more comprehensive, as she draws on extensive declassified documentation, oral-history interviews, and institutional records to assess how certain ideas about science were developed and propagated during the Cold War. Like Jewett and Gordin, she is less interested in specific scientific claims or experiments than in the way scientists have understood and promoted *science* writ large. She consistently warns that scientists' ideas and actions cannot be severed from political, social, and economic context. This, of course, is the opposite of what Cold War scientists posed to their international audience: science as objective, apolitical, and above the fray.

Taken together, these books thus offer an uneasy characterization of science as a process deriving its credibility and authority from popular willingness (or unwillingness) to accept its particular claims. This willingness may be affected by perceived policy implications or religious dogma, as well as by the persuasiveness of scientists defending or evangelizing their own visions of the scientific process. All of these elements, in turn, are subject to significant political and economic pressure. On one level, this is an unsurprising portrait from historians who prioritize examination of the social conditions of science. When you're a social scientist, the whole world can look like a social process. But one wishes that these authors had grappled more deeply with a key insight from Naomi Oreskes and Erik Conway's influential *Merchants of Doubt*: when nonscientists are conditioned to understand science as objective, infallible, and absolute, then the real-life messiness of scientific claims can be easily exploited and politicized. Climate change, ecology, the causes of human illness and behavior—these are particularly vulnerable to politicization not only because of their regulatory implications but also because uncertainty is inherent in so much relevant scientific research. That's why Jewett is able to find social science such a ripe target, why pseudoscientists are sometimes able to skirt Popper's demarcation test, and why Gordin's exclusion of quack medicine is a missed opportunity.

In the end, it's Wolfe who enhances the analysis of Oreskes and Conway by explaining, in some detail, at least one *source* of our unrealistic expectations for science. Notably, it's also only Wolfe who applies her analytical frame to her own methodology and narrative. Does critiquing the naivety of mid-century scientists' faith in objectivity, for example, also obligate historians to interrogate their own standpoint perspectives? Do historians owe their readers extended analyses of the limits and uncertainties of the evidence upon which their arguments are based? Wolfe clearly thinks so. Of the three authors, she takes on this burden most forthrightly and conscientiously. Like Jewett, Wolfe stretches her narrative to include the rise of science and technology studies, but it's only she who positions her own scholarship, sometimes with perceptible discomfort, amid the twin legacies of Cold War science idealism and STS critiques.

Competing interests. The author declares none.

Cite this article: Bridger S (2024). Merchants of Certainty: Reconsidering Scientific Credibility and Prestige. *Modern Intellectual History* **21**, 489–501. https://doi.org/10.1017/S1479244324000039