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Science & the promise of democracy in America

The intellectual skirmishes known as the science wars have centered on whether scientific facts and theories are socially constructed. This is, of course, a substantive argument over meaningful issues: the nature of truth, the possibility of objective knowledge, and the proper methodology for scholarly inquiry.

But why in the past decade has debate over this particular set of abstract questions become so acrimonious, so deeply politicized? And why has the debate erupted most stridently in the United States?

Commentators sometimes claim that sociological factors explain the intensity of the conflict, and that this philosophical quarrel gains its emotional tenor from an underlying struggle over academic turf. Thomas F. Gieryn argues, for example, that sociologists and literary theorists are trying to portray their own disciplines as the only sources of authoritative judgment – an assertion that physicists, chemists, and biologists naturally dispute. The science wars, he writes, are a series of "credibility contests in which rival parties manipulate the boundaries of science in order to legitimate their beliefs about reality and secure for their knowledge-making a provisional epistemic authority that carries with it influence, prestige, and material resources."[1]

For Gieryn what is really at stake is social status. But I am not convinced. I believe that the science wars express something more than a substantive debate over epistemological issues, and something deeper than a dispute over academic status. What we are witnessing is a new chapter in an ongoing struggle over the meaning of modern science for American democracy.

This is a struggle that took shape in the first half of the twentieth century, especially during the 1920s and 1930s. The vigorous debates of that period about the political meaning of science inform today's political, institutional, and cultural climate, and by reconsidering them we may discover the deep roots and true stakes of the science wars today.

In the late nineteenth century, a few Americans began to argue that the nation could best guarantee its political

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1 Thomas F. Gieryn, *Cultural Boundaries of Science: Credibility on the Line* (Chicago, Ill.: University of Chicago Press, 1999), 337.

health by expanding its scientific institutions. After the turn of the century, an increasingly broad group of academics – some based in the natural sciences but most in the social sciences, philosophy, history, and educational theory – were joined in this endeavor by journalists and educators outside the academy who agreed that science held great social promise.

This group of 'scientific democrats' included (to name only a few of the most famous) the philosopher John Dewey, President Herbert Hoover, the physicist Robert A. Millikan, the anthropologist Franz Boas – and Vannevar Bush, the electrical engineer who directed the wartime effort to build the first atomic bomb.[2] They constituted a large proportion, perhaps even an outright majority, of those Americans engaged in research, study, and writing during the first half of the twentieth century. And, although their views were far from uniform, they shared enough ideas that we can consider them a social movement.

For the scientific democrats the most salient fact of American life during the Gilded Age was the spread of egoistic and self-seeking behavior. As the frontier closed and the economy industrialized, the nation seemed increasingly in danger of developing some of the most feared solvents of a republican society: a permanent class of dependent wage-earners and an economically parasitic elite.

One response was the Social Gospel movement in American Protestantism. Theologians of this bent emphasized that the path to individual salvation ran through social salvation, and they advocated for, among other moralities, the worker's right to a living wage and safe working conditions. Other responses included socialism and trade unionism.

But the scientific democrats felt that none of these programs could adequately address the political challenges of an industrial society. Since most of these democrats had been raised in evangelical Protestant environments, they still believed that personal benevolence was central to solving the nation's industrial woes. They therefore rejected what they saw as the narrowly material goals of the socialists and the trade unionists.

Yet they also moved away from institutional Protestantism, believing that it was still tainted by a stringent Calvinist emphasis on self-denial and failed to explain how benevolence, by itself, could transform a complex industrial society. The "major problem of life," as Ralph Barton Perry put it, was to foster simultaneously "sentiments" and "modes of organization" by which "human suffering may be mitigated, and by which every unnecessary thwarting of human desire may be eliminated."[3]

To solve this problem, the scientific democrats proposed a return to the scientific method, as they understood it. (By the standards of contemporary physics or biology, what they meant by 'science' was quite broad – it implied a general commitment to the experimental investigation and theoretical explanation of a variety of phenomena, both natural and social.) In their optimistic view, modern science had proved its power in practice, by harnessing natural resources and creating new inventions such as the steam engine and the rail-

2 I use the term 'democrat' in a relatively loose sense to refer to those who rejected authoritarian solutions to the nation's problems and who retained a place for universal suffrage and the consent of the governed. We have, of course, come to see many of their proposals as something less than democratic in the wake of the New Left's renewed emphasis on the value of political participation.

3 Ralph Barton Perry, "Realism in Retrospect," in *Contemporary American Philosophy*, ed. George P. Adams and William P. Montague (New York: Macmillan, 1930), 187 – 209, 206.

road, creating an industrial society with the potential to overcome scarcity. The task now was to apply the methods of modern science to the improvement of social organization itself. The application of such methods might allow the nation to close the gap between its professed ideals and the realities of industrial social life, by organizing a new kind of political community that was capable of enlightened self-rule.

By taking as givens both political democracy and an industrial system based on extensive personal interdependence, the scientific democrats were forced to reject the nineteenth-century equation of civic virtue with economic independence. In effect, the scientific democrats neatly severed the two halves of what Sacvan Bercovitch describes as the nineteenth-century American model of "representative selfhood": "independence of mind" and "independence of means."[4] What virtue, they asked, was economic independence supposed to have protected in the first place?

Their answer was *intellectual freedom*, a social-psychological state that allowed the individual to participate constructively in collective action and decision-making. The problem, as they saw it, was to restore the intellectual freedom that had been lost during the rise of the industrial economy. According to Lyman Bryson, "scientific or objective thinking" was the source of "the only kind of freedom that is worth having, the freedom to use the mind in all its untrammeled strength and to abide by clearly seen conclusions." And in order to keep the people from "suffering at the hands of those who have knowledge and would use it against them," Bryson continued, society had to provide for "common ownership" of such "effective thought." Science would protect the public against not only errors in judgment, but also "enslavement" by the more knowledgeable.[5] Universal access to science would liberate the public from its mental bondage.

To modern ears, the scientific democrats' program may sound as deeply authoritarian as the intellectual tyranny they feared. But the now common charge that these figures imposed a concrete ethical system under the cover of absolute neutrality misses the point, for the scientific democrats defined intellectual freedom in far different terms than we do. Scholars have long noted that Progressive Era reformers developed a positive notion of political freedom, in which removing obstacles to action was only the first step toward making freely chosen action possible. The scientific democrats understood intellectual freedom in equally positive terms, conceiving it as the possession of sufficient resources to think effectively in a social setting, rather than as merely the absence of coercion. "No man and no mind," Dewey wrote in 1927, "was ever emancipated by being left alone."[6] Freedom was a product of social relations, not of the escape from them. Meanwhile, science seemingly reinforced the point that an attitude of pure neutrality or pure self-seeking was counterproductive; what characterized science as a cultural practice was the participants' emotional commitment to the pursuit of collective truths.

4 Sacvan Bercovitch, "The Rites of Assent: Rhetoric, Ritual, and the Ideology of American Consensus," in *The American Self: Myth, Ideology, and Popular Culture*, ed. Sam B. Girgus (Albuquerque, N.Mex.: University of New Mexico Press, 1981), 5–42, 13.

5 Lyman Bryson, *The New Prometheus* (New York: Macmillan, 1941), 74, 82, 99, 107.

6 John Dewey, "The Public and Its Problems," in *John Dewey: The Later Works, 1925–1953*, vol. 2, ed. Jo Ann Boydston (Carbondale, Ill.: Southern Illinois University Press, 1988), 340.

During its first phase, in the years before World War I, the movement for scientific democracy centered on two goals. The first was increasing the cognitive and social authority of science. This meant familiarizing the public with the inevitability of industrialization, as well as expanding the predictive power of the physical and social sciences, establishing these disciplines on a firmer professional basis, and strengthening the universities with which these disciplines were increasingly associated. Despite internal divisions, the nascent movement united during these early years behind a general program of persuading Americans that a commitment to 'science' – however vaguely defined – promoted social integration and the only kind of democracy compatible with an industrial society.

The second shared goal prior to World War I was more subtle, though equally consequential: redefining how scientific inquiry itself was understood. Nineteenth-century American interpreters of science offered a narrowly empirical reading based on the work of Francis Bacon, as filtered through the writings of the Scottish common-sense realists. They held that all individuals possessed a truth-finding faculty that could perceive the orderly, lawful structures of the universe, just as the eye perceived light and shape. Scientific facts were like objects to be collected or discovered, available to all and requiring little analysis beyond systematic classification. The scientist was like a pioneer on the prairie, struggling to organize the elements of an inhuman but morally responsive nature.[7]

But to the scientific democrats it was abundantly clear that morally normative facts were not simply strewn about the landscape to be collected and assembled by any frontiersman. The general public consistently got the facts wrong, and, more importantly, consistently read the social implications of even the most well-established facts – in particular, the irreversible rise of the industrial economy – incorrectly. Abandoning common-sense realism, then, the scientific democrats developed a range of new theories based on the work of European thinkers such as John Stuart Mill, Karl Pearson, and Ernst Mach. These theories, typically designated either positivism or pragmatism, held that the production of scientific knowledge required coordinated effort by specially trained individuals.

When these scientific democrats invoked objectivity as a characteristic of scientific knowledge, they meant neither that the knowledge was absolutely certain nor that the generalizations would necessarily hold permanently true. As one researcher summarized recently, "All the great scientists of the last hundred years (and some much earlier ones) have in one place or another clearly stated that their purpose was to create plausible theoretical models for the organisation of experience and that these models must not be considered representations of absolute reality."[8] Objectivity, for these theorists, meant that scientific

7 Historians have demonstrated that science flourished in the nineteenth-century state only where it was linked firmly to the colonization of the continent. The government scientist was, in many cases, a pioneer in actual as well as metaphorical terms, accompanying various expeditions to work in relatively unpopulated areas on the frontier. See Philip J. Pauly, *Biologists and the Promise of American Life: From Meriwether Lewis to Alfred Kinsey* (Princeton, N.J.: Princeton University Press, 2000), esp. 44–70.

8 Ernst von Glasersfeld, "Comment on Neil Ryder's 'Science and Rhetoric,'" *Pantaneto Forum* 10 (April 2003), <http://www.pantaneto.co.uk/issue10/glasersfeld.htm>.

knowledge was as immune as possible to the influence of the observer's own desires. Science was, in the new theories, most fundamentally a means of error correction, producing not perfect truths but simply the best available truths.

In the wake of World War I, a new variant of scientific democracy appeared, endorsed by such figures as Dewey, Perry, Bryson, and Eduard C. Lindeman. Rather than leave the organization of society to the political-economic conclusions of a small group of scientific experts, this group of 'deliberative democrats' wanted to engage the public in the intellectual freedom represented by science. If science was the preeminent form of free communication, then it was also the preeminent means by which the social organism could alter itself democratically. By Dewey's account, "Society not only continues to exist *by* transmission, *by* communication, but it may fairly be said to exist *in* transmission, *in* communication."[9] Even if substantial socialization of property was the wave of the future, the process would attain political legitimacy only through the public's active intellectual participation.

The deliberativists agreed with their predecessors that the scientific method as such was value neutral, in that it neither forced any particular values nor produced facts that were inherently normative. Yet they suspected that the scientific methodologies inherited from their European predecessors were themselves part of the social problem; science would have to be purified or Americanized so that it could perform its appointed task of buttressing democratization. So the deliberativists set out to create not merely a new science but what they often called 'a science of science' – a methodologically self-conscious form of inquiry that, by going beyond both realism and positivism, would automatically generate democratic knowledge. The most influential formulation of this idea was Dewey's instrumentalism. This philosophy held that all intellectual constructs and even the scientific method itself were merely tools for the achievement of human values, available for use by any and all actors in the pursuit of any and all conceivable ends.

A purely methodological conception of science had positive consequences for the organization of intellectual life. It allowed the specialized disciplines to claim scientific authority without stepping on each other's toes. In lieu of transcendent or universal principles, standards of explanation could be determined locally, according to the specific characteristics of the phenomena under investigation. It also provided a quasi-political role for a new group of scientific democrats: first- and second-generation immigrants, almost all of them Jews. These figures were deeply committed to the tenets of democracy, but found the United States far less egalitarian and open than it proclaimed itself to be. Suspicious of crass business values, and harboring idealized images of the highly integrated Old World communities they or their parents had left behind, they faced what one historian has called a standing ideological challenge "to relate the myth of America to the context and conditions of modern America."[10] Tools of inquiry that retained their validity no matter who cre-

9 John Dewey, "Democracy and Education: An Introduction to the Philosophy of Education," in *John Dewey: The Middle Works, 1899 – 1924*, vol. 9, ed. Jo Ann Boydston (Carbondale, Ill.: Southern Illinois University Press, 1976), 7.

10 Sam B. Girgus, "The New Covenant: The Jews and the Myth of America," in *The American Self: Myth, Ideology, and Popular Culture*, ed. Girgus, 105 – 123, 111.

ated or used them offered an important means by which they could help close the cultural gap.

On the other hand, installing this methodological definition of science at the heart of American democratic theory forced a split between institutionally committed religious thinkers – no matter how supportive they were of modern science's findings – and scientific democrats. A strict insistence on scientific methods ruled out reference to biblical authority or mystical visions as guides to political action. The program of the deliberative democrats was, in this regard, radically secular. And because it denigrated in principle the beliefs and religious convictions held by many ordinary Americans, the movement was never able to win the democratic support its own vision demanded.

The ascendancy of the movement to create a scientific democracy did not in any case last long. The Great Depression, the rise of fascism and Nazism, and America's entry into World War II and subsequent emergence as a global power with a large standing army presented formidable new challenges to the ideal of a deliberative democracy. By the 1950s, with new support in all quarters for research and a seemingly endless Cold War underway, the language of scientific democracy had lost much of its critical edge.

The rhetorical identification of science with democracy remained a staple of Cold War rhetoric, but in the publicly visible invocations of this equation, both science and democracy were defined in strictly material fashion and shorn of the deliberative idealism championed by Dewey.[11] Defenders of science had jettisoned Dewey's emphasis on science as a tool for the pursuit of human values in favor of rigorous new theories of objectivity that gained their support from the work of the logical empiricists in the new field of philosophy of science. The new, postwar emphasis was summarized by Harvard economics professor John D. Black, writing that the growth of science secured a new Bill of Rights for Americans:

> *To every man shall be given a job suited to his abilities, or a shop of his own in which to turn out products or services needed by his fellow men, or a piece of land upon which to make a living for his family. To every woman shall be given a home or these same opportunities. To every father and mother shall be given the same opportunities for their children to be well-fed and educated and successful as are given to any other children. No man or woman is entitled to any share of the world's goods larger than he produces; but he shall be given an opportunity to produce according to his abilities and his ambition and a necessary minimum of food, clothing, and shelter, regardless of his means; and the child shall not be denied an equal opportunity merely because of the poverty of the parent.*[12]

11 As Rebecca Lowen shows in her study of Stanford University, *Creating the Cold War University: The Transformation of Stanford* (Berkeley: University of California Press, 1997), even during the depths of the Cold War there were scientists who fought against a militaristic reading of their enterprise. The socio-political meaning of science has always been contested, both inside and outside the scientific disciplines. David Hollinger discusses scientific intellectuals' participation in the cultural battles of the midcentury in "Science as a Weapon in Kulturkämpfe in the United States during and after World War II," in *Science, Jews, and Secular Culture: Studies in Mid-Twentieth-Century Intellectual History* (Princeton, N.J.: Princeton University Press, 1996), 155 – 174.

12 John D. Black, *Design for Defense: A Symposium of the Graduate School*, U.S. Department of Agriculture (Washington, D.C.: American Council on Public Affairs, 1941), 40.

Such a deeply chastened consensus set the stage for an inevitable reaction.

When the ideological pressures of the Cold War eased in the early 1960s, a new generation began to wonder why consumption and military spending were politically untouchable. The situation was galling, in part, precisely because educated middle-class Americans – and the generation of the 1960s was no exception – had entertained such lofty political hopes for science and the universities. Faced with the argument that not even those scientists funded by the Department of Defense bore responsibility for the use of their discoveries, many social critics turned against the language of scientific objectivity itself. Believing that they were forced to choose between democratic values and the benefits of science, many Americans were prepared to reject the dream of the scientific democrats and their Enlightenment-inspired vision of a society modeled on the intellectual freedom of scientists.

As they entered academia, these critics retained their focus on science as the ideological core of the American social and political system. Assuming, as had the scientific democrats, that intellectual and institutional change were causally linked, they insisted that the critique of objectivity offered a theoretical lever for moving society toward social justice. In fact, historian Edward A. Purcell, Jr., writes, the "most characteristic and significant intellectual endeavor of the Sixties" was the "attempt to reevaluate the nature of science: to analyze its sociological bases, to illuminate its political functions, and, above all, to deny its pretensions to exclusive and total access to truth." The goal was to "dethrone objectivist science as the supreme intellectual authority."[13]

And as the conservative ascendancy of the 1970s and 1980s swept away hopes of social reconstruction, the critics redoubled their efforts to unmask the pretensions of science to enlighten and liberate. Meanwhile, defensively minded scientists dug in their feet and took a stand for the possibility of objectivity, even if they personally sought different political goals than those articulated by Black. The outspoken entomologist Edward O. Wilson wrote in a characteristic recent passage that "The propositions of the original Enlightenment are increasingly favored by objective evidence, especially from the natural sciences."[14] The stage was set for the science wars.

Still, the original vision of scientific democracy has yet to disappear fully from the American scene. Despite the sound and fury of contemporary arguments in the academy, the prospect that science can have cultural as well as material benefits for ordinary Americans has not entirely lost its hold on the national imagination. And while it seems unlikely that any group of academics will ever voluntarily surrender its hard-won claims to institutional authority, the time may come again when America's natural and social scientists, leaving behind the disputes of the 1990s, undertake a new joint effort to redeem the promise of American democracy under the banner of intellectual freedom.

13 Edward A. Purcell, Jr., "Social Thought," *American Quarterly* 35 (Spring/Summer 1983): 80 – 100, 84.

14 Edward O. Wilson, *Consilience: The Unity of Knowledge* (New York: Alfred A. Knopf, 1998), 8.