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It's No Game: Post-Truth and the Obligations of Science Studies[1]

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In late April, 2017, the voice of a once-eminent institution of American democracy issued a public statement that embodied the evacuation of norms of truth and mutual understanding from American political discourse that since the 2016 presidential election has come to be known as "post-truth." We aren't talking about Donald Trump, whose habitual disregard of factual knowledge is troubling, to be sure, and whose advisor, Kellyanne Conway, made "alternative facts" part of the lexicon. Rather, we're referring to the justification issued by *New York Times* opinion page editor James Bennet in defense of his decision to hire columnist Bret Stephens, a self-styled "climate agnostic," and his spreading talking points of the fossil fuel industry-funded campaign to cast doubt on the scientific consensus on climate change and the integrity of climate scientists.[2] The notion of truth made no appearance in Bennet's statement. "If all of our columnists and all of our contributors and all of our editorials agreed all the time," he explained, "we wouldn't be promoting the free exchange of ideas, and we wouldn't be serving our readers very well."[3] The intellectual merits of Stephens' position are evidently not the point. What counts is only the ability to grease the gears of the "free exchange of ideas."

Bennet's defense exemplifies the ideology of the "marketplace of ideas," particularly in its recent, neoliberal incarnation. Since the 1970s, it has become commonplace throughout much of Europe and America to evince suspicion of attempts to build public consensus about facts or values, regardless of motivation, and to maintain that the role of public-sphere institutions—including newspapers and universities—is simply to place as many private opinions as possible into competition ("free exchange") with one another.[4] If it is meaningful to talk about a "post-truth" moment, this ideological development is surely among its salient facets. After all, "truth" has not become any more or less problematic as an evaluative concept in private life, with its countless everyday claims about the world. Only *public* truth claims, especially those with potential to form a basis for collective action, now seem newly troublesome. To the extent that the rise of "post-truth" holds out lessons for science studies, it is not because the discipline has singlehandedly swung a wrecking ball through conventional epistemic wisdom (as some practitioners would perhaps like to imagine[5]), but because the broader rise of marketplace-of-ideas thinking has infected even some of its most subversive-minded work.

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[2] For an analysis of Stephens' column, see Robert Proctor and Steve Lyons, "Soft Climate Denial at *The New York Times*," *Scientific American*, May 8, 2017; for the history of the campaign to cast doubt on climate change science, see Naomi Oreskes and Erik M. Conway, *Merchants of Doubt* (Bloomsbury Press, 2010); for information on the funding of this campaign, see in particular Robert J. Bruelle, "Institutionalizing delay: foundation funding and the creation of U.S. climate change counter-movement organizations," *Climatic Change* 122 (4), 681–694, 2013.

[3] Accessible at https://twitter.com/ErikWemple/status/858737313601507329.

[4] For the recency of the concept, see Stanley Ingber, "The Marketplace of Ideas: A Legitimizing Myth," *Duke Law Journal*, February 1984. The significance of the *epistemological* valorization of the marketplace of ideas to the broader neoliberal project has been increasingly well-understood by historians of neoliberalism; it is an emphasis, for instance, to the approach taken by the contributors to Philip Mirowski and Dieter Plehwe, eds., *The Road from Mont Pèlerin* (Harvard, 2009), especially Mirowski's "Postface."

[5] Bruno Latour, "Why Has Critique Run out of Steam? From Matters of Fact to Matters of Concern," *Critical Inquiry* vol. 30 (Winter 2004).

Science as Game

In this commentary, we address and critique a concept commonly employed in theoretical science studies that is relevant to the contemporary situation: science as game. While we appreciate both the theoretical and empirical considerations that gave rise to this framework, we suggest that characterizing science as a game is epistemically and politically problematic. Like the notion of a broader marketplace of ideas, it denies the public character of factual knowledge about a commonly accessible world. More importantly, it trivializes the significance of the attempt to obtain information about that world that is as right as possible at a given place and time, and can be used to address and redress significant social issues. The result is the worst of both worlds, permitting neither criticism of scientific claims with any real teeth, nor the possibility of collective action built on public knowledge.[6] To break this stalemate, science studies must become more comfortable using concepts like truth, facts, and reality outside of the scare quotes to which they are currently relegated, and accepting that the evaluation of knowledge claims must necessarily entail normative judgments.[7]

Philosophical talk of "games" leads directly to thoughts of Wittgenstein, and to the scholar most responsible for introducing Wittgenstein to science studies, David Bloor. While we have great respect for Bloor's work, we suggest that it carries uncomfortable similarities between the concept of science as a game in science studies and the neoliberal worldview. In his 1997 *Wittgenstein, Rules and Institutions*, Bloor argues for an analogy between his interpretation of the later Wittgenstein's theory of meaning (central to Bloor's influential writing on science) and the theory of prices of the neoliberal pioneer Ludwig von Mises. "The notion of the 'real meaning' of a concept or a sign deserves the same scorn as economists reserve for the outdated and unscientific notion of the 'real' or 'just' price of a commodity," Bloor writes. "The only real price is the price paid in the course of real transactions as they proceed *von Fall zu Fall*. There is no standard outside these transactions."[8] This analogy is the core of the marketplace of ideas concept, as it would later be developed by followers of von Mises, particularly Friedrich von Hayek. Just as there is no external standard of value in the world of commodities, there is no external standard of truth, such as conformity to an empirically accessible reality, in the world of science.[9] It is

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[6] See for instance John Ziman, *Public Knowledge: An Essay Concerning the Social Dimension of Science* (Cambridge University Press, 1968); as well as the many more recent perspectives we hold up below as exemplary of alternative approaches.

[7] Naomi Oreskes and Erik M. Conway. "Perspectives on global warming: A Book Symposium with Steven Yearley, David Mercer, and Andy Pitman." *Metascience* vol. 21, pp. 531-559, 2012.

[8] David Bloor, *Wittgenstein, Rules and Institutions* (Routledge, 1997), pp. 76-77.

[9] As suggested by Helen Longino in *The Future of* Knowledge (Princeton University Press, 2001) as an alternative to the more vexed notion of "correspondence," wrought with metaphysical difficulties Longino hopes to skirt. In Austrian economics, this rejection of the search for empirical, factual knowledge initially took the form, in von Mises' thought, of the ostensibly purely deductive reasoning he called "praxaeology," which was supposed to analytically uncover the imminent principles governing the economic game. Von Hayek went further, arguing that economics at its most rigorous merely theoretically explicates the *limits* of positive knowledge about empirical social realities. See, for instance, Friedrich von Hayek, "On Coping with Ignorance," Ludwig von Mises Lecture, 1978.

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"scientism" (a term that von Hayek popularized) to invoke support for scientific knowledge claims outside of the transactions of the marketplace of ideas. Just as, for von Hayek and von Mises, the notion of economic justice falls in the face of the wisdom of the marketplace, so too does the notion of truth, at least as a regulative ideal to which any individual or finite group of people can sensibly aspire.

Contra Bloor (and von Hayek), we believe that it is imperative to think outside the sphere of market-like interactions in assessing both commodity prices and conclusions about scientific concepts. The prices of everything from healthcare and housing to food, education and even labor are hot-button political and social issues precisely because they affect people's lives, sometimes dramatically, and because markets do not, in fact, always values these goods and services appropriately. Markets can be distorted and manipulated. People may lack the information necessary to judge value (something Adam Smith himself worried about). Prices may be inflated (or deflated) for reasons that bear little relation to what people value. And, most obviously in the case of environmental issues, the true cost of economic activity may not be reflected in market prices, because pollution, health costs, and other adverse effects are externalized. There is a reason why Nicholas Stern, former chief economist of the World Bank, has called climate change the "greatest market failure ever seen."[10] Markets can and do fail. Prices do not always reflect value. Perhaps most important, markets refuse justice and fairness as categories of analysis. As Thomas Piketty has recently emphasized, capitalism typically leads to great inequalities of wealth, and this can only be critiqued by invoking normative standards beyond the values of the marketplace.[11]

External normative standards are indispensable in a world where the outcome of the interactions within scientific communities matter immensely to people outside those communities. This requirement functions both in the defense of science, where appropriate, and the critique of it.[12] The history of scientific racism and sexism, for example, speaks to the inappropriateness of public deference to all scientific claims, and the necessity of principled critique.[13] Yet, the indispensability of scientific knowledge to political action in contemporary societies also demands the development of standards that justify public acceptance of certain scientific claims as definitive enough to ground collective projects, such as the existence of a community-wide consensus or multiple independent lines of

[10] Nicholas H. Stern, *The Economics of Climate Change: The Stern Review* (Cambridge University Press, 2007).
[11] Thomas Piketty, *Capital in the Twenty-First Century* (Harvard/Belknap, 2013). In addition to critiquing market outcomes, philosophers have also invoked concepts of justice and fairness to challenge the extension of markets to new domains; see for example Michael Sandel, *What Money Can't Buy: The Moral Limits of Markets* (Farrar, Straus, and Giroux, 2013) and Harvey Cox, *The Market as God* (Harvard University Press, 2016). This is also a theme in the Papal Encyclical on Climate Change and Inequality, *Laudato Si.* https://laudatosi.com/watch
[12] For more on this point, see Naomi Oreskes, "Systematicity is Necessary but Not Sufficient: On the Problem of Facsimile Science," in press, *Synthèse.*
[13] See among others Helen Longino, *Science as Social Knowledge* (Princeton University Press, 1990); Londa Schiebinger, *Has Feminism Changed Science?* (Harvard University Press, 1999); Sandra Harding, *Science and Social Inequality: Feminist and Postcolonial Issues* (University of Illinois Press, 2006); Donna Haraway, *Primate Visions: Gender, Race, and Nature in the World of Modern Science* (Routledge, 1989); Evelynn Hammonds and Rebecca Herzig, *The Nature of Difference: Sciences of Race in the United States from Jefferson to Genomics* (MIT Press, 2008).

evidence for the same conclusion.[14] (Indeed, we regard the suggestion of standards for the organization of scientific communities by Helen Longino as one of the most important contributions of the field of social epistemology.[15])

Although we reject any general equivalency between markets and scientific communities, we agree they are indeed alike in one key way: they both need *regulation*. As Jürgen Habermas once wrote in critique of Wittgenstein, "language games only work because they presuppose idealizations that transcend any particular language game; as a necessary condition of possibly reaching understanding, these idealizations give rise to the perspective of an agreement that is open to criticism on the basis of validity claims."[16] Collective problem-solving requires that these sorts of external standards be brought to bear. The example of climate change illustrates our disagreement with Bloor (and von Mises) on both counts in one fell swoop. Though neither of us is a working economist, we nonetheless maintain that it is rational—on higher-order grounds external to the social "game" of the particular disciplines—for governments to impose a price on carbon (i.e., a carbon tax or emissions trading system), in part because we accept that the natural science consensus on climate change accurately describes the physical world we inhabit, and the social scientific consensus that a carbon pricing system could help remedy the market failure that is climate change.[17]

Quietism and Critique

We don't want to unfairly single out Bloor. The science-as-game view—and its uncomfortable resonances with marketplace-of-ideas ideology—crops up in the work of many prominent science studies scholars, even some who have quarreled publicly with Bloor and the strong programme. Bruno Latour, for example, one of Bloor's sharpest critics, draws Hayekian conclusions from different methodological premises. While Bloor invokes social forces to explain the outcome of scientific games,[18] Latour rejects the very idea of social forces. Rather, he claims, as Margaret Thatcher famously insisted, that "there is no such thing as 'the social' or 'a society.'"[19] But whereas Thatcher at least acknowledged the existence of family, for Latour there are only monadic actants, competing "agonistically"

[14] Naomi Oreskes, "Trust in Science?" Tanner Lecture on Human Values, Princeton University, November 30, 2016; Naomi Oreskes, "The Scientific Consensus on Climate Change: How Do We Know We're Not Wrong?" in Joseph F. C. DiMento and Pamela Doughman, eds., *Climate Change: What It Means for Us, Our Children, and Our Grandchildren* (MIT Press, 2007), pp. 65-99.

[15] Helen Longino, *Science as Social Knowledge* (Princeton University Press, 1990), and *The Future of* Knowledge (Princeton University Press, 2001).

[16] Jürgen Habermas, *The Philosophical Discourse of Modernity* (MIT Press, 1984), p. 199.

[17] See, for instance, Naomi Oreskes, "Without government, the market will not solve climate change: Why a meaningful carbon tax may be our only hope," *Scientific American* (December 22, 2015), Naomi Oreskes and Jeremy Jones, "Want to protect the climate? Time for carbon pricing," *Boston Globe* (May 3, 2017).

[18] Along with a purportedly empirical component that, as Latour has compellingly argued, is "canceled out" out of the final analysis because of its common presence to both parties in a dispute. See Bruno Latour, "For Bloor and Beyond: a Reply to David Bloor's Anti-Latour," *Studies in History and Philosophy of Science*, vol. 30 (1), pp.113-129, March 1998.

[19] Bruno Latour, *Reassembling the Social: An Introduction to Actor-Network Theory* (Oxford University Press, 2007), p. 5; this theme is an emphasis of his entire oeuvre. On Thatcher, see http://briandeer.com/social/thatcher-society.htm and James Meek, *Private Island* (Verso, 2014).

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with each other until order spontaneously emerges from the chaos, just as in a game of Go (an illustration of which graces the cover of his seminal first book *Laboratory Life*, with Steve Woolgar).[20] Social structures, evaluative norms, even "publics," in his more recent work, are all chimeras, devoid of real meaning until this networked process has come to fulfillment. If that view might seem to make collective action for wide-reaching social change difficult to conceive, Latour agrees: "Seen as networks, … the modern world ... permits scarcely anything more than small extensions of practices, slight accelerations in the circulation of knowledge, a tiny extension of societies, miniscule increases in the number of actors, small modifications of old beliefs."[21] Rather than planning political projects with any real vision or bite—or concluding that a particular status-quo might be problematic, much less illegitimate—one should simply be patient, play the never-ending networked game, and see what happens.[22] But a choice for quietism is a choice nonetheless—"we are condemned to act," as Immanuel Wallerstein once put it—one that supports and sustains the status quo.[23] Moreover, a sense of humility or fallibility by no means requires us to exaggerate the inevitability of the status quo or yield to the power of inertia.[24]

Latour has at least come clean about his rejection of any aspiration to "critique."[25] But others who haven't thrown in the towel have still been led into a similar morass by their commitment to a marketlike or playful view of science. The problem is that, if normative judgments external to the game are illegitimate, analysts are barred from making any arguments *for* or *against* particular views or practices. Only criticism of their premature

[20] Bruno Latour and Steve Woolgar, *Laboratory Life: The Construction of Scientific Facts* (Routledge, 1979/1986); Bruno Latour, *Science in Action* (Harvard University Press, 1987). In *Laboratory Life* this emergence of order from chaos is explicitly analyzed as the outcome of a kind of free market in scientific "credit." Spontaneous order is one of the foundational themes of Hayekian thought, and the game of Go is an often-employed analogy there as well. See, for instance, Peter Boettke, "The Theory of Spontaneous Order and Cultural Evolution in the Social Theory of F.A. Hayek," *Cultural Dynamics*, vol. 3 (1), pp. 61-83, 1990; Gustav von Hertzen, *The Spirit of the Game* (CE Fritzes AB, 1993), especially chapter 4.

[21] Bruno Latour, *We Have Never Been Modern* (Harvard University Press, 1993), pp. 47-48; for his revision of the notion of the public, see for example Latour's *Politics of Nature* (Harvard University Press, 2004). For a more in-depth discussion of Latour vis-à-vis neoliberalism, see Philip Mirowski, "What Is Science Critique? Part 1: Lessig, Latour," keynote address to Workshop on the Changing Political Economy of Research and Innovation, UCSD, March 2015.

[22] Our criticism here is not merely hypothetical. Latour's long-time collaborator Michel Callon and the legal scholar David S. Caudill, for example, have both used Latourian actor-network theory to argue that critics of the privatization of science such as Philip Mirowski are mistaken and analysts should embrace, or at least concede the inevitability of, "hybrid" science that responds strongly to commercial interests. See Michel Callon, "From Science as an Economic Activity to Socioeconomics of Scientific Research," in Philip Mirowski and Esther-Mirjam Sent, eds. *Science Bought and Sold* (University of Chicago Press, 2002); and David S. Caudill, "Law, Science, and the Economy: One Domain?" *UC Irvine Law Review* vol. 5 (393), pp. 393-412, 2015.

[23] Immanuel Wallerstein, *The Essential Wallerstein* (The New Press, 2000), p. 432.

[24] Naomi Oreskes, "On the 'reality' and reality of anthropogenic climate change," *Climatic Change* vol. 119, pp. 559-560, 2013, especially p. 560 n. 4. Many philosophers have made this point. Hilary Putnam, for example, has argued that fallibilism actually *demands* a critical attitude, one that seeks to modify beliefs for which there is sufficient evidence to believe that they are mistaken, while also remaining willing to make genuine knowledge claims on the basis of admittedly less-than-perfect evidence. See his *Realism with a Human Face* (Harvard University Press, 1990), and *Pragmatism: An Open Question* (Oxford, 1995) in particular.

[25] Bruno Latour, "Why Has Critique Run out of Steam? From Matters of Fact to Matters of Concern," *Critical Inquiry* vol. 30 (Winter 2004).

exclusion from the marketplace is permitted. This standpoint interprets Bloor's famous call for symmetry not so much as a methodological principle in intellectual analysis, but as a demand for the abandonment of all forms of epistemic and normative judgment, leading to the bizarre sight of scholars championing a widely-criticized "scientific" or intellectual cause while coyly refusing to endorse its conclusions themselves. Thus we find Bruno Latour praising the anti-environmentalist Breakthrough Institute while maintaining that he "disagrees with them all the time;" Sheila Jasanoff defending the use of made-to-order "litigation science" in courtrooms on the grounds of a scrupulous "impartiality" that rejects scholarly assessments of intellectual integrity or empirical adequacy in favor of letting "the parties themselves do more of the work of demarcation;" and Steve Fuller defending creationists' insistence that their views should be taught in American science classrooms while remaining ostensibly "neutral" on the scientific question at issue.[26]
Fuller's defense of creationism, in particular, shows the way that calls for "impartiality" are often in reality *de facto* side-taking: Fuller takes rhetorical tropes directly out of the creationist playbook, including his tendentious and anachronistic labelling of modern evolutionary biologists as "Darwinists." Moreover, despite his explicit endorsement of the game view of science, Fuller refuses to accept defeat for the intelligent design project, either within the putative game of science, or in the American court system, which has repeatedly found the teaching of creationism to be unconstitutional. Moreover, Fuller's insistence that creationism somehow has still not received a "fair run for its money" reveals that even he cannot avoid importing external standards (in this case fairness) to evaluate scientific results! After all, who ever said that science was fair?

In short, science studies scholars' ascetic refusal of standards of good and bad science in favor of emergent judgments immanent to the "games" they analyze has vitiated critical analysis in favor of a weakened proceduralism that has struggled to resist the recent advance of neoliberal and conservative causes in the sciences. It has led to a situation where creationism is defended as an equally legitimate form of *science*, where the claims of think tanks that promulgate disinformation are equated with the claims of academic scientific research institutions, and corporations that have knowingly suppressed information pertinent to public health and safety are viewed as morally and epistemically equivalent to the plaintiffs who are fighting them. As for Fuller, leaving the question of standards unexamined and/ or implicit, and relying instead on the rhetoric of the "game," enables him to avoid the challenge of defending a demonstrably indefensible position on its actual merits.

Where the Chips Fall

In diverse cases, key evaluative terms—legitimacy, disinformation, precedent, evidence, adequacy, reproducibility, natural (vis-à-vis supernatural), and yes, truth—have been so

[26] "Bruno Latour: Modernity is a Politically Dangerous Goal," November 2014 interview with Latour by Patricia Junge, Colombina Schaeffer and Leonardo Valenzuela of Verdeseo; Zoë Corbyn, "Steve Fuller : Designer trouble," *The Guardian* (January 31, 2006); Sheila Jasanoff, "Representation and Re-Presentation in Litigation Science," *Environmental Health Perspectives* 116(1), pp. 123–129, January 2008. Fuller also has a professional relationship with the Breakthrough Institute, but the Institute seems somewhat fonder, in their publicity materials, of their connection with Latour.

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relativized and drained of meaning that it starts to seem like a category error even to attempt to refute equivalency claims. One might argue that this is alright: as scholars, we let the chips fall where they may. The problem, however, is that they do not fall evenly. The winner of this particular "game" is almost always status quo power: the conservative billionaires, fossil fuel companies, lead and benzene and tobacco manufacturers and others who have bankrolled think tanks and "litigation science" at the cost of biodiversity, human health and even human lives.[27] Scientists paid by the lead industry to defend their toxic product are not just innocently trying to have their day in court; they are trying to evade legal responsibility for the damage done by their products. The fossil fuel industry is not trying to advance our understanding of the climate system; they are trying to block political action that would decrease societal dependence on their products. But there is no way to make—much less defend—such claims without a robust concept of evidence.

Conversely, the communities, already victimized by decades of poverty and racial discrimination, who rely on reliable science in their fight for their children's safety are not unjustly trying to short-circuit a process of "demarcation" better left to the adversarial court system.[28] It is a sad irony that STS, which often sees itself as championing the subaltern, has now in many cases become the intellectual defender of those who would crush the aspirations of ordinary people.

Abandoning the game view of science won't require science studies scholars to reinvent the wheel, much less re-embrace Comtean triumphalism. On the contrary, there are a wide variety of perspectives from the history of epistemology, philosophy of science, and feminist, anti-racist, and anti-colonialist theory that permit critique that can be both epistemic and moral. One obvious source, championed by intellectual historians such as James Kloppenberg and philosophers such as Hilary Putnam and Jürgen Habermas, is the early American pragmatism of John Dewey and William James, a politically constructive alternative to both naïve foundationalism and the textualist rejection of the concept of truth found in the work of more recent "neo-pragmatists" like Richard Rorty.[29] Nancy Cartwright,

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[27] Even creationism, it's worth remembering, is a big-money movement. The Discovery Institute, perhaps the most prominent "intelligent design" advocacy organization, is bankrolled largely by wealthy Republican donors, and was co-founded by notorious Reaganite supply-side economics guru and telecom deregulation champion George Gilder. See Jodi Wilgoren, "Politicized Scholars Put Evolution on the Defensive," *New York Times*, August 21, 2005. Similarly, so-called grassroots anti-tax organizations often had links to the tobacco industry. See http://www.sourcewatch.org/index.php/Americans_for_Tax_Reform_and_Big_Tobacco The corporate exploitation of ambiguity about the contours of disinformation can, of course, also take more anodyne forms, as in manipulative use of phrases like "natural flavoring" on food packaging. We thank Mott Greene for this example.

[28] David Rosner and Gerald Markowitz, *Lead Wars: The Politics of Science and the Fate of America's Children* (University of California Press, 2013). See also Gerald Markowitz and David Rosner, *Deceit and Denial: The Deadly Politics of Industrial Pollution* (University of California Press, 2nd edition 2013); and Stanton Glantz, ed., *The Cigarette Papers* (University of California Press, 1998).

[29] See James Kloppenburg, "Pragmatism: An Old Name for Some New Ways of Thinking?," *The Journal of American History*, Vol. 83 (1), pp. 100-138, June 1996, which argues that Rorty misrepresents in many ways the core insights of the early pragmatists. See also Jürgen Habermas, *Theory of Communicative Action* (Beacon Press, vol. 1 1984, vol. 2 1987); Hilary Putnam, *Reason, Truth, and History* (Cambridge University Press, 1981); see also

Thomas Uebel, and John O'Neill have similarly reminded us of the intellectual and political potential in the (widely misinterpreted, when not ignored) "left Vienna Circle" philosophy of Otto Neurath.[30]

In a slightly different vein, Charles Mills, inspired in part by the social science of W.E.B. Du Bois, has insisted on the importance of a "veritistic" epistemological stance in characterizing the ignorance produced by white supremacy.[31] Alison Wylie has emphasized the extent to which many feminist critics of science "are by no means prepared to concede that their accounts are just equal but different alternatives to those they challenge," but in fact often claim that "research informed by a feminist angle of vision ... is simply *better* in quite conventional terms."[32] Steven Epstein's work on AIDS activism demonstrates that social movements issuing dramatic challenges to biomedical and scientific establishments can make good use of unabashed claims to genuine knowledge and "lay" expertise. Epstein's work also serves as a reminder that moral neutrality is not the only, much less the best, route to rigorous scholarship.[33] Science studies scholars could also benefit from looking outside their immediate disciplinary surroundings to debates about poststructuralism in the analysis of (post)colonialism initiated by scholars like Benita Parry and Masao Miyoshi, as well as the emerging literature in philosophy and sociology about the relationship of the work of Michel Foucault to neoliberalism.[34]

For our own part, we have been critically exploring the implications of the institutional and financial organization of science during the Cold War and the recent neoliberal intensification of privatization in American society.[35] We think that this work suggests a

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William Rehg's development of Habermas's ideas on science in *Cogent Science in Context: The Science Wars, Argumentation Theory, and Habermas* (MIT Press, 2009).

[30] Nancy Cartwright, Jordi Cat, Lola Fleck, and Thomas Uebel, *Otto Neurath: Philosophy between Science and Politics* (Cambridge University Press, 1996); Thomas Uebel, "Political philosophy of science in logical empiricism: the left Vienna Circle," *Studies in History and Philosophy of Science*, vol. 36, pp. 754-773, 2005; John O'Neill, "Unified science as political philosophy: positivism, pluralism and liberalism," *Studies in History and Philosophy of Science*, vol. 34, pp. 575-596, 2003.

[31] Charles Mills, "White Ignorance," in Robert Proctor and Londa Schiebinger, eds., *Agnotology: The Making and Unmaking of Ignorance* (Stanford University Press, 2008); see also his recent *Black Rights/White Wrongs* (Oxford University Press, 2017).

[32] Alison Wylie, *Thinking from Things: Essays in the Philosophy of Archaeology* (University of California Press, 2002), p. 190. Helen Longino (*Science as Social Knowledge*, 1999) and Sarah Richardson (*Sex Itself*, University of Chicago Press, 2013), have made similar arguments about research in endocrinology and genetics.

[33] Steven Epstein, *Impure Science* (University of California Press, 1996); see especially pp. 13-14.

[34] See for instance Benita Parry, *Postcolonial Studies: A Materialist Critique* (Routledge, 2004); Masao Miyoshi, "Ivory Tower in Escrow," *boundary 2*, vol. 27 (1), pp. 7-50, Spring 2000. On Foucault, see recently Daniel Zamora and Michael C. Behrent, eds., *Foucault and Neoliberalism* (Polity Press, 2016); but note also the seeds of this critique in earlier works such as Jürgen Habermas, *The Philosophical Discourse of Modernity* (MIT Press, 1984) and Nancy Fraser, "Michel Foucault: A 'Young Conservative'?", *Ethics* vol 96 (1), pp. 165-184, 1985, and "Foucault on Modern Power: Empirical Insights and Normative Confusions," *Praxis International*, vol. 3, pp. 272-287, 1981.

[35] Naomi Oreskes and John Krige, eds., *Science and Technology in the Global Cold War* (MIT Press, 2015); Naomi Oreskes, *Science on a Mission: American Oceanography in the Cold War* (University of Chicago Press, forthcoming); Erik Baker, "The Ultimate Think Tank: Money and Science at the Santa Fe Institute," manuscript in preparation.

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further descriptive inadequacy in the science-as-game view, in addition to the normative inadequacies we have already described. In particular, it drives home the extent to which the *structure* of science is not constant. From the longitudinal perspective available to history, as opposed to sociological or ethnographic snapshot, it is possible to resolve the powerful societal forces—government, industry, and so on—driving changes in the way science operates, and to understand the way those scientific changes relate to broader political-economic imperatives and transformations. Rather than throwing up one's hands and insisting that incommensurable particularity is all there is, science studies scholars might instead take a theoretical position that will allow us to characterize and respond to the dramatic transformations of academic work that are happening right now, and from which the humanities are by no means exempt.[36]

Academics must not treat themselves as isolated from broader patterns of social change, or worse, deny that change is a meaningful concept outside of the domain of microcosmic fluctuations in social arrangements. Powerful reactionary forces can reshape society and science (and reshape society *through* science) in accordance with their values; progressive movements in and outside of science have the potential to do the same. We are concerned that the "game" view of science traps us instead inside a Parmenidean field of homogenous particularity, an endless succession of games that may be full of enough sound and fury to interest scholars but still signify nothing overall.

Far from rendering science studies Whiggish or simply otiose, we believe that a willingness to discriminate, outside of scare quotes, between knowledge and ignorance or truth and falsity is vital for a scholarly agenda that respects one of the insights that scholars like Jasanoff have repeatedly and compellingly championed: in contemporary democratic polities, science *matters*. In a world where physicists state that genetic inferiority is the cause of poverty among black Americans, where lead paint manufacturers insist that their product does no harm to infants and children, and actresses encourage parents not to vaccinate their children against infectious diseases, an inability to discriminate between information and disinformation—between sense and nonsense (as the logical positivists so memorably put it)—is not simply an intellectual failure. It is a political and moral failure as well.

The Brundtland Commission famously defined "sustainable development" as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." Like the approach we are advocating here, this definition treats the empirical and the normative as enfolded in one another. It sees them not as constructions that emerge stochastically in the fullness of time, but as questions that urgently demand robust answers in the present. One reason science matters so much in the present moment is its role in determining which activities are sustainable, and which are not. But if scientists are to make such judgments, then we, as science studies scholars, must be able to judge the scientists—positively as well as critically. Lives are at stake. We are not here merely

[36] See, for instance, Philip Mirowski, *Science-Mart* (Harvard University Press, 2010); Wendy Brown, *Undoing the Demos: Neoliberalism's Stealth Revolution* (MIT Press, 2015); Henry Giroux, *Neoliberalism's War on Higher Education* (Haymarket Books, 2014); Sophia McClennen, "Neoliberalism and the Crisis of Intellectual Engagement," *Works and Days*, vols. 26-27, 2008-2009.

to stand on the sidelines insisting that all we can do is ensure that all voices are heard, no matter how silly, stupid, or nefarious.

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