Talking about Science

Commentary on “The Golem: Uncertainty and Communicating Science” (T. Pinch)

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For most adults in the western world, hands-on acquaintance with something called science stops with the equivalent of high-school biology. Beyond this point, people may be called upon to evaluate scientific findings and technological products in a wide variety of situations—for example, in making critical medical decisions for themselves or their families, assessing the risks of living near power lines or toxic waste dumps, choosing between organic and genetically modified foods, voting for or against their political leaders’ environmental policies, or selecting equipment and services to enable effective use of the World Wide Web. Inputs from science are indispensable for making any of these decisions, but the science that most people rely on is a heavily mediated commodity: popularized by films and television, spun through advertising, rendered controversial by courts, disseminated in lay terms by newspapers and the Internet, and, above all, embodied in the persons of technical experts. Beyond the first twelve years of school, the great majority of citizens in contemporary societies acquire their science through one or another of these channels of communication rather than by firsthand experience of the life-world of scientists.

The stakes attached to science communication, then, are large and growing. In a technologically sophisticated world that is every day opting for more democratic and liberal forms of governance, citizens increasingly find themselves at a loss if they do not know how to make sense of the threats and promises of science and technology. Yet, they are guided much of the time by secondary sources, by representations of science whose credibility they have to judge for themselves. How to talk about science thus emerges as an important issue for democratic civil societies. It is a matter that concerns us all. Are there some representations that are so false to the nature of the scientific enterprise that it is unethical to display science in those ways? Conversely, are there some features of science that are so important to the exercise of informed citizenship that journalists, academics, and even the entertainment industry have an affirmative obligation to convey these dimensions to their publics?

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Trevor Pinch, a noted scholar of science and technology studies (S&TS), argues that there are indeed important aspects of scientific practice that are not captured in most conventional representations of science, and that S&TS researchers can perform a valuable service by bringing these more to the fore. He suggests that science as communicated to lay publics should be stripped of some of its mythic appurtenances, both positive and negative, so that it appears neither as knight in shining armor nor as Frankenstein. Drawing on his collaborative work with the British sociologist H.M. Collins, Pinch proposes that we think of science as a golem, a creature out of Jewish mythology that is at once human-made and part of nature, powerful and unruly, but also bumbling. With the golem metaphor, Collins and Pinch seek both to humanize science for non-scientists and also to offer a popular account of the ways in which S&TS scholarship over the past two decades has come to understand how science is done. They wish, in other words, to communicate not only science but also something of the recent social study of science and technology.

The image of science as golem derives from the study of controversies in which scientific and technical claims have played a central part. Several decades of research in the history, sociology and politics of science and technology have shown that controversies occupy quite a salient place in the conduct of science. Progress in scientific understanding often happens as a result of researchers questioning each other’s work or failing to replicate each other’s findings. In the work of social scientists, such episodes have proved especially useful in revealing how scientists fall back on social and cultural assumptions, professional judgments, tacit knowledge of experimental practices, trust in peers, and (more rarely) economic and political interests to supplement what they have unambiguously observed in the lab or the field. Behind the apparently seamless facade of accepted scientific knowledge, as Pinch indicates, there lies a considerably more uncertain and makeshift world, in which researchers behave less like all-seeing gods and more like cooks or plumbers using mundane techniques to get things to function right. Ethical science communication includes, in Pinch’s view, a duty to convey these contested, human, and, by implication, fallible aspects of science to the public.

In my experience, however, scientists are extremely uneasy about using controversies as a device for communicating about the work they do. Scientific professional societies have been known to advise their members not to participate in lawsuits because disagreement among expert witnesses may project a misleading impression of uncertainty and undermine the authority of their fields. I have heard eminent scientists question whether controversies should be used in teaching science to pre-college students and even express doubts about rewarding journalists who report on conflicts within science. Such reporting, they believe, presents a distorted picture of the state of knowledge, with potentially grave consequences for public trust and sound policymaking. For example, many US climate scientists are convinced that the media did a great disservice to environmental policy by reporting at length the views of so-called climate change skeptics who questioned whether human activities are causing a rise in greenhouse gas emissions and consequent warming of the earth’s atmosphere.
Publicizing the opinions of a fringe minority in this way, scientists argued, significantly misrepresented what science had actually learned about climate change and made it respectable for Congress to delay action on a pressing social problem. Who is right—Pinch and the social scientists who want to highlight controversy or the scientists who prefer their work to be displayed as consensual?

Clearly, controversy is at the heart of scientific practice, so much so that Robert K. Merton, the great American sociologist of science of the mid-century, posited "organized skepticism" as an essential part of the ethos of science.² It would be irresponsible, in talking about science, not to discuss the extent to which skepticism and controversy fuel scientific discovery or to paper over the many social factors (e.g., trust, conventions, hierarchical authority) that can play a part in the closure of scientific debates. Just as clearly, fair accounts of scientific controversies should attempt to communicate not only that such episodes occur, but also enough information to allow interested non-participants to assess a given controversy's significance and implications. This is just the kind of texture and detail that competent S&TS researchers seek to provide in their accounts of disputes within science.

Abstracting from the most illuminating work in science and technology studies, one might therefore begin to construct something of a checklist of "best practices" for the ethical communication of controversial science. Such a list might include the following sorts of principles:

- Describe the basis for disagreements among scientists, that is, show why evidence is found to be inconclusive or capable of more than one interpretation (S&TS researchers use the term "interpretive flexibility" to refer to this property of scientific findings).

- Discuss the criteria by which workers in contested areas make judgments of relative plausibility or reliability; do not represent such assessments as random, for they rarely are just that.

- Say something about the weight of authority on the sides of a controversy, so that minority opinions can be distinguished from those in, or tending toward, the mainstream. This does not mean that majority opinions are necessarily right or that minority opinions must be dismissed as wrong.

- Whenever possible, present the social context of the controversy, including information about the institutions that are funding or carrying out the research, the interests (if any) at stake in the outcomes, or the possible connections between research and public policy.

- Present controversies as dynamic rather than static events, with life histories that may lead to definitive closure or to issues being reframed in different terms. Try to explain why some controversies persist over very long periods (e.g., nature versus nurture explanations of human behavior), while others end quite dramatically (e.g., whether cigarettes cause cancer).
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Abiding by these principles will not necessarily lead to representations of science that scientists find more comforting. Indeed, outsider accounts are often unsettling because they portray an activity in very different terms from those allowed by its practitioners. The “science wars” that Pinch describes were fueled in part by scientists’ unwillingness to concede that non-specialists can have important things to say about the practice of science. Commentary has been found especially galling when it contradicts images of science that researchers “know” to be correct. Thus, any criticism of science that detracts from its appearance of objectivity tends to anger practicing scientists, who rightly believe that their professional ethos places the search for truth on a higher plane than do most other forms of organized human behavior. But as S&TS studies have repeatedly demonstrated, what counts as objectivity is itself constrained by biases that may not be apparent to those within a given scientific subculture, such as that of 19th century eugenicists whose genetic, racial, and gender theories powerfully complemented one another. Perhaps the deepest insight that has emerged from the systematic study of science and technology by humanists and social scientists is that biases of this kind are not merely historical accidents or cultural artifacts, but a consequence of the fact that science and technology are, when all is said and done, profoundly human and socially embedded institutions.

Is science a golem? Not everyone will agree with Pinch that this is an accurate or even a useful characterization. The important thing, however, is that such unconventional ways of talking about science are likely to lead many more people—both scientists and non-scientists—to reflect more deeply on the nature of science and technology as forms of human activity. S&TS scholarship may help in this way to increase the store of social literarcy about science. In our heavily science-dependent cultures, we should accord a high priority to increasing the multiplicity of representations of science. Engaging more varied perspectives in this enterprise is quite consistent with the broader ethical imperative of talking responsibly about science.

Note: In the interests of disclosure, I should say that for nearly a decade I was a colleague of Professor Pinch at Cornell University and share many of his views about the nature of science. However, my comment on his essay also reflects some of the differences in our research backgrounds and experiences of science in society.

REFERENCES
