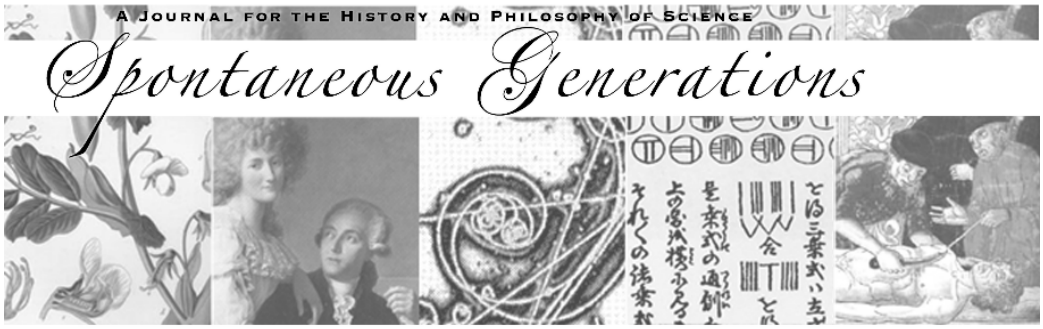

Science and Public Controversy: Editor's Introduction

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Source: *Spontaneous Generations: A Journal for the History and Philosophy of Science*, Vol. 5, No. 1 (2011) 1-4.

Published by: The University of Toronto
DOI: 10.4245/sponge.v5i1.15622

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Published online at jps.library.utoronto.ca/index.php/SpontaneousGenerations
ISSN 1913 0465

Focused Discussion

Science and Public Controversy
Editor's Introduction*

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Scientific claims implicitly invite criticism. While we might expect that challenging an epistemic authority in religious circles would be seen as an illegitimate activity (e.g. heresy) and met with suppression, challenging an epistemic authority in scientific circles is supposed to be a legitimate form of engagement, and should (ideally) be met with reasoned argument based in empirical evidence. Given this implicit invitation to challenge scientific claims, and the sweeping knowledge claims often made by today's scientists, it is hardly surprising that people outside narrowly defined scientific communities (i.e. science's "public") often challenge the truth of scientific consensuses. The scrutiny of scientific claims by non-scientist members of the public is quite understandable and in many ways unobjectionable, given the role that science advice increasingly plays in our society's governance structures and public policy making. As scientists increasingly play policy-maker, they become doubly subject to public criticism: first *as* a scientist making substantive claims about reality and second *as* public-interest decision-maker making important decisions about public policy. Thus, for the scientist's social role as epistemic authority to remain *justified,* public criticism of science should ideally be entertained and answered by practicing scientists.

But as anyone familiar with the social practice of science can tell you, things rarely go "ideally" when actually practicing science. For whatever reasons, the history of science is replete with examples of protracted, unexpected, and unresolved controversies erupting across the scientist/non-scientist divide, making it seem almost inevitable that such controversies will erupt, drawing scientists outside of their narrowly defined epistemic communities and into a more "public" setting. This apparent inevitability of public controversy surrounding scientific knowledge claims may signal an opportunity for the

* Received 30 September 2011.

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historian, sociologist, or philosopher of science to learn something about the nature of science. Accordingly, this issue of *Spontaneous Generations* is dedicated to studying public controversies over science in the hopes of learning a little more about the nature of (and possibilities for) modern scientific practice, existing as it does within a social and political context full of variegated peoples, disputes, agendas and institutions.

Public controversies surrounding science take many forms, from contemporary debates about climate change to historic debates that pitted traditional histories against newer, archeological or geological histories. Two approaches to studying public controversies are broadly represented here. On the one hand we have articles that seek, in one way or another, to understand public controversy over science in terms of communication media. Bernard Lightman's piece, for instance, details the early motivations for developing periodicals as a means of making controversy digestible to the Victorian masses. In his view, "the development of a mass reading audience in mid-nineteenth century Britain transformed the very nature of scientific controversy" (p. 5). Indeed, he argues, that it was during the nineteenth century that public scientific controversies "became possible for the first time." Focussing on the example of evolutionary theory, Lightman shows how periodicals became a place for resolving scientific controversy, pointing out the new risks that came with placing scientific controversy in public view. For although "a non-specialized journal could provide the public space necessary for reaching the reading audience, maintaining scientific authority in such a site was somewhat problematic" (p. 5).

Complementing Lightman's piece is the one by Brent Ranalli, which looks at some of the early justifications for peer scrutiny and self-censorship among members of the Hartlib circle. He argues that a "prehistory" of peer review shows a partial origin in the idea—shared by Comenius and others from the Hartlib circle—that peer review would permit the resolution of disputes outside the public eye, thereby avoiding or at least reducing the kind of doubt, error, confusion, and disruption of the social order that could result from more public forms of disputation. Like their associates in the Hartlib circle, many early fellows of the Royal Society seem to have been aware of these considerations, as their use of peer review seems "designed to shield from public view technical arguments, disagreements, and partially developed or imprudent theses—'dirty laundry' that, if exposed to view, had the potential to prejudice the public or the royal patron against the fledgling institution" (p. 16). As such, these early advocates of peer review anticipated many of the very difficulties that Victorian scientists found when periodicals brought scientific disputes outside the protective walls erected by peer review and exclusive scientific societies.

On the other hand, we have articles that attack a particular controversy head on: this is the approach taken by Evelyn Fox Keller and Jane Maienschein, who address the scientific and public controversies surrounding climate science and

stem cell research, respectively. Speaking from a more philosophical perspective, Keller argues against the idea that, to bridge the public/science climate gap, the public needs to become more science savvy. She turns this popular argument on its head: under Keller's diagnosis, the growth of public skepticism surrounding climate science, and the resultant failure of policy to mesh with reality, can be partially blamed on scientists' failure to see answering public criticism as part of their job description. Climate scientists, she notes, have never made it a priority to rebut criticism in public venues—when the narrowly-defined scientific community (e.g. the Intergovernmental Panel on Climate Change) reaches consensus, that is usually sufficient to satisfy a scientist's sense of duty, qua truth-seeker. But given how important science is in modern policy-making, this is an insufficient sense of duty. Keller argues forcefully that scientific training should be expanded to reflect the social expectations of scientists: that they will explain the science to us, and become epistemic guides rather than isolated authorities.

Taking a distinctly historical approach, Maienschein details the ways that popular (mainly Christian) and scientific (mainly embryological) definitions of "embryo" have departed from one another over time. Maienschein argues that today's public controversies over stem cell research have resulted from our lack of shared understanding about embryos. While developmental biologists have managed to construct a very good understanding of many aspects of embryological development, they have not worked to make that understanding the publicly-accepted one. Instead, prevailing social understandings of embryos are derived mainly from a nineteenth-century Papal decree that seems to care little about the biological advances in understanding embryological development.

Shiju Sam Varughese's piece is the only one that seems to take both approaches simultaneously, looking at the role that both media and science played in resolving controversy over earthquakes in Kerala, India. Popular media often play a crucial, whistleblower role in linking the public with science, and Varughese find the interplay between science and the media most interesting when trust in science breaks down during post-disaster scenarios. Varughese uses the case of micro-earthquakes in Kerala to argue that the popular media can also initiate and maintain public controversies over scientific competence by, for example, generating "public skepticism over the competence of earth science to convincingly explain the phenomenon and address the questions raised by the public" (p. 37).

Historians and philosophers of science walk a very interesting line between science and their wider publics. Very few HPSers are practicing scientists, though many have scientific training in one form or another. At the very least, most of us find ourselves somewhere on the outside of scientific practice. But at the same time, our historical and philosophical interest in science makes us far more familiar with scientific methods, results, and practice than most non-scientists, and far better equipped to think through the complexities of scientific controversies.

As such, HPS offers an appropriate position from which to navigate and analyze disputes between scientists and members of the "public." This is what this focused discussion section has been dedicated to demonstrating. The articles in this issue by no means offer comprehensive analyses of how controversy between or across science and public life are generated or resolved—indeed, a reasonable working hypothesis is that the generation and resolution of such controversies are highly heterogenous processes. These articles should, however, serve as testament to the interesting historical and philosophical work that can be done by focussing on public controversy as a salient aspect of scientific living.

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