A Mathematician Reads *Social Text*

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New York University mathematical physicist Alan Sokal published in the postmodern humanities journal *Social Text* a parody entitled *Transgressing the Boundaries: Toward a Transformative Hermeneutics of Quantum Gravity* [1]. His point in doing so was to test whether the field of ‘‘cultural studies of science’’ was seriously lacking in ‘‘intellectual standards.’’ His article is nonsense from start to finish, but was still published. He revealed the hoax in another article in *Lingua Franca* [2]. The incident, and reactions to it, now being called the Sokal Affair, have received wide coverage in *The New York Times* [3].

Of course, Sokal’s experiment does not settle the issue, but rather points to the need for further study. Did he merely pull a fast one on the editors of *Social Text*, or is the field, known as the social or cultural studies of science, itself truly bunk? In an attempt to answer this question I have read the other articles in the issue of *Social Text* in which Sokal’s article appeared. It was a special issue devoted to what the editor calls ‘‘Science Wars,’’ (capital S, capital W). The call for a special issue on this topic was motivated as a response to the book, *Higher Superstition; the academic left and its quarrels with science*, by Paul Gross and Norman Levitt, Johns Hopkins University Press, 1994.

What follows are a few observations on some of the other articles in the Science Wars issue of *Social Text*.

Andrew Ross: Introduction

Andrew Ross edited the issue of *Social Text* in question and wrote an introduction for it. Ross makes clear that his sympathies lie with those who seek to ‘‘uncover the gender-laden and racist assumptions built into the Euro-American scientific method,’’ and ‘‘to create new scientific methods rooted in the social needs of communities and accountable to social interests other than those of managerial elites in business, government, and the military.’’ If he substituted ‘‘scientific establishment’’ for ‘‘scientific method’’ he would be articulating a legitimate political program with which I myself would have at least some sympathy.

Perhaps he has merely gotten his terms confused. Is he really criticizing the scientific method itself? How would he change it? We read on.

> The unjustified conferral of expertise on the scientist's knowledge of, say, chemical materials, and not on the worker's or the farmer's experience with such materials, is an abuse of power that will not be opposed or altered simply by demonstrating the socially constructed nature of the scientist's knowledge. That may help to demystify, but it must be joined by insistence on methodological reform -- to involve the local experience of users in the research process from the outset and to ensure that the process is shaped less by a manufacturer's interests than by the needs of communities affected by the product.

One does not have to look far to find potential for serious negative outcomes for working people arising from Ross' position. The *New York Times* (6/14/1996,p. A4) reports that pottery makers, including children, in Mexico are being exposed to high levels of lead from the glazes they use. People who use the pots are also at risk. The workers however don't believe this. But the lead doesn't care who believes what. Lead is real and so are its effects. The Mexican government has only recently developed lead free glazes. The potters will likely switch, but only because U.S. import restricts are hurting their business. "The potters remain convinced that the lead scare is simply a foreign conspiracy," the *Times* reports. Here we have a difficult problem were science, economics and cultural pride all meet. This is the type of problem natural and social scientists should be working on together. But Ross' approach confuses the issue, and hence weakens progress towards a goal that I share.

Still skeptical? Don't think someone as educated as Ross could fall into such a trap? Think again: ''... we begin to talk about different ways of doing science, ways that downgrade methodology, experiment, and manufacturing in favor of local environments, cultural values, and principles of social justice.'' Ross is unwilling, on principle, to separate his political views from his analysis. There is nothing wrong with having a political agenda, or using it as a basis from which to formulate questions for study. But you can't answer questions about science, or even politics, with your politics. Ross asserts that that which he doesn't like should downgraded, while politically good things should be elevated to the status of science. It doesn't matter that ''manufacturing'' has nothing to do with ''doing science''; capitalists like manufacturing and science was created under capitalism. It reminds one of a an ideologue who evaluates art based on the politics of the artist.

In a response to Sokal's revelation that his article was a hoax, Ross wrote: ''Prior to deciding whether science intrinsically tells the truth, we must ask, again and again, whether it is possible, or prudent, to isolate facts from values.'' [4] In the analysis of complex social questions the separation of facts from values may be a difficult and problematic task. And it is precisely here that scholars in the humanities can be of service to the common good. For while I cannot prove that the separation of facts and values is a necessary step in solving problems, Ross, and as we will see, others, provide us with ample empirical evidence that this is so.

Sandra Harding: Science is ''Good to Think With''

From the title of this article I thought I might be in for a pleasant relief. No such luck. Criticisms of social studies of science are made by the ''antidemocratic right'' who ''virtually never'' ''contest the accuracy of social studies of science'' but merely engage in ''ridicule''. The desire to ridicule is indeed a difficult beast to tame.

> The conceptual frameworks of modern physics, chemistry and biology on the one hand and environmental sciences on the other hand do not fit together perfectly. The latter require *learning* [my emphasis] to negotiate between the principles of those modern sciences and of

> both local and social knowledge of environments, neither of which has a place in the conceptual frameworks of those modern sciences (...). Indeed, the conceptual frameworks of those three modern sciences no longer appear unifiable (...).

I can agree with Harding that the interdisciplinary work needed to do environmental studies is hard and involves transgressing both intellectual and administrative barriers. But she is not simply advocating better management of science. She believes that since different cultures intersect nature in non-identical ways that they should or will produce different sciences. (Likewise, men and women would produce masculine and feminine sciences.) And, these sciences are not integratable. ‘‘Different questions produce different answers containing distinctive, sometimes conflicting, representations of nature and, indeed of science, and the representations that conflict do not fit together like pieces of a jigsaw puzzle,’’ Harding writes.

Postmodernists tend to view the world as a collage of images, and believe that the use of reason as a means to gain a unified picture of nature or society is a project that is running out of steam in this, the postmodern age. My view is that the engine is sound but the hill is steep. Politically and culturally Western countries are looking more like collages. Leftist programs to challenge the power of capital have been set back. While it is true that reason and objectivity are not all powerful, it seems to me that in the confusion and frustration of the moment Harding is retreating, rather than finding new paths up.

Emily Martin: Meeting Polemics with Irenics

An irenic, Martin tells us, is like a polemic, only friendlier, and indeed she is. Her article is a search for ‘‘common ground,’’ between the social and natural sciences, and among the social scientists themselves, who, it seems don’t always see eye to eye on questions about the nature of science.

As an example of some of her very interesting work she recounts an experience she had while giving a talk to medical students on how our perceptions of the body are influenced by our culture. Several female students told of how, in their gross anatomy class they were instructed to remove the breasts if their cadaver was female, and dispose of them. Martin encouraged them to pursue the matter.

‘‘At stake,’’ Martin writes, ‘‘is what counts as knowledge and who gets to determine this.’’ If she had said, ‘‘what knowledge counts’’ I would have no qualms. If it were not for the context in which her essay appears, I would pass this over as merely poor wording. But it is at just this point that some of Martin’s colleagues go so far astray. Later in the article Martin too falls into the same trap, but is not snared as badly.

As part of her work on the impact of AIDS on local communities, Martin interviews John Marcellino of Baltimore, Maryland. Marcellino relates his and his community’s fears of the epidemic. In doing so, and she quotes him at length, he gives an analysis of the different social groups in his neighborhood and describes how his people fit in to the larger society and its power structures.

> However compelling the problems Marcellino raises (and the fact that he is able to articulate them), by itself his story would not count as doing ‘‘social science’’. What counts as ‘‘science’’ is in part an effect of institutions (giving credentials, granting authenticity, and so on). By himself Marcellino has none of these things. This is where the institutionalization of feminism in the academy plays a small but crucial role. In this particular example, it is my position in a university, itself made possible by the activities of earlier generations of

> feminists, that gives me the time and resources to talk to people like Marcellino and to publish books and articles (and give lectures) in which I argue that what he says should begin to participate in what counts as social science.

It is a common view, I suspect, among social critics of science that scientists only count as science that which is produced by people with ‘‘credentials’’. To cite but two counter examples, Yuji Hyakutake’s discovery of a comet now bearing his name [5], an event not at all uncommon in astronomy, and of course the Indian mathematician Ramanujan (see for example [6]).

The deeper question though is, is Marcellino ‘‘doing science’’? I believe the answer is no. He is not systematically collecting data or presenting it in verifiable ways. He is engaging in a social analysis that is important. Writing a poem about AIDS might have political, educational and artistic value, but it is not science. If Martin really believes Marcellino is doing science, I would hope that she is giving him a share of her honorariums and royalties. If not, shouldn’t he start talking to a lawyer?

I believe that it is very likely that Marcellino is capable of doing science. If Martin where to work with him and his neighbors, showing them how to conduct and document surveys and focus groups and how to dig through medical records and transcripts of city council meetings and helping them to write reports and papers, then Marcellino would be doing science. Then the mumblings and whinings of the people could become articulate voices for change resonating through the halls of power. But, to say Marcellino is doing science now, is to lock him into his place now. It seems to me that what Martin is saying, is that what Marcellino needs in order to be counted as doing science are someone else’s credentials to piggyback on, rather than training in scientific methodology. If this is her meaning, I cannot disagree more, though I do so respectfully.

Langdon Winner: The Gloves Come Off

Despite his title, I found Winner’s essay quite enlightening. Like Martin’s it is well written and free of jargon. It starts by outlining four broad areas into which science and technology studies tend to fall: (1) the history of science and technology, (2) sociological and political analysis of scientific communities, (3) analyses and critiques of specific technologies (e.g. nuclear power), and (4) philosophical criticisms of how the scientific lookout and technology have effected modern lifestyles and values. He is up front about his own background and political framework:

> My own work, for example, flows primarily from two of these : expressing a desire to confront what I perceive to be a systematic disorder in modern life, a disorder manifest in technology-centered ways of living that I regard as unfriendly to any sane aspiration for human being; and applying concepts and approaches of a particular discipline, political theory, to questions about the significance of technology for political life.

Notice here that there is a clear division between the political agenda and the program of research. They are separated by a semicolon. I find myself wishing to dialog with Winner already. I’d like to know more about his critique of technology-centered modern life. But I also want to tell him that I have strong reservations about his political analysis of the scientific community.

> As David Dickson has noted, the late 1970s and early 1980s ... were years that witnessed a shift in the relationships between science and society. During the previous decade, scientists found themselves subject to pressures to orient research toward national priorities in health

> care, environmental clean-up, and energy research. Many scientists came to believe that the public's influence on R & D had grown too large, that the direction of science by political policymakers had gotten out of hand. Dickson argues that scientists, galled by what they regarded as excessive democratic control of research agendas, were more than willing to form alliances with other sources of social control. Hence, during the Reagan era scientists supported a turn away from research agendas shaped by a sense of social need toward R & D geared to the ongoing military buildup and the quest for ''national competitiveness'' expressed in priorities of business firms.

The reference to Dickson is his book *The New Politics of Science*, Pantheon Books, New York, 1984. Winner's characterization appears to be more one sided than what Dickson claims. Still I find myself in a similar position to the social critics of science. Dickson's claims do not jibe with my own experience, yet I lack the time and background to present a detailed alternative. The issue of the political role of the scientific communities is clearly very important, and characterizations similar to the one above are repeated by other authors in this issue of *Social Text*. I don't trust the objectivity of their analysis, yet a knee-jerk defense of scientists' roles would only make matters worse. An objective analysis of the political functioning of scientists and their organizations would be important to the improvement of democracy and may indeed cause us to develop new ethical norms and more democratic organizational strategies. This it seems to me is an area where serious dialog and debate could be of great use.

Sarah Franklin: Seeing Through the Science Wars

In the movie *Monty Python and the Holy Grail*, there is a scene in which the village people are about to burn a woman for witch-craft. But one of the knights to be intervenes and insist that they must prove that the woman is indeed a witch or let her go. How to do so? Well, what else burns? Why wood burns. And what else does wood do? Why it floats on water. And what else floats? Why a duck floats. Thus, if the woman is a witch she must weigh the same as a duck. Of course! A duck is brought out and it and the woman are placed on opposite sides of a scale. Sure enough, they weigh the same!

By a similar concatenation of fact and fallacy, Franklin shows that the book, *Higher Superstitions*, is linked to the anti-abortion movement. I kid you not. Her article makes Sokal's parody look reasonable. Here is a sentence from her concluding paragraph. ''Like Randall Terry and the Operation Rescue campaigners, Gross and Levitt espouse a paternalistic Right-to-Life discourse concerning the vital essence of the scientific ethos, and the importance of its salvation on behalf of our children's futures.''

Conclusions

Having only read a single issue of this one journal, *Social Text*, it would be premature of me to pass judgement on the entire field of social studies of science. I can say that my initial impressions are as follows. The field seems very uneven. There are serious scholars doing interesting if controversial work and with whom dialogue and debate with the scientific community might well be fruitful. There are also many, including some who are prominent in the field, for whom ideology is paramount over objective scholarship. They seem to view intellectual standards as political barricades. The situation is perhaps analogous to the field of psychometrics (IQ testing) which in my view is dominated by persons with right wing and elitist political agendas. This is not reflective of psychology as a whole or of conservative politics as a whole. Likewise, the unfortunate prominence of some dubious scholarship in the field of social science studies should not be held against the field as whole or be seen as typical of the political left. It is up to rigorous researchers and scholars, of whatever political persuasion, to up hold high standards and expose those whose work does not measure up. It is also important that this be done through normal academic mechanisms and not be used by outside political forces to promote anti-intellectual hysteria. This is tricky as it is equally important in a democratic society for the public to observe and participate in such a process.

What to do?

In the conclusion of their book Gross and Levitt recommend that science and math faculty play a more active role in tenure and curriculum issues in departments of those who attempt to use or evaluate the natural sciences but lack training in them. I would like to suggest some additional avenues. Might not it be possible to develop an ‘‘Introduction to the Natural Sciences’’ course, for graduate credit, aimed at interested humanities students? I admit that it is not easy to see how such a course would be structured. But I think the idea is worth exploring. Another possibility is to have science and math researchers give regular expository guest lectures on their work to humanities and social studies departments. Perhaps inter-departmental ‘‘exchange’’ programs could be negotiated. While I doubt ‘‘hard core’’ postmodernists would be won over, such effects could open lines of communication and narrow the cultural gaps in the academe.

References

[1] *Social Text*, Spring-Summer, nos. 46-47, 1996.

[2] A. Sokal. A physicist experiments with cultural studies. *Lingua Franca, the review of academic life*, May-June, 1996, pages 62-64.

[3] See *The New York Times*, May 18, 1996, front page. Also see Op-Ed pieces by Stanley Fish (May 21) and Edward Rothstein (May 26), and the Letters page of May 23.

[4] See *Social Text's* webpage: *http://www.designsys.com/socialtext*. The response will appear in *Lingua Franca*.

[5] J. Shibley. Astro Forum: Springtime for Hyakutake, *Astronomy*, July 1996, pages 22-24.

[6] G. Andrews. An introduction to Ramanujan's ‘‘lost’’ notebook. *American Mathematical Monthly*, **89** (1976), no. 2, 89--108.

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