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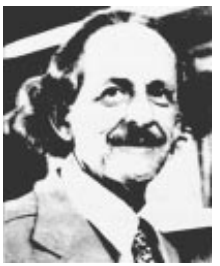

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Can a Science Court Settle Controversies Between Scientists?

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The idea of a "science court" is reexamined. Such a court would be a forum for scientists to evaluate research data, especially in controversial areas of science, and to discuss matters of ethics and protocol in scientific research. Recent, much-publicized events—the investigations into published data from David Baltimore's team and the scramble to publish or replicate cold fusion experiments—are used to underscore the necessity for a self-regulatory process. A science court could settle, or even anticipate, differences between scientists as well as violations of scholarly conduct.

Over two years ago in *THE SCIENTIST*®,[1] I discussed the idea of a science court. The initial proposal for such a "court," as described by one of its chief proponents, Arthur Kantrowitz, Department of Engineering, Dartmouth College, Hanover, New Hampshire,[2,3] involved an adversarial process. Kantrowitz's model called for scientist-advocates to argue all sides of a scientific controversy before a panel of scientist-judges. The issues would have economic, social, or environmental importance to the public—for instance, toxic tort (civil action) cases. The judges would ultimately decide on the merits and weaknesses of the arguments and make their "verdict" public, for government and society at large to use in making policy decisions. Another formulation, by Richard E. Talbott, an attorney with the firm of Hallmark, Keating & Abbot, PC, Portland, Oregon, has just come to my attention.[4] Talbott holds a PhD in physiology and biophysics. His paper is both a useful critique of the original proposal by Kantrowitz and the task force he chaired and a review of the relevant literature. It is quite likely that a future essay will cover Talbott's distinctive perspective on this topic—as both a scientist and an attorney-at-law.

Recent events in the scientific community have suggested to me a science court with a further, or slightly different, function: not to settle arguments between laypeople (that is, society at large) and scientists, but rather to settle disputes between scientists themselves.

Among the issues that could well be tackled by the existence of such a science court are those that relate to scientific misconduct and fraud. An illustrative incident that began to emerge in 1985-1986 (and that has been simmering and occasionally raging ever since) revolves around research conducted at the Massachusetts Institute of Technology (MIT), Cambridge, and published in *Cell* in April 1986.[5] In this particular case, it appears that a researcher (and principal author of the paper), Thereza Imanishi-Kari, now at Tufts University, Medford, Massachusetts, was reported to have modified laboratory notebooks, making the data look much stronger than they actually were. One of the earliest reports on the matter depicts the situation as follows: "The traditional pattern of science has come up against the investigatory instincts of the United States Congress in a clash of cultures in this case that leaves each side dissatisfied with the other."[6]

The case has been particularly newsworthy because of the involvement of one of Imanishi-Kari's coauthors, Nobel Prize winner David Baltimore, Department of Microbiology, MIT. A February update in *Science* reported that Baltimore had been cleared of all fraud charges. However, the report went on to say that officials from the National Institutes of Health (NIH), Bethesda, Maryland, were still demanding

further clarification of scientific details from the research, which has been under investigation since 1986.[7] This investigation continues, as indicated by a recent newspaper article reporting the back-and-forth allegations between the researchers involved, the NIH investigators, and the congressional committee hearing the case.[8,9] In a recent issue of *THE SCIENTIST*, I discuss Rep. John Dingell's (Democrat, Michigan) recent congressional committee hearings about the Baltimore matter. Dingell's rough manner and prosecutorial tone underscore the need for a science court. It should be the business of the scientific community, not Congress, to investigate and adjudicate matters of scientific misconduct.[10]

Another category of disputes that a science court of this nature could tackle involves the priority claims of scientists in research breakthroughs, whether theoretical or experimental. A case in point is the very recent eruption in the scientific and political/economic communities caused by the race to prove the existence of cold fusion.[11] In the news, there have been not only publication priority and patent disputes,[12] but also skeptical and disparaging comments by many members of the science community.[13]

My recent essay on self-promotion[14] also mentions the furor and the preemptive tactics exhibited by members of the scientific community regarding this controversial "discovery." The incident bears repetition, since it poses many questions that we must carefully consider as scientists and as citizens: To what extent can we allow the breakdown of scholarly convention and courtesy in the face of today's urgent (real or perceived) technological and environmental needs? Who should settle priority claims among scientific researchers—their peers or the courts? If their peers, then by what process?

In these illustrative incidents, what seems to have happened is a breakdown of the time-honored rules of scholarly communication. This has been all too well demonstrated in the sensationalism of media coverage surrounding such cases. For example, one recent article—in *Nature*, no less—includes a photograph of University of Utah chemist B. Stanley Pons shortly after a press conference at the American Chemical Society meeting in Dallas, Texas; the caption describes Pons being "pursued by reporters, protected by police"![12] A 1988 story in *THE SCIENTIST* illustrated how these cases can devolve into an unseemly public exchange of accusations and counteraccusations. The story quoted Baltimore's "Dear Colleague" letter, in which he charged Walter Stewart and Ned Feder, the NIH investigators, with "a lack of understanding of the complex serology involved." To this the two NIH scientists responded, "We're fully competent to make the criticisms we have made."[15] It is precisely such situations and arguments that would better be handled—and with more dignity—by scientists themselves. The press could then be brought in to convey the court's findings or conclusions to the public.

The fact that such incidents have aroused so much concern and have caused the intervention of a congressional committee lends support to the idea of expanding the scope of the originally proposed science court. Such an institution of scientific peers would have the proper motives and expertise to settle most issues involving research misconduct or the ethics of scientific work and competition. At the same time, the science court would be answerable to government, scientific sponsoring bodies, and the public at large.

The primary responsibility for responding to changes and maintaining the quality of science rests with scientists and the institutions they represent. To fulfill this responsibility, all scientists and institutions will have to recognize professional standards for the conduct of research, the supervision of trainees, and the privilege of authorship. These and other recommendations, intended to stimulate the research community to provide the accountability now so stridently demanded, are contained in the report from the Committee of the Institute of Medicine on the responsible conduct of research in the health sciences, released earlier this year.[16]

It may be appropriate to conclude with the words of one concerned scientist in a recent discussion of the quality and integrity of scientific research and the importance of socializing young scientists in the ways of sci-

ence. Paul J. Friedman, professor of radiology and associate dean for academic affairs, School of Medicine, University of California, San Diego, called for responsible, ethical science, concluding with this statement:

> It is probably not an exaggeration to say that the way the nation's scientists respond to all these issues [hasty publication, uncollegial behavior, mishandling statistics, biasing results, etc.] will have much to do with the future of scientific research—its quality as well as its public support. If students are not trained in the best traditions of science, those traditions will be lost; the research establishment will look more and more like the defense industry—and it will be regulated accordingly.[17]

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Contemplating a Science Court:

On the Question of Institutionalizing Scientific Factfinding

Reprinted from: *THE SCIENTIST*® 1(6):9; 29, 9 February 1987. Back to Introduction

The past two decades have seen much discussion among legal and science professionals about the competence with which our elected officials decide upon public policy matters that have a scientific or technological dimension. A consensus seems to have formed that the present system of decision making is flawed, that policymakers lack the expertise to weigh complex technical data, and that scientific facts are too often mangled in the political arena, thus rendering rational decisions nearly impossible.

Arthur Kantrowitz has been an articulate proponent of creating a science court designed to improve such decision making. The court would weigh scientific data pertaining to an issue apart from its political and moral considerations. As a current example, the Reagan administration's SDI program is a controversial public policy issue with an obvious scientific and technological dimension. Just as clearly, it has political and moral dimensions. A science court might be asked to render a judgment on the technical feasibility of deploying a shield in space that would guard against incoming ballistic missiles and its economic costs relative to other technical options for achieving the same ends. In this and all other matters put to it, the court would leave aside political and moral questions, such as, should a space shield be deployed?

Central to the concept of a science court is a belief in the utility of separating the technical, verifiable facts of a matter from the political and moral issues it involves. Kantrowitz proposed that the court adopt an adversarial process, in which scientist-advocates would argue the competing sides of a question before a panel of scientist-judges. As in a court of law, the advocates would have an opportunity to question the evidence sub-

mitted by the opposing side. The judges would be trained scientists, though not experts in the particular disputed issue since they would likely have a bias in the matter. Having heard the evidence, the panel of judges would render its decision. But they would not advocate how the technical judgments ought to be acted upon. Kantrowitz also proposed that the decisions of the judges be published so the political community and the public would have a clear statement of the scientific facts in a dispute. With the "best thinking" of the scientific community in hand, the public debate might have a more rational underpinning.

The idea admittedly holds great appeal, especially, I imagine, to professional scientists, who have often seen the politicization of technical matters on which they are expert. So, too, the ideal of seeking scientific truth is a concept congenial to scientists; it is no surprise that Kantrowitz himself is a scientist. The literature in support of a science court rings with enthusiasm and optimism, and the sincerity of proponents' attempts to ameliorate the decision-making process is unquestioned.

However, many have questioned whether it is in fact possible to separate scientific facts from values. Dorothy Nelkin has argued that such separation might be achieved, but only with "issues that are clearly factual, involving simple measurement and little interpretation," which, she added, "are either relatively non-controversial or are dealt with adequately by existing non-adversarial procedures." In other words, the really difficult questions disputed among scientists, and those which Kantrowitz imagined the court would be most helpful in sorting out, generally concern probabilities rather than certainties. Since discussions focusing on probabilities are likely to be influenced [by] values, one begins to doubt that separation of facts from values is possible in the large and controversial issues a science court would hear.

Others have questioned whether the court could truly be free of politics. The Kantrowitz model seems susceptible to political manipulation, especially in administrative matters, such as the selections of judges and advocates and of the exact questions the court would consider. Barry M. Casper has observed that "the very process of separating technical from political and value questions could well involve political and value choices." Refinements of the Kantrowitz model might address these concerns.

But the most serious problem with a science court as Kantrowitz conceived it may be the court's authority. He plainly states that the court would play an advisory role and that its decision would not be binding. While this is the intent, what would be the reality and impact of the court's judgment?

By institutionalizing scientific factfinding in the form of a science court, a decision rendered by the court could well carry greater weight than intended and even unduly shape the ensuing political and moral discussion of an issue. The scientific facts certainly should not be played down; however, considering them first might mean neglecting other and equally important dimensions. The court might accumulate by perception greater authority than Kantrowitz imagined. Barry Commoner and Stephen L. Carter have emphasized in their discussions of the court its inherently undemocratic status as an unelected elite, one that would nonetheless end up wielding great power. They worry that public debate might be inhibited by the pronouncements of a science court. These are only a few of the possible problems of a court that in the real world possesses too much authority.

On the other hand, if the court lacked sufficient authority to command respect for its judgment, what would distinguish it from any other advisory panel? Without a measure of authority, how much would be settled? Dissenters among the panel of judges and scientists and policymakers outside the court would certainly remain active and vocal. It is difficult to imagine any opposition conceding to the court's judgment, packing up its tent, and going home. The complex question of the science court's effective authority has not been adequately considered, in my view.

The proponents of a science court correctly identify certain inadequacies in the current system of deciding public policy issues involving science and technology. But the idea of institutionalizing scientific factfinding in imitation of the legal system's advocates and judges offers, I think, more pitfalls than promise. In particular, the need for judges is questionable. Supporters of the idea of a science court assume that the public is incapable of informed and balanced judgments after hearing both sides of a technical matter. I think the public is educable and well able to make informed and balanced judgments after hearing both sides from scientists.

If professional scientists would become more involved in educating the public and its representatives who are charged with making these difficult technical decisions, the debate might be raised to a level on which political obfuscation is less likely. This, after all, was the goal of Kantrowitz in proposing a science court. I, therefore, place the burden on myself and my colleagues since our specialized knowledge carries public responsibility with it. Although primarily designed for an audience of science professionals and policymakers, THE SCIENTIST, I hope, will also serve in educating the public in the technical aspects of controversial issues.