

LETTERS

The Science Wars Continue, with Debate on 'Fashionable Nonsense'

In his review of our book *Fashionable Nonsense*¹ in your April issue (page 70), N. David Mermin acknowledges that the passages we quoted from Jacques Lacan, Julia Kristeva, Luce Irigaray, and others—in which highly abstruse concepts from mathematics and physics are invoked without any apparent rhyme or reason—“sound like irredeemable rubbish to one who has learned to use in the original contexts the technical terms they employ.” But then Mermin takes us to task for having failed (according to him) to consider the possibility that the authors may have assigned to those words meanings different from the standard scientific ones.

In fact, we *did* search in and around the cited texts for plausible “hidden” or “alternative” meanings, but we were simply unable to find any. (By contrast, our files contain numerous similar quotes that we decided to exclude from the book because, by some stretch of the imagination and with one of us playing devil’s advocate, some conceivable semblance of possible meaning *could* be found in them.) Besides, it would be a remarkable coincidence if a phrase such as “axiom of choice,” “generalized continuum hypothesis,” or “complete set of commuting observables” suddenly acquired in philosophy or the social sciences a meaning different from the standard mathematical one. Finally, as Jacques Bouveresse, a professor of philosophy in the College of France, points out, “One should not invert the burden of proof. It was up to the contested authors, in the first instance, to show that they succeeded in giving a comprehensible meaning to the expressions they used—not to their readers to pull out their hair in order to discover or invent one.” Bouveresse further observes that, in all the debates since the publication of our book, “even the people who most violently protested against the book’s con-

clusions rarely took the risk of defending explicitly one or another of the passages under discussion” by proposing a plausible alternative meaning.²

Mermin makes no such effort either, except in one case: Irigaray’s claim that the symbol + in mathematical logic denotes the “definition of a new term.” Without entering into the merits of Mermin’s rather strained reading, let us stress that this item was a detail of minuscule importance (we included the footnote in part because we knew that scientists reading our book might otherwise have pointed out this mistake to us). And by singling out this one example to the exclusion of all others, Mermin gives a grossly misleading impression of the kind of verbiage that we were criticizing. Here is a more typical example, taken from the very same Irigaray passage: “According to the semantics of incomplete beings (Frege), functional symbols are variables found at the boundary of the identity of syntactic forms and the dominant role is given to the universality symbol or universal quantifier.”³

This kind of language raises two issues. The first, which Mermin never seems to consider, is: What are the intended readers of this text—who obviously are not mathematicians or logicians—supposed to make of it, apart from being impressed? Second, in the same passage,³ Irigaray opposes quantifiers (“there exists,” “for all”) to what she calls “qualifiers,” apparently not realizing that quantifiers in logic have nothing to do with the opposition between quantity and quality; moreover, in her attempt to expose the sexist bias in pure mathematics, she claims that the universal quantifier (“for all”) exercises a “dominant role” over the existential one (“there exists”), whereas in reality their roles in logic are completely symmetrical. All this makes us strongly doubt that Irigaray herself understands what she is talking about.

Mermin concludes by asserting—without, however, providing any empirical evidence—that “instead of narrowing an unfortunate breach between two scholarly communities, this book will broaden it.” Even if that were true, it would be irrelevant to the evaluation of our arguments; we wrote our book as intellectual com-

Letters submitted for publication should be sent to Letters, PHYSICS TODAY, American Center for Physics, One Physics Ellipse, College Park, MD 20740-3843, or by e-mail to p1etter@aip.org (using your surname as the “Subject”). Please include your affiliation, mailing address, and daytime phone number. We reserve the right to edit letters.

Advanced Instruments For The World



Instruments

Gage DMO - Deep Memory Oscilloscopes

- ✓ 1 Billion Samples Memory
- ✓ 8 Channels ✓ 100 MS/s

GageLab DSO - Digital Storage Oscilloscopes

- ✓ High Resolution ✓ Fast Sampling
- ✓ Deep Memory ✓ Built-in Computing

LapScope

Combining the Power of Laptop PCs and Oscilloscopes

Board Level Products

- 500 MS/s A/D Cards for PCI Bus
- 12 Bit, 100 MS/s A/D Cards
- 32 Bit, 100 MHz Digital Input Cards
- Analog Output Cards up to 80 MHz

GageScope for Windows

World's Most Powerful Oscilloscope Software

Powerful plug-ins for:

- ✓ FFT ✓ Waveform Parameters
- ✓ AutoSave ✓ Averaging

CALL 1-800-567-GAGE

Ask for extension: 3469

GaGe

GAGE APPLIED SCIENCES INC.

1233 Shelburne Road, Suite 400
South Burlington, VT 05403

Tel: 800-567-GAGE Fax: 800-780-8411
e-mail: prodinfo@gage-applied.com

From outside U.S. call 514-633-7447 or Fax 514-633-0770

www.gage-applied.com/ad/phys799.htm

mentary, not as group therapy for the professoriate. But above all, it seems to us that communities of scholars are brought together by serious and well-informed discussion of issues of common interest—for example, concerning the philosophy of science or the social effects of science and technology—and not by displays of false erudition.

It is especially ironic that rather negative reactions to our book have appeared in some scientific journals and magazines (PHYSICS TODAY is not the only example), while very favorable reviews have appeared in some nonscientific ones. Where Mermin accuses us of widening the gap between scientists and humanists, Bouveresse praises our effort to denounce pseudoscholarship in the humanities and draws attention to one enormous gulf of misunderstanding between the “two cultures”: Whereas our background as scientists should allow us to understand the technical concepts invoked by Lacan and others, were they to make any sense, we face people who, without having any scientific competence, “nevertheless claim that what they do not understand may actually very well be understood.”² These comments, and many similar ones coming from the nonscience side, indicate that our exposure of nonsense is not regarded there as totally useless or fundamentally unfair, and that not all people in the humanities consider us, as Mermin fears, “every bit as naive, simple-minded, self-important and ridiculous” as our “victims.”

References

1. Originally published in French as *Impostures Intellectuelles*, Editions Odile Jacob, Paris (1997); subsequently published in English and distributed in the US and Canada as *Fashionable Nonsense: Postmodern Intellectuals' Abuse of Science*, New York, Picador (1998), and in Commonwealth of Nations countries (other than Canada) as *Intellectual Impostures: Postmodern Philosophers' Abuse of Science*, London, Profile (1998).
2. J. Bouveresse, *Le Monde Diplomatique*, August 1999, p. 27.
3. L. Irigaray, *Hypatia* 2 (3), 65 (1987).

JEAN BRICMONT

(bricmont@fyma.ucl.ac.be)
Catholic University of Louvain
Louvain-la-Neuve, Belgium

ALAN SOKAL

(sokal@nyu.edu)
New York University
New York, New York

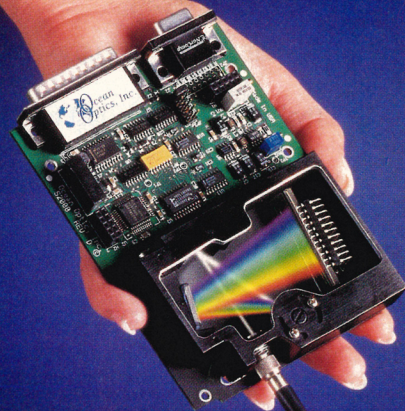
With many of my colleagues in physics, and in the humanities as well, I have been saddened by the “science wars” that were rudely brought under public scrutiny by the

publication of Alan Sokal's hoax in the spring/summer 1996 issue of *Social Text* and that now seem to have permeated much of academia. N. David Mermin's review of the new Sokal/Bricmont book raises the issue again of whether the use of scientific language in nonscientific inquiry, where it appears to have no rational context and serve no discernible purpose, may yet be part of a meaningful dialogue—albeit one that is essentially opaque to precisely those academics (scientists) who might conceivably understand the turgid prose.

My feeling on this matter is somewhat at odds with Mermin's. He would give the widest latitude to the postmodernists in their conscripting of scientific jargon. The onus would appear then to fall on Sokal and Bricmont and their like-minded colleagues (among whom, for that matter, I would almost certainly include Mermin) to do more than, as it were, shoot fish in a barrel. Mermin's point, as I understand it, is that it is an essentially trivial exercise to fault the writers in question on the mere face of their prose, however much they may constitute a veritable pantheon of postmodernist thought. The real job that needs to be undertaken, and the one he claims was neglected by Sokal and Bricmont, is to answer the question, “To what extent has the broader setting from which the excerpts have been extracted [by Sokal and Bricmont] loosened or shifted the conventional meaning of the technical terms?” Now that is a tall order indeed, and it's really a bit much to ask theoretical physicists Sokal and Bricmont to take on the task of tidying up the language in another field, and exploring in detail how apparently meaningless prose is really a serious extension of our conventional scientific vocabulary. In fact, Sokal and Bricmont are careful to explain, in their preface to the English-language version of the original French edition, exactly the task they set themselves. Moreover, as the book demonstrates, they have admirably carried out that task (sometimes to exhaustion). As for the larger task proposed by Mermin, that might well be left to sturdier souls.

Following the appearance of Sokal's *Social Text* article and the furious rebuttals that immediately ensued, Edward Rothstein commented in the 26 May 1996 issue of the *New York Times* that what was on exhibit was nothing less than a severe case of science envy. And three years later, there is surely a strong component of that in the ongoing debate. Nonetheless, there also remains a real need

Optical-sensing Solutions



The World's First Miniature Fiber Optic Spectrometer offers remarkable performance at an affordable price, with unmatched flexibility ...

- **High detector sensitivity -- ideal for low light level experiments from 200-1100 nm**
- **Great system stability -- ± 0.001 AU over extended periods**
- **Excellent optical resolution -- to < 0.5 nm (FWHM)**
- **Flexible integration times -- 4 milliseconds to 60 seconds**
- **Remarkable unit durability -- no moving parts**

Custom spectrometers, application-specific systems and OEM components from the leader in miniature modular spectroscopy



Ocean Optics, Inc.

Tel: (727) 733-2447

Fax: (727) 733-3962

E-mail: Info@OceanOptics.com

Web: www.OceanOptics.com

AVS Show—Booth #932

Circle number 11 on Reader Service Card

for serious study of science and its methods, its funding, its politics (yes, politics!), and even its sociology. However, for that endeavor to proceed usefully, it is essential that we get past the awful prose and meaningless pseudoscience—and outright anti-science—that currently suffuse too much academic writing. As Mermin suggested in his review, what is needed most here is a narrowing of an “unfortunate breach between two scholarly communities.”

SIMON C. MOSS

(smoss@uh.edu)

University of Houston
Houston, Texas

As a mathematician with a keen interest in the social sciences and the humanities, I was appalled by the arrogant contempt toward these disciplines displayed by physicist N. David Mermin.

Mermin openly admits with commendable honesty that he does not believe in the possibility “that the formal languages of contemporary physics and mathematics may fruitfully be employed in disciplines far from those for which they were originally developed.” But he goes much further, and alleges that “Alan Sokal and Jean Bricmont share my prejudice that such efforts are futile.”

For someone like me—who believes this particular “prejudice” to be utterly groundless, as well as a deplorable manifestation of the inability by some practitioners of the “superior” exact sciences to appreciate and respect the intellectual achievements of those other areas that they tend to look down on—to attribute such an unfair view of the humanities to an individual is a very serious charge that carries (to use Mermin’s own phrase) “a scholarly and, indeed, a moral obligation to make a serious effort to come to terms with the offending texts.” I have enough confidence in Mermin’s power of introspection to be willing to take at face value his acknowledgment of his own guilt. However, when he attributes a similar view to Sokal and Bricmont, he certainly fails to fulfill his own “moral obligation” to substantiate such an improbable charge. What is more, I have read the Sokal/Bricmont book rather carefully and have found nothing to suggest that the authors share Mermin’s view, but much to indicate that they do not.

Near the end of his review, Mermin writes that for “those who take seriously the nontechnical writings of the authors under attack here,” it will be easy “to read Sokal and Bric-

mont as every bit as naive, simple-minded, self-important and ridiculous as their victims will surely appear to most readers of PHYSICS TODAY.” From this assertion, he draws the conclusion that “instead of narrowing an unfortunate breach between two scholarly communities, this book will broaden it.”

For this conclusion to follow, one would have to believe that “those who take seriously the nontechnical writings of” authors such as Jacques Lacan, Julia Kristeva, or Bruno Latour are truly representative of the scholarly communities of psychologists, literary critics, and philosophers. Such a belief is as ludicrous as if one were to claim that those physicists who criticize the alleged discoveries of Jacques Benveniste on the memory of water and the way they are supposed to lend support to homeopathy, or the medical uses of quantum mechanics by Deepak Chopra and the Christian Scientists, are actually helping to broaden the gap between the physics community and the medical community, because somehow the medical community endorses the view of Benveniste and company and is unsympathetic to outsiders who dare to criticize them.

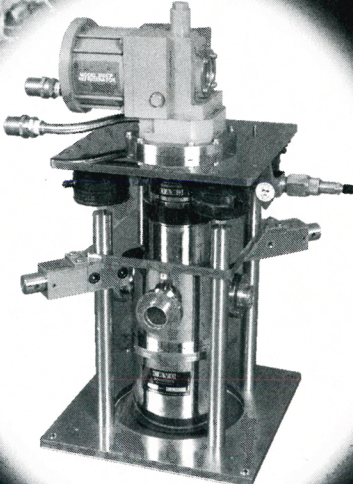
When physicists criticize Latour or Jacques Derrida, they are not criticizing the whole community of philosophers, nor even the much smaller and highly eccentric community of French philosophers. After all, most philosophers worldwide, including serious French philosophers such as Jacques Bouveresse, agree with such criticism. When Sokal and Bricmont criticize the psychoanalyst Lacan, some individuals who take Lacan seriously may well be offended, but the community of psychologists will not be. Most psychologists are not psychoanalysts, and most psychoanalysts are not Lacanians.

It is not because of the truth telling by Sokal and Bricmont that the breach between our two communities is going to be broadened, but rather as a result of the implicit suggestions made by physicists like Mermin that the ideas of Lacan are taken seriously by a substantial part of the community of psychologists, or that Latour’s theorizing on relativity is representative of the intellectual quality of most philosophical work. I am sure that most members of the social sciences and humanities communities will be delighted that physicists such as Sokal and Bricmont share their concern for intellectual integrity and are willing to get involved and help

continued on page 120

CRYO INDUSTRIES

Cool
It!



- Cool it with a CRYO closed cycle refrigerator. No liquid helium or nitrogen required. Plug it in and Play!
- Large selection of models for a perfect match to your requirements. Cooling capabilities down to 1.5K.
- Optical, tubular and custom cryostats. Sample in vacuum, exchange gas or vibration isolated.
- Available with integral superconducting magnets. Fields to 14 Tesla and still Cryogen Free!

**CRYO Industries
of America, Inc.**

(603) 621-9957
(603) 621-9960 Fax
cryo@cryoindustries.com
www.cryoindustries.com

AIP APS CONGRESSIONAL SCIENCE FELLOWSHIPS 2000-2001

THE AMERICAN PHYSICAL SOCIETY AND THE AMERICAN INSTITUTE OF PHYSICS are currently accepting applications for their Congressional Science Fellowship Programs. Fellows serve one year on the staff of a senator, representative or congressional committee. They are afforded an opportunity to learn the legislative process and explore science policy issues from the lawmakers' perspective. In turn, Fellows may lend scientific and technical expertise to public policy issues.

QUALIFICATIONS include a PhD or equivalent in physics or a closely related field, a strong interest in science and technology policy and, ideally, some experience in applying scientific knowledge toward the solution of societal problems. Fellows are required to be U.S. citizens, members of one or more of the AIP Member Societies for the AIP Fellowship, and APS Members for the APS Fellowship.

TERM OF APPOINTMENT for both fellowships is one year, beginning in September of 2000, with participation in a two-week orientation. Choice of congressional assignment is reserved to Fellows.

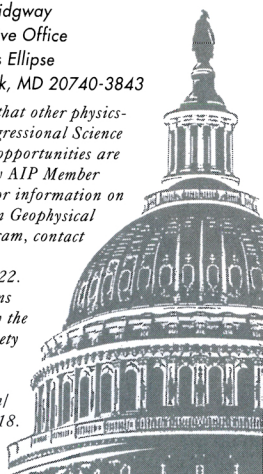
A STIPEND of up to \$49,000 is offered, in addition to allowances for relocation, in-service travel, and health insurance premiums.

APPLICATIONS should consist of a letter of intent, a 2-page resume, and three letters of reference. Please see either the AIP website (<http://www.aip.org/pubinfo/>) or the APS website (http://www.aps.org/public_affairs/fellow.html) for detailed information on materials required for applying and other information on the programs. Unless otherwise specified in the letter, the applicant will be considered for both APS and AIP fellowships.

ALL APPLICATION MATERIALS MUST BE POSTMARKED BY JANUARY 15, 2000 AND SHOULD BE SENT TO THE FOLLOWING ADDRESS:

APS/AIP Congressional Science
Fellowship Programs
c/o Erika Ridgway
APS Executive Office
One Physics Ellipse
College Park, MD 20740-3843

Please note that other physics-related Congressional Science Fellowship opportunities are sponsored by AIP Member Societies. For information on the American Geophysical Union program, contact Daryl Tatel 202-939-3222. For programs sponsored by the Optical Society of America, contact Liz Baldwin 202-416-1418.



LETTERS (continued from page 15)

those who strive for the highest standards of scholarship.

HECTOR J. SUSSMANN
(sussmann@hilbert.rutgers.edu)
Rutgers University (Busch campus)
Piscataway, New Jersey

In his review, David Mermin makes an excellent point: Sokal and Bricmont cannot persuade by merely launching "a barrage of jocular declarations" against those postmodern intellectuals whom they view as publishing nonsense. They must also describe the postmodern intellectual's dictionary and show that even when viewed in the appropriate context the cited material remains nonsense.

While I agree completely with Mermin's comments, it does seem to me that the very publication in *Social Text* of Sokal's nonsensical paper answers, to some extent, Mermin's criticism: Why did Sokal—ignorant of the postmodern dictionary—succeed in publishing his hoax? Only, I suspect, because his targets regularly publish rubbish.

DAN T. ABELL
(dabell@bnl.gov)
Brookhaven National Laboratory
Upton, New York

N. David Mermin misses the strength of the authors' argument. Every scholar has an obligation to present the details of his methods and sources so that his work can be independently evaluated. If the postmodernists are actually giving new meanings to the familiar technical terms they use, and new technical meanings to everyday words and phrases, as Mermin suggests in their defense, then they must fully describe and explain their new vocabularies for their readers. Their failure to do so would be irresponsible, and reason enough for them to forfeit their right to be taken seriously.

The Sokal/Bricmont argument is actually stronger than this. Alan Sokal's famous hoax did more than make the postmodernists a laughing-stock. It also performed a Turing-like test to decide whether there is intellectual substance behind their impenetrable prose—and found that there is not. Unfortunately, it will be impossible to repeat this experiment because postmodernist journals are now suspicious of submissions from outsiders.

The only reasonable conclusion is that postmodernism is nothing more than a scheme to obtain cushy university jobs for its practitioners, and that raises a serious question: Why haven't university departments in the humani-

ties and social sciences been able to recognize this scheme for the transparent scam it is? Don't they have a nose for cowpatties at all? And, if not, can we trust anything they do?

JONATHAN KATZ
(katz@wuphys.wustl.edu)
Washington University
St. Louis, Missouri

MERMIN REPLIES: The general characterizations in my review ("irredeemable rubbish," "manifest nonsense on an almost lunatic scale") indicate how the passages cited in *Fashionable Nonsense* struck me, and I believe this is how they are likely to strike most physicists and mathematicians who read them as physics or mathematics. My inclusion of a less bizarre specimen, which Jean Bricmont and Alan Sokal (B&S) find grossly misleading, was to illustrate why I thought readers without such technical expertise might find some of B&S's more accessible jibes superficial when directed at specimens that use a vocabulary comprehensible to a lay person.

I criticized B&S's book not because I believe there is sense to be found in the passages they cite, but because I suspect that their style of argumentation will be ineffective in convincing readers who admire the broader writings of the targeted authors that those authors produce "cowpatties" (as Jonathan Katz puts it) when they turn their attention to physical science and mathematics. It's hard to persuade people to trust your judgment on highly technical examples, if your treatment of some simpler cases raises doubts.

The example in B&S's letter is similarly flawed. You and I and (I make bold to guess) B&S may all suspect that a "dominant role" in "the semantics of incomplete beings" is another cowpatty, but it would appear to be central to whatever point Luce Irigaray is trying to make about quantifiers. Who is going to be persuaded that Irigaray doesn't understand what she is talking about, by a remark about the completely symmetrical role of existential and universal quantifiers in formal logic, in the absence of even a nod to those incomplete beings?

It's not surprising that many humanists who were appalled by postmodernism long before its scope expanded to include technical matters should give B&S a sympathetic reading. But although Hector Sussmann does not know any and clearly finds them hard to imagine, there are scholars of intelligence and good faith who do take seriously what many of B&S's

AMERICAN INSTITUTE OF PHYSICS

Physics Management Fellow

AIP has a fellowship in non-profit management for a recent PhD in physical science or engineering. As an Assistant to AIP's CEO/ Executive Director, the Fellow will be actively involved in serving the physics community while gaining experience in administration and management. This is a one year, renewable fellowship.

Requires strong organizational & writing skills, ability to function under pressure of multiple priorities, and familiarity with current issues affecting the physics profession. Interest in science policy and industry/academia interactions is a plus.

Located in AIP's headquarters (College Park, MD) close to the metro. Competitive salary and benefits; on-site child care and fitness centers. Reasonable relocation expenses will be reimbursed.

If interested, please send cover letter, resume and the names of three references to:

Alice L. Gersh,
Human Resources
Department,
American Institute
of Physics,
One Physics Ellipse,
College Park, MD
20740-3843
Fax: 301-209-0847
E-mail: aiphr@aip.org

EOE/AA

cited authors have to say in their own fields. Such scholars will want evidence that B&S have made a serious effort to learn their rather arcane language, before accepting B&S's claim that it fails disastrously when applied to physics or mathematics. No such evidence is to be found in *Fashionable Nonsense*. You don't have to be a fan of Irigaray, Jacques Lacan, or Bruno Latour to find B&S's level of argumentation ineffective.

Of course, if you believe with Katz that the whole postmodernist thing is just a scam, or with Sussmann that only cranks and crackpots take postmodernists seriously, or with B&S that postmodernists are cynically engaged in "displays of false erudition," then there is no point in trying to make a more effective case, because there is nobody on the other side worth persuading or capable of being persuaded. I don't believe that, and even those who do might give a little thought to those in the middle who are wondering whether anybody in either camp knows how to put together an argument.

DAVID MERMIN
Cornell University
Ithaca, New York

Canada Lacks Science Equipment, Funding

According to your May issue (page 60), the decision to build the Canadian Light Source (CLS) will cause Canada to "lose the dubious distinction of being the only Group of Seven (G-7) country without its own synchrotron light facility." Canada still holds another such dubious distinction, that of being the only G-7 country without a fusion research program. It's also poor in several other classes of scientific equipment, its scientists are paid less than those of any other G-7 country, and its annual science budget is only about one-quarter of that of the UK or France, despite having a comparable per capita income and half the population of either of them. And contrary to the situation in other nations, but as exemplified by the case of the private funding for the CLS, the bizarre new policy of the Canadian government is to pay only a fraction of the cost of facilities, thereby forcing the country's scientists to try to put together complicated financing schemes involving provincial and local authorities and private business.

BERNARD TERREAU
(terreau@inrs-ener.quebec.ca)
University of Quebec
Varenes, Quebec, Canada

More on Approaches To Teaching Physics

In their article "Teaching Physics: Figuring Out What Works" (PHYSICS TODAY, January, page 24), Edward Redish and Richard Steinberg rediscover two principles well established at least a decade ago that physicists seem to have ignored. The first, as demonstrated in a 1989 videotape made by Matthew Schneps, is that presuppositions are tenacious and subvert learning science.¹ The second, as demonstrated in a 1959 book written by M. L. J. Abercrombie, is that what Redish and Steinberg call "interactive engagement classes" undermine presuppositions.² Abercrombie also told us something that Redish and Steinberg do not: *how* the second principle attacks the first principle.

References

1. M. Schneps, *A Private Universe*, Pyramid Film and Video, Santa Monica, Calif. (1989).
2. M. L. J. Abercrombie, *The Anatomy of Judgement*, Penguin, Harmondsworth, England (1959). For a synopsis of Abercrombie's findings, see K. A. Bruffee, *Collaborative Learning, Higher Education, Interdependence, and the Authority of Knowledge*, 2nd ed., Johns Hopkins U. P., Baltimore (1999), p. 144.

KENNETH A. BRUFFEE
(kbruffee@brooklyn.edu)
Brooklyn College
Brooklyn, New York

REDISH AND STEINBERG REPLY: We certainly agree that many of the principles that underlie our philosophy have roots deep in history, from Socrates to John Dewey. Unfortunately, these ideas have had little impact on college physics instruction. Even if one knows the principles stated by Kenneth Bruffee, one may still be hard pressed to create interactive engagement activities that successfully deal with student "presuppositions." (For example, contrast the positive Workshop Physics results presented in our PHYSICS TODAY article with the disappointing Studio Physics results reported by Karen Cummings and coworkers.¹)

Reference

1. K. Cummings *et al.*, Phys. Ed. Res. Suppl. 1 to Am. J. Phys. **67**, S38 (1999).
EDWARD F. REDISH
(redish@physics.umd.edu)
University of Maryland, College Park
RICHARD N. STEINBERG
(rstein@scisun.sci.cuny.edu)
City College of New York
New York, New York ■