

the article.

Poiseuille's law for blood flow and Hooke's law for elasticity have nonetheless been widely accepted in the neurosurgical literature and have been successfully applied to cerebrovascular diseases such as aneurysms¹ and arteriovenous malformations.² I would like to suggest that King consult the references cited in this letter for a more appropriate and current review of the applications of blood flow and elasticity to biological systems than the 45-year-old review articles he cites.

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Labs Collaborate on ICF Research

The Search and Discovery story on inertial confinement fusion (September 1994, page 17) gave an accurate picture of this exciting, formerly classified frontier of research. One of the most important aspects of the ICF research is the nationally cooperative nature of the program. Los Alamos National Laboratory, Sandia National Laboratories and the University of Rochester also perform a significant number of experiments on the Nova laser at Lawrence Livermore National Laboratory. Los Alamos, in particular, has been key to resolving a number of critical physics issues for ignition, has pioneered state-of-the-art modeling for hohlraums and fundamental physics and has used its state-of-the-art fabrication capability to further Nova target manufacture and cryogenic research.

Los Alamos has made significant contributions to experimental campaigns on Nova addressing both radiation drive symmetry¹ and laser plasma instabilities.² Both issues are critical to being able to predict ignition-target performance confidently. Within the symmetry campaign, Los Alamos and Livermore collaborated on understanding time-independent drive symmetry¹ by measuring x-ray images of capsules imploded under a variety of drive conditions on Nova. Recently Los Alamos has taken the

primary responsibility for extending this research to encompass time-dependent characterization of drive symmetry.³ Two separate techniques developed at Los Alamos were proved successful through an extensive series of experiments on Nova. These techniques should also prove useful for understanding and hence being able to control radiation drive on the proposed National Ignition Facility.

For the ICF program and NIF to accomplish their missions within DOE defense programs, it is widely recognized that there must be broad national participation. In particular, for NIF to achieve its mission within the Science-Based Stockpile Stewardship Program, there must be significant involvement of all the nation's nuclear weapons laboratories. Los Alamos and Livermore have forged a productive collaboration that is expeditiously addressing the physics issues crucial for ignition. With the recent declassification of much of the ICF program, both laboratories are now working to extend the collaborations on ICF to universities in the US and institutions around the world.

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Photon Tunneling Goes Back in Time

The wording of the Optical Society of America's Engineering Excellence Award to John Michael Guerra for "the invention and development of the photon tunneling microscope" (December 1994, page 81) leaves out some history. Photon tunneling in microscopy is not new. Mechau¹ and later I² made microscopes that observed the topography of a specimen by the way it frustrates internal re-

flection at a nearby surface. Local specimen height is given by a non-linear gray scale of intensity in the image. Mechau's instrument used unidirectional illumination and had a severely tipped image plane. Mine was axially symmetric, used illumination from all azimuthal angles and had the resolution of a high-aperture microscope.

Guerra's big contribution was to use a computer to process the image from Mechau's optics and then the image from mine (properly acknowledged in his articles³) to make it easier to interpret. The result is spectacular. The processed image looks like a landscape. A second advance made by Guerra was to use a flexible internal-reflecting surface that more easily gets within frustrating distance of the specimen. These improvements promise to make Guerra's instrument a standard method of microscopy.

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'Shrinking Science' Revisited

The letter on "shrinking science" by Adam Frank (February, page 11) is grimly familiar and totally convincing. But one remark, "I have always thought that science, like art, is our society's way of looking outward beyond the details of everyday commerce," stood out and seems worth commenting upon. It is precisely the details of everyday commerce that always did generate the surplus revenue that funded science, and it is lack of attention to those details that has resulted in our stumbling economy, gradually imperiling physics and practically everything else that makes life interesting.

Lest that remark be misunderstood, let us insist upon the fact that it is not the shortcomings of American science that have resulted in the loss of our manufacturing base, the loss that is so apparent every time one goes to a hardware or electronics store and finds that everything one

wants to buy is imported. It has been to a considerable extent the vitality of American science that has provided the techniques and inventions that other countries have developed, particularly in Asia, and that have displaced American manufacturing superiority. Many American patents were bought, hat in hand and for the asking price, from American companies that did not want to make the long-range effort necessary to develop them into products for the market.

The difficulty seems systemic and philosophical, rooted in the next-quarter's-bottom-line mentality of corporate America. To try to change that mind-set to something more forward looking seems both difficult and dangerous, because the commitment to it is deep, sincere and irrational. But physicists only accept at their peril the widespread notion, seemingly very prevalent in Congress, that it is somehow their fault—for not being “practical” enough—that American industry has lost its edge. Maybe for a few decades the smart people went into physics, leaving the corporations and the agencies to be run by those who weren't up to the job.

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Right to Reply? Writer Replies

Jack Sandweiss, the editor of *Physical Review Letters*, concludes his defense of *PRL*'s selection policy (April 1994, page 15) by stating that the journal is seeking to make the system work even better. May we suggest introducing something many would consider essential for any scientific journal, but which is apparently missing from present *PRL* policy—a guaranteed right of reply in the journal to criticism published in *PRL*? It is necessary to ask for this right to apply whether or not the criticism is designated as a “comment.” According to correspondence we have had with *PRL* editors regarding a comment on one of our *PRL* papers, current procedure allows a comment to be “restyle” as a “stand-alone letter,” thus permitting a response forwarded as a reply to this “letter” to be rejected as though it were itself a comment.

The benefits of right of reply are self-evident. Criticism is fine. A strong reply might refute the criticism. A weak reply would tend to endorse it. In either case, understanding

—which is after all the reason for the journal's existence—should move forward. As things stand, absence of a reply could reasonably be taken to imply that the authors of the original work have no response to make, even when they may in fact have attempted vigorously to respond to what they see as misunderstandings and factual errors.

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SANDWEISS REPLIES: The general question of comments and replies is one of those areas in which different desiderata are most often in conflict. The present policy in *Physical Review Letters* requires that a comment either correct or criticize the letter to which it refers. Clearly such corrections or criticisms are important to the readers of the journal. Comments that extend or amplify the letter would also be of value, but the practical complications have led us to exclude such comments.

When a comment is received, the authors of the “target” paper have the right to see the comment before it is published and to submit a reply. The comment and the reply are subject to peer review and may or may not be accepted. In most cases, but not all, a published comment is accompanied by a reply. When a regular letter criticizes a target paper, the comment-reply format is not used, but the authors of the target paper have the right to submit a comment on the critical letter.

Duncan Bryant and his colleagues believe that those authors should have a guaranteed right of a published response, which means that there would be no peer review of the response. We believe that this is not in the best interests of physics, nor is it the best use of space in *Physical Review Letters*. The referees and the editors may be convinced that nothing is added to the discussion by the response. Finally, I note that the authors of any response that is rejected have the right to appeal that decision to a divisional associate editor and, if necessary, to the editor-in-chief of the American Physical Society's publications.

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Reflections on Adel, Lawrence

Seeing the account of the death of Arthur Adel (May, page 83) reminded me of an incident during the summer of 1933. I was then a beginning graduate student at the University of Michigan, which was well known for its summer program in physics.

Ernest O. Lawrence, who had received the Nobel Prize for his work on the cyclotron, was at Michigan helping the staff and students construct and assemble the university's new cyclotron. One evening Adel was giving a lecture based on the research he had completed for his PhD. His topic was the composition of planetary atmospheres. In the course of his lecture he used the word “albedo.” In a room packed with senior staff members, graduate students and a few Nobel Prize winners, Lawrence said: “Excuse me. I should have known, but what does ‘albedo’ mean?”

That incident taught me a lesson that has stayed with me, although of course it was not so intended. Will Rogers remarked, “You know everybody is ignorant, only on different subjects.” It is a lesson we could all take to heart.

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Why Do Vines Twine?

The May 1995 issue (page 26) carried interesting information about how a baseball curves. Now I would like to read a similar article about why “twining vines” twine. It has nothing to do with the Coriolis force; neither is it determined by touch. Who knows?

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Correction

September, page 89—George Smoot was incorrectly identified as “COBE project director” in the review of Alan Dressler's *Voyage to the Great Attractor*. John Mather directed COBE as project scientist; Smoot was principal investigator on the differential microwave radiometer. ■