merely exists at the fringe of the real world. I disagree. As I explicitly said, "of those who continue to do research within academic physics, more choose to work in areas allied with today's and tomorrow's technology . . . than to pursue answers to eternal questions." Mertens correctly observes that much research in the private sector is proprietary—silent and secret and invisible in his words, and I would add inaccessible to journalists—and goes on to fear for the loss of physics's independence. But that is precisely the point: In the halls of academic institutions, that beautiful, independent, comprehensive edifice of physics will, we hope and trust, perpetuate itself for many generations to come; once beyond those halls, however, the tools of the physicist are put to other tasks, even magazine publishing, and the sharp image of a physicist doing physics gets blurred. I for one will no longer think of physicists changing their self-identification as "curious," even as I continue to seek them in all their guises.

The class taught by John Hauptman and Jennifer Lowery sounds like more than just a terrific way to reach students. It offers a way for all of us, whether in or out of academia, to talk easily about physics with our friends and neighbors, with taxi drivers and pedestrians. Wouldn't it be nice to collectively raise the visibility of our favorite discipline, and perhaps even demonstrate some of its relevance to the population at large? I think so.

Stephen G. Benka
PHYSICS TODAY
College Park, Maryland

Windows and credit in irreversibility

In their fine Reference Frame "Microscopic Irreversibility and Chaos" (PHYSICS TODAY, August 2006, page 8), Jerry Gollub and David Pine remark that they don't know why there is a threshold for irreversibility in the Taylor fluid rotation experiment. They also ask whether the origins of microscopic irreversibility can be usefully explored for other areas of physics. Recent experiments on the composition dependence of reversibility in glass transitions have uncovered surprising new effects that are relevant here.

It is often assumed that glasses have not crystallized because they are mixtures of different compounds that have not been able to phase separate during quenching—in other words, that glass formation is primarily a kinetic phenomenon related to chemical chaos. However, several compounds—silica (SiO_2) and arsenic sulfide (As_2S_3), for example—are good glass formers even when pure. Similarly, it has long been supposed that all glass transitions are irreversible, with the degree of irreversibility varying slowly with composition. Using phase-modulated calorimetry, Punit Boolchand and colleagues found that network glass alloys show a reversibility window, with abrupt edges (thresholds).[1] Outside the window the degree of irreversibility does vary slowly with composition, but within the window the irreversibility is smaller than outside by a factor of 10.

Theoretical models at present are primitive and merely relate the reversibility window not to dynamics and boundary conditions, as in hydrodynamics, but to statics and space filling. It may be that a better understanding of reversibility will be found not in fluids but in glasses, with a theory that includes hydrodynamic concepts.

Reference

1. S. Chakravarty, D. G. Georgiev, P. Boolchand, M. Micoulaut, *J. Phys. Condens. Matter* **17**, L1 (2005).

J. C. Phillips
(jcphillips8@comcast.net)
Rutgers University
Piscataway, New Jersey

Jerry Gollub and David Pine have forgotten, or perhaps never knew, that the movie they credited to G. I. Taylor was inspired by one made by the gifted applied physicist John P. Heller as part of research he published in the *American Journal of Physics* (volume 28, page 348, 1960) and elsewhere. For the low Reynolds number flow film for which Taylor was recruited by the National Committee for Fluid Mechanics Films, Heller's demonstration was recreated without acknowledgment.

Having spent his career unsung in the old Mobil R&D laboratories in Dallas, Texas, Heller was not anointed for the recognition he deserved.

L. E. "Skip" Scriven
University of Minnesota
Minneapolis

Gollub and Pine reply: We appreciate the intriguing note from J. C. Phillips pointing out a possible connection between the reversible regime in oscillating Couette flow containing particles, as we discussed, and the window of reversibility and lack of aging seen in alloy glasses for certain compositions. In very recent work to be published soon on the fluid case, Laurent Corté and colleagues at New York University have noted that the particles in the reversible suspension self-organize until further structural evolution ceases—that is, the suspension also becomes "non-aging." (Further information may be obtained from the authors.) Whether the underlying physics of these two reversible states is actually similar remains to be seen, but we agree with Phillips that it is worth considering.

We regret not having referenced John Heller's demonstration of reversible low Reynolds number flow, of which we, and others, were unaware.

Jerry Gollub
Haverford College
Haverford, Pennsylvania
David Pine
New York University
New York City

Planning needed for US nuclear weapons

Jim Dawson's Issues and Events piece "Future of US Nuclear Weapons a Tangle of Visions, Science, and Money" (PHYSICS TODAY, February 2007, page 24) piqued my interest. I agree with Bruce Tarter, the former director of Lawrence Livermore National Laboratory, whom Dawson quotes: If the proposed new bomb, the Reliable Replacement Warhead, is to survive 12 Congresses and as many as four administrations, the National Nuclear Security Administration (NNSA) had better have a detailed plan in place. The fact that the House of Representatives voted in June to halt funding for the RRW is no surprise.

Look at what's happening with the Yucca Mountain repository because of the lack of a detailed plan. Is the nuclear waste going to be buried hot or cold? Are titanium drip shields going to be used or not? Are the canisters going in tunnels, or will they be buried en masse on the repository floor? No one knows. Congress's interest in the repository was flagging long before Nevada's Harry Reid assumed the helm in the Senate. Look for Yucca Mountain to suffer the same fate as the RRW.

Ron Bourgoin
(bourgoinr@edgecombe.edu)
Rocky Mount, North Carolina ■