that are noteworthy by their failure to present an accurate picture of modern science to the public. Perhaps the networks can be embarrassed into being more responsible in this area.

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Bad Science, Bad Policy?

The gist of Gerald R. Fink's editorial "Bureaucrats save lives" (1 Mar., p. 1213) is that, in 1977, National Science Foundation (NSF) administrator Herman Lewis found a way to circumvent the National Institutes of Health (NIH) recombinant DNA guidelines' prohibition on doing certain cloning experiments in yeast. Fink writes that he and his co-workers were able to do the experiments literally years before they would have been able to otherwise, which accelerated research leading to the ultimate development of a much improved, second-generation hepatitis B vaccine (of which I was one of the Food and Drug Administration reviewers).

Other U.S. researchers who lacked a governmental good Samaritan were stymied for years by regressive, unnecessarily restrictive federal regulatory policies, delaying all manner of important research. Using the Lewis anecdote as an example of the exception that proves the rule, Fink could have observed that bad science makes bad policy, and bad policy has real-world impacts.

While scientifically oriented institutions like NIH and NSF may, indeed, have "a legion of gifted public servants who possess invaluable knowledge and experience gained at the forefront of science," there are precious few at the regulatory agencies, and their policies often reflect it.

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Calculus as a Tool

I read the short article by Barry Cipra about calculus teaching reforms (News, 16 Feb., p. 901) with interest. I studied calculus for an entire year in college, but without really understanding it. Proving all the theorems constituted a considerable portion of the course, but I memorized the proofs. I felt then and feel now that proofs are irrelevant to the great majority of us who use calculus as a tool. In using it in physical chemistry class, I suddenly experienced an epiphany. The entire topic of calculus became clear in the course of understanding partial derivatives of thermodynamic functions; and in that one second, I learned more than I had ever learned in an entire year of calculus. If calculus were taught as a useful tool rather than as a theoretical discipline, I believe more students would learn it, understand it, and enjoy it. I have taken this same approach to my own teaching, particularly of enzyme kinetics. I find that the traditional way of teaching theory first reaches maybe 10% of students, while teaching the methodology first and then teaching the theory reaches 80 to 90% of students.

I encourage the reformers to continue, particularly in eliminating irrelevant proofs.

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