Letters

Science, Policy, and the Press

Robert Pool's News & Comment article "Struggling to do science for society" (11 May, p. 672) illustrates a number of the problems inherent at the interface between science and policy-making, particularly in the United States, where the legal process has supremacy over scientific knowledge as the primary driving force in regulatory activities. One problem is the failure of regulators to recognize and communicate the crucial uncertainty underlying a science-based decision process while there is still time to perform the needed research. If framed appropriately, most of these crucial uncertainties are in fact fascinating scientific questions.

Unfortunately Pool demonstrates another major problem facing scientists involved in research related to well-publicized regulatory issues: the propensity of the press to make sweeping generalizations and the frequent inability of journalists to go beyond superficialities in reporting science related to complex regulatory issues. His discussion of the risk of asbestos quotes an article in *Science* (B. T. Mossman *et al.*, 19 Jan., p. 294) as saying that "more than 90% of the asbestos actually poses no health risk." As is clear from the article, no forms of asbestos are without risk. Pool follows this statement with a discussion of the risk of different fiber types and a quote from a geologist concerning the failures of federal regulators to appreciate the issue. Had he checked the record, he would have found that Jack Moore, a toxicologist who was the Environmental Protection Agency's (EPA's) regulator responsible for asbestos removal from schools (a program mandated by Congress), and I, as EPA's assistant administrator for research and development, clearly understood that there is a relative difference in the toxicity of different fiber types. It would be surprising if it were otherwise. However, we did not fall for the obfuscation promoted by the asbestos industry that there is a form of asbestos that poses no health risk.

Pool's generalizations belittling the role of science in setting acid rain policy reflect the unfortunate propensity of policy-makers to forget that there were major scientific advances that permitted the policy to advance to its current state and the ability of journalists to find those scientists who feel that yet more research is needed. Pool's quote from an economist about the failure to do more to "cost out" the impact of a 10-million-ton cut in sulfur oxide emissions ignores the fact that such studies have been done, and done again, for many years. Pool also ignores the fact that, because of the major research accomplishments in this area, policy-makers can no longer reasonably argue that acid deposition is without effects, or that continued emissions of sulfur oxides will doom all the lakes and forests in the Northeast. By narrowing down the extent of reasonable uncertainty, which is the major objective of regulatory research, scientists have provided the necessary basis for regulation.

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Availability of Lo's Mycoplasma

The News & Comment article of 25 May (p. 952) concerning statements made by me was misleading. I never meant to discredit any scientist. Robert Gallo's lab was the only group who requested the "virus-like infectious agent" in April 1989. At this time they were told that the reagent would only be shared with scientific collaborators. General distribution of the reagent was not available as yet. A few months later, when we announced that the reagent was ready to be distributed to all interested researchers, we were not sure whether Gallo's laboratory was still interested in the agent known to be a mycoplasma. No further requests were received from Gallo's lab. If Gallo's lab is still interested in the microbe, we will certainly be happy to supply the reagent.

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Icosahedral Crystals in Perspective

I'm afraid John Horgan only compounds the problems in his article on quasicrystals (News & Comment, 2 Mar., p. 1020) with his reply to Frank W. Gayle (Letters, 25 May, p. 944), who was understandably upset that Horgan neglected to mention the experimental discoverers of icosahedral crystals.

The problem is again sins of omission. A number of pioneering theorists besides Dov Levine and Paul J. Steinhardt speculated about physical realizations of Penrose tilings in nature before the pivotal experimental paper by D. Shechtman *et al.* (*1*). In 1982, Alan MacKay (*2*) optically Fourier-transformed a *two*-dimensional Penrose tiling and found a tenfold symmetric diffraction pattern similar to some of the diffraction data later discovered experimentally. The *three*-dimensional generalization of the Penrose tiling most closely related to the experiments was discovered by Peter Kramer and R. Neri (*3*) independently of Steinhardt and Levine (*4*). The paper by Kramer and Neri was submitted for publication almost a year before the paper of Shechtman *et al.* These are not obscure references: they appear, for example, in a review published in the pages of *Science* by Bertrand Halperin and myself in 1985 (*5*).

I share Gayle's surprise that Horgan could write a long article about icosahedral crystals without once mentioning Shechtman *et al.* Hogan's failure to mention important theorists in either his article or his reply to Gayle's letter is almost as bad.

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REFERENCES AND NOTES

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2. A. L. MacKay, *Physica* **114a**, 609 (1982); see also *Sov. Phys. Crystallogr* **26**, 517 (1981).
3. P. Kramer and R. Neri, *Acta Crystallogr Sect A* **40**, 580 (1984).
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5. D. R. Nelson and B. I. Halperin, *Science* **229**, 233 (1985).

Feelings . . .

As a psychophysicist interested in the measurement of intensive psychological continua (feelings), I was intrigued by Robert Pool's article about studying atomic behavior through the use of lasers ("Making atoms jump through hoops," Research News, 1 June, p. 1076). His noting that atoms coming close to an intense electromagnetic field "can *feel* this field" (italics mine) considerably broadened my horizons of inquiry. And my clinical colleagues were, of course, set to wondering how the atoms *feel* about researchers taking joy in making them jump through hoops.

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Erratum: The name of the reviewer of *The History of Modern Mathematics* [David F. Rowe and John McCleary, Eds. (Academic Press, San Diego, CA, 1989)] (22 June, p. 1561) was incorrectly printed. It should have been *Joan* L. Richards, not "Juan" L. Richards.