

Soviet Role in SAGE

I was impressed and pleased with how quickly *Science* picked up on the important implications of preliminary observations from the Soviet-American Gallium Experiment (SAGE) ("Solar neutrino deficit confirmed?", Research News, 29 June, p. 1607). If a much smaller than expected number of solar neutrinos are detected in this experiment it will show, among other things, that neutrino masses are nonzero and that there is mixing between neutrino species.

The article did not, however, appropriately reflect that SAGE is predominantly a Soviet experiment. Soviet scientists have been involved in this area for almost 20 years. Credit for the idea of the use of gallium as a solar neutrino detector belongs to V. A. Kuzmin (1). A group of dedicated researchers from the Institute for Nuclear Research in Moscow has created an effective underground laboratory at the end of a 4-kilometer tunnel into Mount Andyrchi in the Caucasus Mountains. The Soviet scientists obtained the gallium required to carry out the experiment (60 tons). The American side of SAGE (Los Alamos National Laboratory, the University of Pennsylvania, Princeton University, and Louisiana State University) joined the experiment in 1986, providing some much needed electronics, detectors, and small computing systems. All of these elements are essential to carry out an experiment as difficult and subtle as SAGE. Groups in both countries have a role in the scientific decisions.

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Asbestos Policy

Bernard Goldstein's letter (13 July, p. 111) about Robert Pool's article "Struggling to do science for society" (News & Comment, 11 May, p. 672) underscores the complexity and the differing perceptions of environmental issues.

Although the legal process may now have supremacy over scientific knowledge "as the primary driving force in regulatory activi-

ties" in the United States, these exercises are not carried out in a vacuum. If our legislators propose new laws that influence regulatory policy, they are able to do so because they support their laws with some form of data. They are advised by persons who are held to have expertise in a particular area. Sometimes this advice is not good.

We believe the initiative to form policies should be taken by the federal agencies with the committed support of their scientists. Only where there is inept or timid leadership do these roles fall, by virtue of default, outside of the scientific spheres. Goldstein's letter serves to emphasize the failure of the leadership at the Environmental Protection Agency (EPA) to communicate the uncertainties regarding asbestos fiber inhalation in buildings and perceived risk to passive occupants.

Pool's article accurately reflected the impressions of many of us in the asbestos field that the federal regulatory agencies have not appreciated the differing biological potentials exhibited by the various asbestos fiber types. These differences have not been reflected in their public statements, current policies, or regulatory statutes.

We are gratified to learn that Goldstein and Jack Moore "clearly understood that there is a relative difference in the toxicity of the different fiber types." Following the advice of Goldstein, we have checked our letter and briefing records and find that one of us (M.R.) could not convince Don R. Clay (former director of EPA's Office of Toxic Substances) of these fiber distinctions in letters of 17 December 1981 and 21 April 1982, could not convince former EPA Administrator William D. Ruckelshaus of these distinctions at a 9 July 1984 briefing, and could not convince Goldstein and Moore of these distinctions in a letter of 28 February 1985. Another of us (A.M.L.) failed in his attempt to introduce fiber type as a factor to be considered in building inspection in several of the school guidance documents. Either Goldstein is practicing a form of federal revisionism, or the cadre of EPA's middle-management did not follow the directions of its leadership. It appears that EPA officials still do not accept the opinions expressed by Goldstein in 1990, as EPA specialist Tom Tillman was quoted in August 1990 as saying, "we don't differentiate between types of asbestos" (1).

We are distressed that Goldstein appears to fall victim to the oversimplification that he condemns. He states that "sweeping generalities" and "superficiality" in reporting science has led to an inappropriate conclusion regarding asbestos in buildings. His statement that he "did not fall for the obfuscation promoted by the asbestos industry

that there is a form of asbestos that poses no health risk" is exactly this kind of statement. We have heard, on many occasions, representatives of the chrysotile-producing industry from Canada state that risk of disease from asbestos is a function of the nature of the disease itself, fiber type, dose, state of aggregation (fiber length and diameter), and social and other host factors. None of us has ever heard anyone from industry suggest that inhalation of chrysotile fiber at levels which existed in the workplace in the past has not been associated with disease.

The regulatory agencies should move forward in lockstep with the best current science. Strong, knowledgeable, leadership must be willing to take an unpopular stand, based on science, in the face of pressures from vested interest groups. As Goldstein states, we should not fall prey to obfuscation (which may be promoted by *any* vested interest group—industry holds no monopoly on potential for villainy). EPA must be supported for its efforts to formulate policy on the basis of science, and we applaud Robert Pool, who fairly communicated the concerns by scientists about current policy decisions.

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Young Scientists and the Future

Joseph Palca's article "Young investigators at risk" (News & Comment, 27 July, p. 351) deserves high marks for making clear just how difficult it is to start up an independent research laboratory. However, the article seems to suggest, that unless a trainee (particularly one finishing a postdoctoral fellowship) follows the career path of his or her mentor, the training has essentially been wasted.

The fact is that very good scientists, "even the very best," can find rewarding careers in the private sector or in branches of the public sector other than those that rely solely on federal grants. Simple arithmetic shows that training in a top laboratory at a top institution, combined with the requisite number of high-quality publications, does