

show that there is no such cleavage between "theory" and "experience," we would like to point out that all the figures contained in Branscomb's report were simplified versions of "models" presented by Ziman at the AAAS meeting in San Francisco in 5 January.

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Nuclear waste stalemate

The following is a proposal to break the political stalemate concerning the location of a nuclear waste disposal site. Presently, politicians will not support the location of such a site in their state. Until they are able to see benefits to their state from the site and are able to explain these benefits in a form easily understood by their constituents, no politician is likely to support a nuclear-waste site in his state. My suggestion to change this situation is based on the following assumptions:

- Our present waste should be stored in the location best suited to contain it.
- The responsibility for waste disposal should be distributed equally to each citizen. Those who live in localities that do not directly receive electrical power generated by a nuclear reactor are receiving other fuels freed by nuclear power for their consumption.
- Storage in a state will hurt that state in some fashion.
- a. There will be additional psychological stress in some part of the population.
- b. Some new industry may locate elsewhere.
- c. Transportation through the state to the depository has its risks.

To break the stalemate on site location Congress could require all the states to set a value for the storage of their populations' proportion of the waste. The state with the lowest bid (in dollars per person-year) gets the job. The other states pay that state yearly an amount equal to one half the sum of their bid and the lowest bid, times the population of the paying state. States that do not offer a bid by the deadline pay at the highest rate. A time limit of about 30 years should be set for these agreements. The waste should be stored in a manner that allows it to be retrieved with a reasonable effort.

A plan such as this would share the responsibility for safeguarding our waste. It would make it possible for states with geological formations that

appear to be favorable locations for depositories to look upon these formations as valuable resources of the state. Presently, many states consider these locations liabilities.

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Sakharov poll

Hurrah for your editorial "Scientific freedom: Political hostage" and the APS stance on the humiliation of the US Science Community by the Carter White House. I am moved to ask: Can't APS do anything? Can we demand less at home than FAS seems to want of the USSR? I know that Frank von Hippel would want me to dissent, perhaps even honor me for it. While I respect him enormously for the informed dissenting role he has played in science and society matters, I believe the "Sakharov Poll" (April, page 9) was unnecessarily loaded. As a member of FAS, I approve of the no-boycott stance von Hippel has emphasized. However, there is a remnant tenor to the guest comment that suggests that those of us who believe that the entire non-cooperation strategy is ineffective and counterproductive are either less politically concerned, or possibly less patriotic, or both. The evidence: The poll offers five levels of "action," and the other titled "Scientists should not be involved," with an even less attractive description. The write-up gives none of the dissenting viewpoint; that the entire exercise is one of venting frustration by the US science community, and that by the test of effective help to Sakharov it is at very best a very long-odds gamble. No mention is made of the potential negative impacts of the more draconian options. Is a protest worth even a 1% increase in the chance of nuclear war?

If the FAS were better trained in the social sciences it could perhaps have had other options listed to give a less biased set. Here are some possibilities:

Scientists should get informed and involved. The political background and realities of USSR actions in Afghanistan, increased suppression of civil rights of outspoken critics of the regime (including scientists and clerics, and so on), and the increased threat of nuclear war, require the intense study of every scientist-citizen prior to any response.

Scientists should work for betterment of civil rights, starting with their home countries, but extending their concerns to wherever they can be effective. They should exclude grandstanding as vigorously as they exclude forging of data.

US scientists should strengthen existing ties with their colleagues in the USSR science community, encouraging and ex-

panding exchange, as the most effective means of helping Sakharov (and Orlov and Scharansky, and so on). After all, detente and increasing exchanges did yield results: Thousands of Jewish emigres; Levich allowed out, Sakharov not expelled. Continued cooperation will give the USSR Academy the maximum positive leverage to exercise in their much better informed ways to effect some change. To expect to force the government of the USSR to its knees to officially retract on "SOS" in the full glare of publicity by threatening to withhold some paltry visits, flies in the face of history and human nature, and exposes a touching naiveté ill-suited to the complex science of political response by scientists.

There are some scientists, and I note in this connection, Kenneth Boulding among them, who said in his editorial in *Chemical & Engineering News* (14 April) that it is of "the greatest importance to sustain whatever contacts we can with the scientific community of the Soviet Union. We can certainly express our dismay and anxiety about what has happened, but we must endeavor to maintain whatever contacts we can." Unless more convincing evidence is forthcoming the null hypothesis must surely be that aggressive friendliness and cooperation and an accurate humility about the worldwide track record of our own government (even though we may be much better on personal rights) may be just as effective as an SOS campaign, as is the route of travel boycotts and exchange cutoffs.

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Frank von Hippel's Guest Comment in April (page 9), accompanied by his poll (in the name of the Federation of American Scientists), seems to me one too many of such write-ups in your journal. He is all worship for Sakharov and all curse for the Soviets. His poll provides one number to circle disagreement with his assessment and recommendation and five different numbers to choose for agreement. He will do the counting and publish the results, presumably in *PHYSICS TODAY*. To make doubly sure, he reminds the readers, "We citizens of the US have little to lose by speaking out in support of Sakharov. We stand to lose a great deal, however, if we do not come effectively to his defense." Not a very subtle way to intimidate me to vote right!

I happen to admire people such as Gandhi, Russell, Pauling, Sakharov, and so on who like to stir up the system now and then and enjoy the penalty for it. But von Hippel wants us, as physicists, to protest the Soviet way of dealing with Sakharov. That is precisely

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ing with Sakharov. That is precisely what I will not do. In the first place, during the few decades I have been a teacher and researcher in physics I have not come across a single paper in physics by Sakharov, nor a reference to it. He is supposed to have been a young and ambitious party loyalist when Stalin chose him in key roles to get their H-bomb going. One doesn't have to know much physics for such roles. Secondly, even the American press has conceded that his internal "exile" followed in the wake of his open support to President Carter's move to cut off much of the grain sales to the Soviets, to deter American sportsmen from going to the Moscow Olympics and to persuade the "free world" allies to deter their sportsmen likewise. I see no physics in the matter of his exile and I don't see why PHYSICS TODAY should provide a forum for the Sakharov issue. It may even violate the AIP charter.

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THE AUTHOR COMMENTS: It has often been argued as Rustum Roy does, that the free people in other nations can do little to help Soviet dissidents and that our attempts may even work to unravel the fragile fabric of peaceful relationships upon which the avoidance of nuclear war depends. To me Sakharov's response is both eloquent and convincing.¹

It seems obvious to me that a firm policy on human rights could not and cannot 'spoil' anything. On the contrary, it shows that the West... will resolutely defend the principles which hold such fundamental significance for our common future. Weakness or excessive 'flexibility' on human-rights matters immediately undermines Western positions all along the détente 'front'...

As long as a country has no civil liberty, no freedom of information and no independent press, then there exists no effective body of public opinion to control the conduct of the government and its functionaries. Such a situation is not just a misfortune for citizens unprotected against tyranny and lawlessness; it is a menace to international security...

As to the possible forms of pressure appropriate in securing human rights, we must bear in mind that a specific human-rights matter can be solved only when it becomes a political problem for the leaders of the violator country. Détente creates various levers for exerting pressure which, without threatening to exhaust its potential, nonetheless brings specific human-rights questions as well as general problems to the attention of top policymakers.

These levers are controlled not just by governmental and legislative bodies. There is a role for nongovernmental organizations and private citizens involved in exchanges—business firms, scientific associations, trade unions, workers, scholars, authors and artists. I am not suggesting blackmail, of course, but rather the adjustment of interests which is a normal part of the process of eliminating confrontation. Such measures as a partial and temporary boycott of scientific or cultural contracts, temporary embargo on certain specialized equipment, or a dock workers' embargo do not threaten détente...

Dissenters demand respect for human rights, the development of democracy within the framework of the existing system, and the fulfillment of international undertakings; they reject violence on principle. Their voices do not reach top decision-makers; their appeals are answered largely with repression. Therefore the Western public and its political leaders, when speaking with the leaders of socialist nations, in fact represent not only their own people, but also those who have been deprived of a voice in their own countries.

Note, however, that Sakharov carefully avoided suggesting any *total* boycott of the Soviets. It is important to keep the communication channels open and the machinery that facilitates exchanges in place, so as to prevent the level of mutual understanding between the US and USSR from declining to its dangerously low Cold War level and to make possible a quick return to "normalcy" if the Soviet government reverses its current movement toward ever more brutal treatment of dissidents. The efforts of Roy and others of like mind to encourage exchange *need not* therefore undermine the impact of the decisions of those who refuse *as individuals* to participate in *official* exchanges pending the freeing of Sakharov. This would be true especially if those who work to keep channels open take pains to make clear to the Soviet government that their efforts should in no way be misunderstood as acceptance of the imprisonment and mistreatment by the Soviet government of the finest members of the Soviet scientific community.

As to Roy's suggestion that "continued cooperation will give the USSR Academy the maximum positive leverage to exercise in their much better informed ways to effect some change," I am moved to remind Roy that Sakharov is the most courageous member of the Soviet Academy of Sciences and is surely the most knowledgeable on the situation of Soviet dissenters. Nevertheless the leadership of the Soviet Academy has

repeatedly been pressured into denouncing Sakharov. Fortunately the Academy's rank-and-file membership has thus far refused to vote Sakharov's expulsion by the required two thirds majority on a secret ballot.

I believe that this silent resistance within the Academy is due, at least in part, to the protests of foreign scientists over the Soviet Government's treatment of Sakharov. If this is the case then we are *helping* the Soviet Academy resist the pressure from the Soviet government by pressing them from the opposite side. Pressure can be welcome. Thus Franklin D. Roosevelt once said to a visitor, "You've convinced me. Now go out and bring pressure on me."²

I am happy that Roy agrees that "scientists should get informed and involved." And I do appreciate his willingness to contribute to the debate. It is critical, however, that we work to keep the issue of the dissident Soviet scientists before world opinion. Sakharov carried a large part of this burden until his voice was stilled. Free scientists must now pick up that burden. Are we up to it?

As far as Sakharov's contributions to physics are concerned, R. Pathasarathy obviously would have benefited had he been able to attend the special evening session at this year's Washington APS meeting. This session was devoted entirely to a discussion of Sakharov's contributions to the areas of magnetic fusion and elementary-particle theory.

Pathasarathy is equally wrong when he discusses the timing of Sakharov's exile relative to the US moves to put pressure on the Soviet Union to leave Afghanistan.

Finally, it would be a sorry situation indeed if it were a violation of the AIP charter for PHYSICS TODAY to carry a discussion of how free US physicists can help a colleague who is being persecuted because he has, in the words of the Nobel Peace Prize Award, become "the spokesman for the conscience of mankind."

References

1. D. Sakharov, *Alarm and Hope*, Vintage Books, New York (1978), pages 171-173 and 108-111.
2. Quoted in: J. Primack, F. von Hippel, *Advice and Dissent, Scientists in the Political Arena*, New American Library, New York (1974), page 125.

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Spirit of physics gone

This letter might well be titled "It makes me laugh!" I speak of the ads in Information Exchange—Positions Open—in PHYSICS TODAY.