Letters

Scientific Exchange with the Soviets

R. Jeffrey Smith's comments (News and Comment, 28 July, p. 331) about my amendment to the National Science Foundation Authorization Bill were interesting and, though there is much with which I agree, I feel that the thrust of the article fails to deal with the depth and complexity of the issue and the questions I was trying to raise. Human rights, according to Smith, is a political issue. It is, of course, but besides political, we must also consider, among others, moral and national security questions.

The recent trial of Anatoly Shcharansky has focused attention on cybernetics and computers. Shcharansky, reputed to be a very knowledgeable and creative thinker in this area, will spend the next decade and a half breaking rocks and sawing wood in Siberian labor camps. He will not be the first cyberneticist to suffer because of his political beliefs. Several years ago, a lesser known dissident, Leonid Plyushch, a Ukrainian, was released after spending 4 years in Soviet psychiatric prisons, where he had been regularly injected with haliperidol and insulin as part of his "treatment" for his political beliefs. Other examples of such barbaric behavior can be found. Is it morally justified to provide the Soviet Union with the computer technology and know-how their system cannot produce, largely because of the repressive atmosphere under which their scientists and engineers are forced to work, making creativity difficult, often impossible?

We must also consider the fact that much of the scientific knowledge our system creates has military applications. Laser technology can guide missiles, computers can program MIRV's, physics can be applied to nuclear weaponry, and so forth. When creative individuals like Sakharov or Orlov, who could provide the Soviet system with the scientific knowledge they require to keep pace with the United States militarily are repressed, are we wise to facilitate Soviet acquisition of such knowledge through scientific exchange?

These are, obviously, difficult questions and my amendment does not provide all of the answers. I am grateful to see, however, that it has contributed to the stimulation of much-needed debate on the political, moral, and strategic issues involving human rights. I hope scientists will continue to pursue these questions, which transcend purely scientific or political considerations.

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Nitrates and Nitrites in the Human Diet

R. Jeffrey Smith (8 Sept., p. 887), in his News and Comment article, states, "Researchers have estimated that less than 20 percent of all nitrite entering the stomach is derived from cured meats." Insofar as I can determine, the best currently available estimates concerning dietary sources for the U.S. population are those of White (*1*), where a figure of 21.2 percent is given for the nitrite contribution of cured meats. White estimates that 76.8 percent of gastric nitrite arises from saliva, and we have to consider that a primary source of this salivary nitrite is ingested nitrate (*2*). White (*1*) estimates that 9.4 percent of ingested nitrate is from cured meats; thus cured meats possibly contribute an additional 6.8 percent of gastric nitrite, or a total of 28 percent of the nitrite in the stomachs of healthy individuals.

Smith's article also fails to mention that cured meats are suspect teratogens in the human (*3*) or that strong correlation is being increasingly demonstrated between nitrate ingestion, gastric nitrite, and stomach cancer incidence in the human (*4*). Using living bacteria and cell-free DNA, we have shown that genetic activity of nitrite is greatly enhanced through interaction with a variety of ubiquitous compounds including polyamines, alcohols, glycols, and phenols (*5*), very likely through "transnitrosation" following the formation of unstable and reactive *C*- (and, possibly *O*-) nitroso compounds (*6*). On the other hand, carcinogenic effects in the presence of nitrite are decreased by agents such as sodium ascorbate (*7*). Thus, accessory dietary constituents are expected to influence the potency of nitrite as a mutagen-carcinogen.

While meat packers are now taking the brunt of regulatory inspection, we have to consider that entry of nitrate into certain water supplies is on the increase (*8*) and that strain selection and heavy fertilization may be increasing the nitrate content of particular foodstuffs, such as spinach (*9*) and tomatoes (*9*, *10*).

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Saccharin, Cancer, and Calories

The report on "Relative risks of saccharin and calorie ingestion" by Bernard L. Cohen (3 Mar., p. 983) has most certainly weighed a horse on an analytical balance. I only hope that the author was attempting to evoke comment rather than be serious.

Many assumptions are left unmentioned, but two limit the logic of the article to a mere exercise in arithmetic. First, carcinogenic potential in the rat cannot be equated with that in the human; response differences between species for other carcinogens may vary by three to four *orders of magnitude*. Unless the epidemiologist can tell us otherwise, woe be the user of saccharin if hu-

man sensitivity relative to the rat were greater by only a fraction of that which is possible. Relevant to this point, it should be unequivocally stated that regularly used saccharin preparations are carcinogenic, even though the pure chemical has not been shown to be mutagenic. Apparently, it remains to be established whether the bladder tumors are due either to the presence of mutagenic contaminants (*1*), to the rather potent synergism of saccharin for other bladder carcinogens (*2*), or to some other mechanisms.

The second assumption, namely that diet cola drinkers actually reduce calorie consumption, is not supported with evidence. As a matter of fact, when saccharin was ingested by rats at levels more equivalent to those used by humans, *more* calories were consumed and *greater* weight gain resulted (*3*); in fact, there is some tentative evidence to indicate that saccharin ingestion may induce hypoglycemia (*4*) and greater appetite (*5*). Moreover, it was shown more than 20 years ago that use of noncaloric sweeteners by obese human subjects had no effect on weight loss when compared to the nonuse of these products (*6*).

In sum, I can only think of unquantifiable risk factors: carcinogenicity; possibly greater, not less, calorie consumption; psychological rationalization for not addressing the obesity problem by more appropriate means; and so forth, and so forth. The benefit-risk ratio leaves little or nothing in the numerator and an unquantifiable risk in the denominator. How can Cohen be so specific?

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With regard to Campbell's first criticism, I merely accepted the estimate of the Food and Drug Administration for the bladder cancer risk from saccharin. His quarrel should be with them rather than with me, although I might mention that there is a great deal of evidence that their risk estimate is much too large, rather than too small as he suggests.

With regard to his second criticism, I offer examples of how uses of saccharin *do* decrease calorie intake: Many people eat or drink to reduce nervous tension—that is probably why it is common to gain weight when one stops smoking, and visa versa—and low-calorie things work just as well. As another example, many people use soft drinks to quench their thirst, and a diet drink is fine for that purpose. As a third example, many like to end a meal with something sweet, and low-calorie desserts fill the bill. As a fourth example, some like a carbonated drink to "wash down" greasy foods or excess mucous, or to get rid of a bad taste, and diet drinks are fine for the job. Note that none of these effects are applicable to the rats in Campbell's references. The reason I know about them is that they all apply to me personally, and to dozens of others with whom I have discussed these questions. There are a lot of reasons why people eat and drink other than to satisfy their body's needs for energy and materials—that's why so many people are overweight. I have lost 40 pounds over the last 7 years by being careful about what I eat and drink, and diet foods have served as a powerful crutch in this program to provide some of the needs listed above.

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Vietnamese Universities

Recently I visited Vietnam at the request of Senator Edward M. Kennedy (D–Mass.) and on behalf of the Judiciary Committee of the U.S. Senate. In the course of this trip I was able to investigate the food and agriculture situation in Vietnam. I had the opportunity to convene with government officials concerned with universities and technical schools, including the Prime Minister and the Ministers of Education, Health, and Agriculture and to visit the Universities of Hanoi (including the Polytechnic Institute) and the University of Ho Chi Minh City (including its medical school).

I found the universities isolated and destitute. In the libraries, the collections of scholarly and technical journals stop in 1975, except for some Russian journals, useless in a country where French, and, in the southern area, English, are the only foreign languages widely known. Chemical reagents are unavailable. They came from China in the north (the border is now essentially closed and Chinese help has been terminated) and from the United States in the south (again, the source of help is now missing). Russian help is negligible, not to say farcical. At the Polytechnic Institute it has consisted of a limited number of secondhand pieces of electrical equipment, most of them not in working order. The unavailability of foreign exchange precludes using Unesco as an intermediary to buy books and equipment abroad. The professors, in both the north and south, feel completely cut off from outside civilization and anxiously asked me what discoveries had been made in the past 3 years "in all fields." The beginning of the coming academic year was looked at with dread by the medical schools, which feel unable to properly prepare for the teaching of basic sciences in the face of a shortage of textbooks, journals, reagents, instruments, and animal feeds.

I believe that, even before our government accepts the fact that normalization of relations is in the best interest of the United States (Vietnam has dropped all demands for reparation and, I have been assured by the Prime Minister, would welcome joint ventures with American machinery, chemical, and oil companies), we should act to lift the isolation of Vietnamese universities by sending them journals, reprints, and books. These could be addressed (hopefully at least two copies, and if possible, six) to the Ministry of Higher Education in Hanoi, or directly to the universities. Particularly prized would be reference journals, such as *Chemical Abstracts* or *Index Medicus*.

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Shroud Study

I have just reviewed the 21 July article on the Shroud of Turin (News and Comment, p. 235) and offer a small correction. I was incorrectly named as the x-ray fluorescence "expert" on the scientific team. This distinction properly belongs to Roger Morris of the Los Alamos Scientific Laboratories. My function lies in the domains of infrared spectroscopy and thermal imaging.

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