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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References

1. J. W. White, Jr., *J. Agric. Food Chem.* **24**, 202 (1976).
2. M. Harada, H. Ishiwata, Y. Nakamura, A. Tanimura, M. Ishidate, *J. Food Hyg. Soc.* **16**, 11 (1975); H. Ishiwata, P. Boriboon, Y. Nakamura, M. Harada, A. Tanimura, M. Ishidate, *ibid.*, p. 19; B. Spiegelhalder, G. Eisenbrand, R. Preussmann, *Food Cosmet. Toxicol.* **14**, 545 (1976); S. Tannenbaum, M. Weisman, D. Fett, *ibid.*, p. 549; A. B. Lowenfels, A. J. Tuyns, E. A. Walker, A. Roussel, *Gut* **19**, 199 (1978).
3. E. G. Knox, *Br. J. Prev. Soc. Med.* **26**, 219 (1972).
4. M. J. Hill, G. Hawksworth, G. Tattersall, *Br. J. Cancer* **28**, 562 (1973); G. Hawksworth, M. J. Hill, G. Gordillo, C. Cuello, *IARC (Int. Agency Res. Cancer) Sci. Publ.* (No. 9) (1974), p. 229; R. Armijo and A. Coulson, *Int. J. Epidemiol.* **4**, 301 (1975); C. Cuello, P. Correa, W. Haenszel, G. Gordillo, C. Brown, M. Archer, S. Tannenbaum, *J. Natl. Cancer Inst.* **57**, 1015 (1976); S. R. Tannenbaum, D. Moran, W. Rand, C. Cuello, P. Correa, *ibid.*, in press.
5. H. F. Thomas, P. E. Hartman, M. Mudryj, D. L. Brown, in preparation.
6. B. C. Challis, *Nature (London)* **244**, 466 (1973); _____ and M. R. Osborne, *J. Chem. Soc. Perkin Trans. 2* (1973), p. 152; A. J. Buglass, B. C. Challis, M. R. Osborne, *IARC (Int. Agency Res. Cancer) Sci. Publ.* (No. 9) (1974), p. 94.
7. S. S. Mirvish, L. Wallcave, M. Eagen, P. Shubik, *Science* **177**, 65 (1972); Y. T. Fan, S. R. Tannenbaum, *J. Food Sci.* **38**, 1067 (1973); S. S. Mirvish, *Ann. N.Y. Acad. Sci.* **258**, 175 (1975); _____, A. Cardesa, L. Wallcave, P. Shubik, *J. Natl. Cancer Inst.* **55**, 633 (1975); S. S. Mirvish, A. F. Pelfrene, H. Garcia, P. Shubik, *Cancer Lett.* **2**, 101 (1976).
8. M. S. Boulos and O. K. Manuel, *Science* **174**, 1334 (1971); B. Commoner, *Ambio* **6**, 157 (1977).
9. Y. Sohier, A. M. Poumarat, P. Berges, *Ann. Nutr. Aliment.* **30**, 689 (1976).
10. B. S. Luh, N. Ukai, J. I. Chung, *J. Food Sci.* **38**, 29 (1973).

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-