Letters

Seismic Monitoring in the Soviet Union

I am compelled to clarify issues regarding the U.S. Geological Survey (USGS) raised in R. Jeffrey Smith's article "Soviets agree to broad seismic test" (News & Comment, 1 Aug., p. 511). The impression given in the article, that Jack Evernden recently spoke as a USGS official on behalf of "a USGS proposal" to install seismographic equipment in the Soviet Union, is erroneous and misleading. Evernden, a USGS employee, during a recent private trip to the Soviet Union and at his own initiative, discussed his desire to see seismographic equipment installed in the Soviet Union to pursue his own research. Evernden apparently anticipated support from other agencies for this proposal and its ultimate execution under a scientific exchange agreement on earthquake prediction between the United States and the Soviet Union. It is unfortunate that Evernden represented himself as a USGS official to Soviet officials while on a private visit.

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It is necessary that your readers be made aware of an erroneous impression given in the recent article "Soviets agree to broad seismic test." This article states that the Defense Advanced Research Projects Agency (DARPA) expressed a willingness to support a proposal to establish a seismic monitoring network inside the Soviet Union which was discussed in Moscow with the Soviet Academy of Sciences in May 1986. We had no knowledge of plans for these unofficial discussions, nor were any prior indications or commitments made to fund the establishment of a monitoring network in the U.S.S.R.

In February 1986, Jack Evernden, a USGS employee, submitted a proposal directly to DARPA for basic research on "High frequency noise measurements and Q determinations in the U.S.S.R. and U.S.A." This proposal called for the temporary deployment of several seismic instruments at a number of sites in the Soviet Union to collect the data necessary for the research. It is DARPA policy that support for projects with foreign countries be only on an approved government-to-government basis. This would be especially true of a project involving the Soviet Union. It was determined that this proposal was inappropriate since the established agreement between the USGS and the Soviet Union Institute of Physics of the Earth involves cooperation in earthquake prediction research, not test ban monitoring research. We therefore could give this effort no further consideration. It was totally inappropriate for Evernden to convey a willingness of our support in his subsequent private meetings with officials of the Soviet Academy of Sciences.

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R. Jeffrey Smith incorrectly suggests that the Department of Energy supports the Evernden proposal and that the Department has "expressed a willingness to support the proposal with appropriate funds and equipment." While individuals associated with the Department or with the National Laboratories may very well have discussed the Evernden proposal with some of its sponsors, they were not expressing the Department's view.

The Department of Energy certainly supports obtaining more seismic data about the Soviet Union; but the fact remains that the Evernden proposal is being promoted not so much for its scientific merits as for its role as a potential step toward a comprehensive nuclear test ban. The Administration has stated that a test ban or moratorium is not now in the national security interests of this country, and the Department of Energy would not support or fund any effort that is contrary to Administration policy.

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Response: My remembrance of events is, of course, quite different from the history sketched in these three letters, but I believe there to be no purpose in using the pages of *Science* for what might well degenerate into endless quibbling about the details of historical fact and fancy. I will only say that I feel Smith's article to be an accurate report and that every act of mine, whether or not within the context implied by the three letters, had only one purpose, that purpose being to serve in the best way I know how the U.S. government and the American people.

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Response: Before the publication of my article, I spoke with a DARPA expert who assured me of the agency's enthusiasm for the Evernden proposal, and of its previous, verbal commitment to contribute funds if the Soviets accepted it. Similar expressions of enthusiasm were made by persons employed at or affiliated with DOE.

I also deliberately raised the issue of USGS involvement with one of Evernden's superiors at the agency's headquarters in Reston, Virginia. The official specifically said that it would be correct to describe the Evernden plan as an "informal USGS proposal," and this is exactly how it was described in my article.—R. JEFFREY SMITH

Human Genome Sequencing

Roger Lewin (Research News, 8 Aug., p. 620) summarized a recent meeting organized by the Howard Hughes Medical Institute at which the proposal to "sequence the human genome" was discussed. During this meeting sentiment seemed to shift away from "sequencing" toward "mapping" the genome for a variety of reasons, some political, some technical. Sequencing was seen as too expensive ($3-billion estimate), likely to divert funds from other worthy projects, likely to give the Department of Energy too much control, and better delayed a few years until it could be done more efficiently. These are important considerations, but they assume that sequencing the entire human genome is a worthwhile project. There is a fundamental reason for doubting this assumption: most of the DNA in the human genome does not code for proteins and may have no sequence-dependent function at all, or at least none that will be revealed by random sequencing. The evidence comes from a variety of experimental and theoretical considerations.

The human genome contains 3.5 picograms of DNA or about 3×10^9 base pairs. Nearly every fragment that has been sequenced contains some noncoding regions; the question is simply how much of the total is noncoding? It is instructive to begin with a theoretical calculation of how much DNA is needed to code for a reasonable number of proteins. Let us assume that there are 20,000 to 30,000 different proteins in the human body with an average molecular weight of 70,000 daltons. These require only 5×10^7 bases out of the total of 3×10^9 or about 2%. Even using a rather unlikely assumption of 100,000 different proteins, one comes up with a figure of no more than 10%.

Because something is theoretically possible doesn't mean it is true or even likely. However, we know that some complex organisms get by with very small amounts of