The position of Program Director is a rotating one, and my successor will soon be named. However, it would be both unwise and unfair to assume that this alone will bring about major improvements for social anthropology. These improvements must come out of the field itself. Hopefully, this heated exchange of words may awaken the profession sufficiently so that more of its members will chose to work with the Program Director in what should be a united effort to enlarge the funding opportunities in our field.

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Krypton-85 and Atmospheric Conductivity

In his article "Meteorological consequences of atmospheric krypton-85" (16 July 1976, p. 195) William L. Boeck arrives at the conclusion that ionization due to the release of ^{85}Kr from the nuclear power industry could decrease the total electrical resistance between the earth and the ionosphere by about 10 percent within the next 50 years. He speculates that this could lead to a form of inadvertent weather modification, the effects of which—be they beneficial or harmful—cannot be determined on the basis of our present understanding of atmospheric processes.

This question is of much significance for differential cost-benefit considerations in connection with the retention of ^{85}Kr by nuclear fuel reprocessing plants, and it could also be a controversial issue in the public debate on the acceptability of nuclear power. It is therefore important to make a realistic estimate of the extent to which ^{85}Kr will be retained and to put the effect of release of ^{85}Kr in proper perspective by comparing it with other factors influencing the electrical conductivity of the atmosphere. As it appears from Boeck's article (equation 4), one such factor is particulate pollution of the atmosphere.

Boeck assumes a ^{85}Kr concentration of 3 nanocuries per cubic meter in the early part of the next century, basing this value on information given in (*1*). This is in fair agreement with the information given in (*2*). In calculating this concentration it is presupposed, however, that no ^{85}Kr is retained by fuel reprocessing plants. According to proposed standards (*3*) it is intended that the release of ^{85}Kr shall be limited to 50,000 curies per gigawatt-year from 1 January 1983, and this limiting standard, which is based upon the minimum performance reasonably anticipated for commercial operations, may be reconsidered as practical experience with retention plants is gained. This limit corresponds to about one-sixth of the ^{85}Kr produced. Therefore it is a more realistic but still conservative assumption to use a value of 0.5 nanocurie per cubic meter for the ^{85}Kr concentration in the early part of the next century. The use of this value in the calculation method employed by Boeck reduces the increase in the electrical conductivity of the atmosphere from about 10 percent to about 1.5 percent.

Even if this is a substantial reduction in a relative sense, it does not help us judge the absolute consequences of ^{85}Kr releases if we have nothing to compare them with. It is therefore fortunate that the information in Boeck's comprehensive article allows us to calculate the relationship between conductivity and particulate pollution of the atmosphere. Using the same constants and parameter values we find that a 10 percent increase in atmospheric particulate pollution *decreases* the electrical conductivity of the atmosphere by about 1.5 percent, which is the same relative amount as the *increase* caused by the concentration of ^{85}Kr used as a conservative value for the beginning of the next century.

From a conservationist's viewpoint, the release of ^{85}Kr would therefore be beneficial in the sense that it would compensate for the effect of some of the particulate pollution on electrical conductivity.

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References

1. *Krypton-85 in the Atmosphere—Accumulation, Biological Significance and Control Technology* (NCRP Report 44, National Council on Radiation Protection and Measurements, Washington, D.C., 1975).
2. G. N. Kelly, J. A. Jones, P. M. Bryant, F. Morley, *The Predicted Radiation Exposure of the Population of the European Community Resulting from Discharges of Krypton-85, Tritium, Carbon-14, and Iodine-129 from the Nuclear Power Industry to the Year 2000* (Commission of the European Communities, Luxembourg, 1975).
3. Environmental Protection Agency, *Fed. Regist.* **40**, 23421 (1975).

Gjørup focuses on two important topics. On 13 January 1977, the Environmental Protection Agency promulgated regulations (*1*) that would limit the total quantity of ^{85}Kr released to the general environment to less than 50,000 curies per gigawatt-year of electrical energy generated by nuclear power reactors. These

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limits apply only to ^{85}Kr produced as a by-product of electrical power after 1 January 1983. The regulations do not limit the release of ^{85}Kr resulting from plutonium production reactors, naval nuclear propulsion reactors, or research nuclear reactors, and leaks to the atmosphere from underground nuclear tests. Nor do they apply to nuclear power reactors outside the United States. Gjørup implicitly assumes that all nuclear fuel reprocessing plants in the world will adopt control measures similar to those required by the United States. I am not convinced this assumption is presently realistic and conservative. I prefer to increase the range of uncertainty of atmospheric ^{85}Kr predictions. It is likely that the world usage of nuclear fission will continue to grow in the next century, and a reduction in ^{85}Kr releases per unit output may be offset by a corresponding growth in total nuclear energy output.

I urge caution before drawing any conclusions from a comparison of ^{85}Kr effects to other phenomena. First, when comparing ^{85}Kr ionization to natural background ionization, one should not implicitly assume that the preexisting ionization background level is at an optimal value. For example, although mankind has survived millennia in an unavoidable natural background of ionizing radiation, background radiation is not necessarily beneficial.

Second, particulate pollutants will have an effect on cloud formation not compensated for by ^{85}Kr.

Third, the removal mechanisms for atmospheric aerosols are much more rapid than the radioactive decay of ^{85}Kr. The result is that ^{85}Kr can contaminate even the pristine air in remote regions of the globe. I would expect that the atmospheric electrical conductivity would show a net decrease due to particulate pollution in regions downwind of industrial countries and a net increase due to ^{85}Kr ionization in remote regions of the oceans.

Within a human lifetime, the nations of this world will have a capability to manipulate the ionization background of the lowest layers of our atmosphere. I believe the implications of that capability should be carefully examined.

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References

1. Environmental Protection Agency, *Fed. Regist.* **42**, 2858 (1977).

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the most technically competent Chief Executive since Herbert Hoover, an engineer—knows a substantial amount about science and technology. Press calls the President "an expert" on energy, says he "knows a surprising lot about technology in the national security areas," and is well-versed in agricultural and space technologies, too. Indeed, some observers suspect Press will have more trouble communicating with top White House aides than with the President himself.

The staff support available to Press may be somewhat less than that enjoyed by his predecessor and somewhat less than that expected by Congress. The OSTP currently has some 16 professionals and is authorized to appoint four associate directors. But Press told the Senate committee he expected to appoint only one associate director and indicated he might have somewhat fewer professionals than at present because President Carter has put out the word to operate "a lean White House." The size of the staff will be determined in large part by a study now under way to reorganize all components of the Executive Office of the President. Any staff cuts would probably be offset by greater reliance on consultants from the research community. Eugene B. Skolnikoff, director of the Center for International Studies at the Massachusetts Institute of Technology, has already been tapped to spend part-time assisting Press in a review of bilateral scientific agreements.

Press has been revving up the three statutory committees associated with his office. He hopes that the Federal Coordinating Council for Science, Engineering, and Technology will develop "real clout" in coordinating federal programs—a wish that his predecessors shared to no avail. He plans to use the new Intergovernmental Science, Engineering, and Technology Advisory Panel as a device by which state and local officials can voice opinions on priorities for federal R & D programs that affect them. (That effort may carry some weight, since the President has voiced a desire to give local officials greater say over federal programs, and both Bert Lance, Carter's budget director, and Jack H. Watson, Jr., the President's assistant for intergovernmental affairs, participated in the panel's first meeting.)

He has also forwarded to the White House a new list of nominees for the President's Committee on Science and Technology, which is conducting a 2-