LETTERS

Nuclear Waste Management

The article on radioactive wastes by Luther J. Carter (News and Comment, 18 Feb., p. 661) was excellent, but why follow it with the letter from Bernard L. Cohen (25 Mar., p. 1280), who writes about eating a half-pound of 500-year-old, high-level radioactive wastes and storing the 2 cubic meters of high-level wastes generated per year from a nuclear reactor "under a typical dining room table"? If the public is to make a responsible decision concerning radioactive wastes, including mill tailings, then we need responsible information. Cohen, in his letter and his article (*1*), appears to omit information that is harmful to his case and to uncritically accept information from the nuclear industry.

The facts a responsible scientific journal should carry are these. With present regulations and practices of the industry, calculations show (i) that, using reasonable assumptions, the health effects caused by the nuclear and coal fuel cycles are comparable (*2*); and (ii) that the total waste volume, including mill tailings, is also comparable to that from coal fuel cycles (*2*). The only difference in the health effect calculations is that, with coal, the generation that has the benefit takes the risk; but with nuclear power, the burden is passed to future generations.

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References

1. B. Cohen, *Rev. Mod. Phys.* **49**, 1 (1977).
2. R. Pohl, *Search* **7**, 345 (1976).

The well-researched and thoughtful review of the persistently deplorable state of the nuclear waste management by Carter is harshly criticized by Cohen, who claims that Carter, at least by implication, grossly exaggerated the potential health risks posed by this waste. To make his point, Cohen presents some of his own health effect estimates, which are indeed marvelously small. What he does not mention, however, is that these estimates are based on model situations which bear no resemblance whatsoever to the current state of the waste management reviewed by Carter.

For example, in describing what he calls the principal hazard scenario for the waste, Cohen seems to assume that the high-level waste is in a geologic repository deep underground in bedded salt, from where the radioactive releases are

predictable, delayed, and miniscule. His result, "less than one fatality per year from all the waste accumulated by a million years of all-nuclear power in the United States," has been seriously questioned previously on a number of grounds (*1*). In the present context, there is no reason why estimates based on Cohen's assumptions should apply to the risks posed by the waste as it is currently managed.

Similarly, for people living close to the burial sites for our major low-level nuclear wastes it must be rather uninteresting to be told what this waste would do to human health if it were distributed uniformly throughout the soil of the United States, as Cohen apparently assumes in estimating the health effects (that is, the absence thereof) caused by this form of nuclear waste. Rather, what these people want to know is whether their land or their rivers may eventually become permanently contaminated by the effluents from the existing burial sites and what should be done to avoid this pollution. The same consideration applies to the waste that leaks from storage tanks. This is precisely what Carter discussed.

Certainly most biologists would discourage anyone from eating fission waste, irrespective of its age, as well as cinnabar (mentioned by Cohen as being more dangerous to eat than fission waste); the difference between the two substances, however, is that nobody has proposed to base our future economy on this compound of mercury. Efforts to belittle the nuclear waste problem with comparisons of this kind are bound to be counterproductive.

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References

1. F. von Hippel, *Phys. Today* **29**, 68 (August 1976); R. O. Pohl, *ibid.* (November 1976), p. 13; D. G. Jacobs and J. E. Turner, *ibid.*, p. 15; H. T. O'Keeffe, *ibid.*, p. 86.

Solar Eclipses and Ancient Artistic Motifs

John A. Eddy is to be congratulated on his article "The Maunder Minimum" (18 June 1976, p. 1189) showing the distinct changes in the behavior of the sun that have been recorded since the invention of the telescope, and for carrying the record further into the past by using the earlier, naked-eye observations. I would like to propose yet another means to