change such that we can again take up and build upon the strong bonds of collaboration and understanding already forged in JCC-FPM activities. Critical to this change is the rebuilding of the necessary open and free atmosphere.

Let us assure you that it is with the deepest regret that we find it necessary to take this action. We had much looked forward to meeting you, to visiting your Institute, and to exploring areas of possible future collaboration. And we look forward to a future time when such activities can be resumed as an important part of the truly international fabric of our science.

D. ALLAN BROMLEY
Yale University, New Haven, Connecticut 06520
HERMAN FESHBACH
Massachusetts Institute of Technology, Cambridge 02139
GERALD T. GARVEY
Argonne National Laboratory, Argonne, Illinois 60439
EARL HYDE
Lawrence Berkeley Laboratory, Berkeley, California 94720
O. LEWIN KELLER
Oak Ridge National Laboratory, Oak Ridge, Tennessee 37830
JOSEPH WENESER
Brookhaven National Laboratory, Upton, Long Island, New York 11973

Solar Energy in 2000

I must comment on Luther J. Carter's article of 12 May (News and Comment, p. 627), in which he discusses the recent solar energy report by the Council on Environmental Quality (CEQ). I feel I was quoted in that article in a manner that did not reflect my intended meaning. Frankly, I think the CEQ estimate that 25 percent of America's energy will be provided by solar technology in the year 2000 is probably optimistic. Although it may seem curious, I use the nuclear industry as a rule of thumb. This amounts to comparing a complex industry (nuclear) with what in most cases is a much simpler one (solar). However there are factors that tend to cancel the nuclear industry's increased complexity, such as the strong contributions from the weapons and naval reactor programs and the unquestioning support of congresses and presidents during the 1950's and 1960's. Thus a well-supported, successful program was able to supply about 10 percent of the nation's electrical energy (2.5 percent of total energy) approximately 20 years after commercial demonstration, and 30 years after the beginning of the R & D program. Because solar energy is not limited to just the electricity market, I feel it can supply from 5 to 10 percent of the nation's energy by 2000.

This business-as-usual projection has many uncertainties associated with it. Probably the most significant is the extent to which solar energy is perceived as more than just another energy option, although one with relatively benign environmental and health impacts to balance its present economic limitations. A projection of 5 to 10 percent by 2000 is low to the extent that solar energy is increasingly perceived as a symbol of a new way of thinking about the future. This emerging mind-set or cultural paradigm would look to solar as an energy source with significance beyond narrow marketplace economics.

My other major point was that projecting that solar energy will provide 5 to 10 percent of the nation's total energy by 2000 does not mean that it is not an important part of the solution to our *current* energy problems. I find this attitude as unrealistic as a projection that the solar share of the market will be 25 percent by 2000.

RICHARD CAPUTO
Solar Energy Research Institute, Golden, Colorado 80401

Paraquat Pyrolysis Products

R. Jeffrey Smith, in two recent articles (News and Comment, 24 Feb., p. 861, and 28 Apr., p. 417), describes a health hazard arising from the presence of the herbicide paraquat (1,1′-dimethyl-4,4′-bipyridinium dichloride) on marijuana supplies obtained from Mexico. Smith states that pyrolysis of the paraquat results in the formation of "bypiridine," which is not considered to be cause for concern because it is present in smoke from tobacco cigarettes. Actually, the pyrolysis product of paraquat is 4,4′-bipyridine, a compound which has never been found in tobacco smoke. The only bipyridines which have been detected in tobacco smoke are the 2,2′ and 2,3′ isomers (*1*). 2,2′-Bipyridine decreases gastric secretory volumes and pepsin output in rats (*2*). I am not aware of any studies on the pharmacology or toxicity of 4,4′-bipyridine, but it seems highly unlikely that it is completely innocuous.

EDWARD LEETE
Natural Products Laboratory, School of Chemistry, University of Minnesota, Minneapolis 55455

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