

## "Perils of the Peaceful Atom" revisited

Although he may not believe it, I can truthfully sympathize with the position Walter H. Jordan finds himself in, over the criticisms directed not only by laymen like Richard Curtis and me in our book, "Perils of the Peaceful Atom," but by a growing number of scientists, toward nuclear power plants.

In his opening paragraphs of "Nuclear Energy: Benefits versus Risks" (May, page 32) Jordan expresses very well the psychological barrier that keeps many nuclear-power proponents from being able to take an objective attitude toward such criticism. He states that he feels "betrayed" because he felt "a sense of righteousness" in promoting nuclear energy in the belief that this would eliminate health hazards and prove a genuine blessing to mankind.

As we took pains to point out in our book, Jordan was not alone in this belief: it was shared by all early proponents of peaceful nuclear power—including the first chairman of the AEC, David E. Lilienthal. Unlike many others, however, Lilienthal was wise, humble and honest enough, as the years went by, to recognize a number of previously unknown threats to public safety. Hence, in 1969, he termed the growing number of nuclear plants "one of the ugliest clouds overhanging America."

The more common tendency of other early proponents to minimize the significance of documented cases where inferior materials, poor workmanship and inadequate inspection have made major accidents far more probable than the "ideal" conditions which such proponents persist in projecting, constitute the greatest problem those of us who oppose nuclear plants face.

No one can blame early-day proponents for failing to recognize safety problems before these became obvious—but the proud, blind failure to do so now is blameworthy. Misleading statements about the "benefits" of nuclear power plants are equally so.

The statement that though construction costs are higher, "operating costs are much less" for nuclear plants, is one example. This does not appear to be true thus far, for the majority of operating nuclear plants; it would be even less true without the enormous sub-

sidies—direct and indirect—granted utilities who operate them.

Further, repairs for nuclear reactors tend to be much more costly than those for conventional power plants—not only in terms of money, but equally in terms of time and "shutdowns."

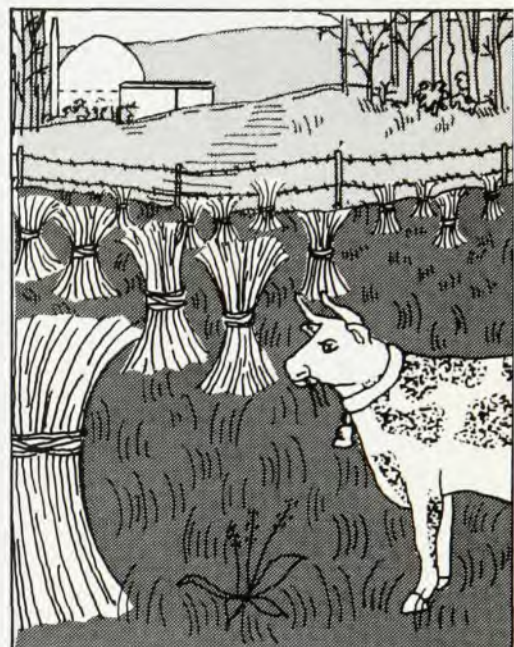
Again, Jordan does not seem to have consulted the same "Brookhaven Report" of potential consequences for major accidents that I have. He states that the authors of this report "gave no credit for containment." My copy of the Brookhaven Report reads:

"A leak- and pressure-resistant containment building of the usual type is assumed to surround the reactor," (page 7). And again, (under "The Volatile Release Case," page 11): "Here it was assumed that, because of a breach in the container or failure to close all openings, all volatile fission products would be discharged to the atmosphere at the time of the accident."

Jordan also attempts to allay fears by referring to the "exclusion area" around reactors, and the low-population zone outside of that. Con-Edison's "Indian Point" reactor, soon to be joined by two much larger reactors, is a good example of how much dilution of radioactivity could be expected before this would reach a population center—defined by the AEC as an area containing more than 25 000 persons. Indian Point is actually one mile from a population center, and the estimated population within ten miles is 155 510. (Readers who are interested will find population densities within ten miles of other operating nuclear plants on page 128 of the Ballantine edition of "Perils of the Peaceful Atom.")

But the most grievous "blindspot" revealed by Jordan is his attitude toward the *normal* operations release of radioactivity from nuclear plants. He states that "The whole argument has to do with defining a 'small amount' of radioactivity."

This is very far from the whole argument. The major argument of those who oppose nuclear plants is that the release of very small amounts of radioactivity (into rivers, for example) tends to concentrate thousands of times over in fish. The numerous ways in which the same individual can receive doses

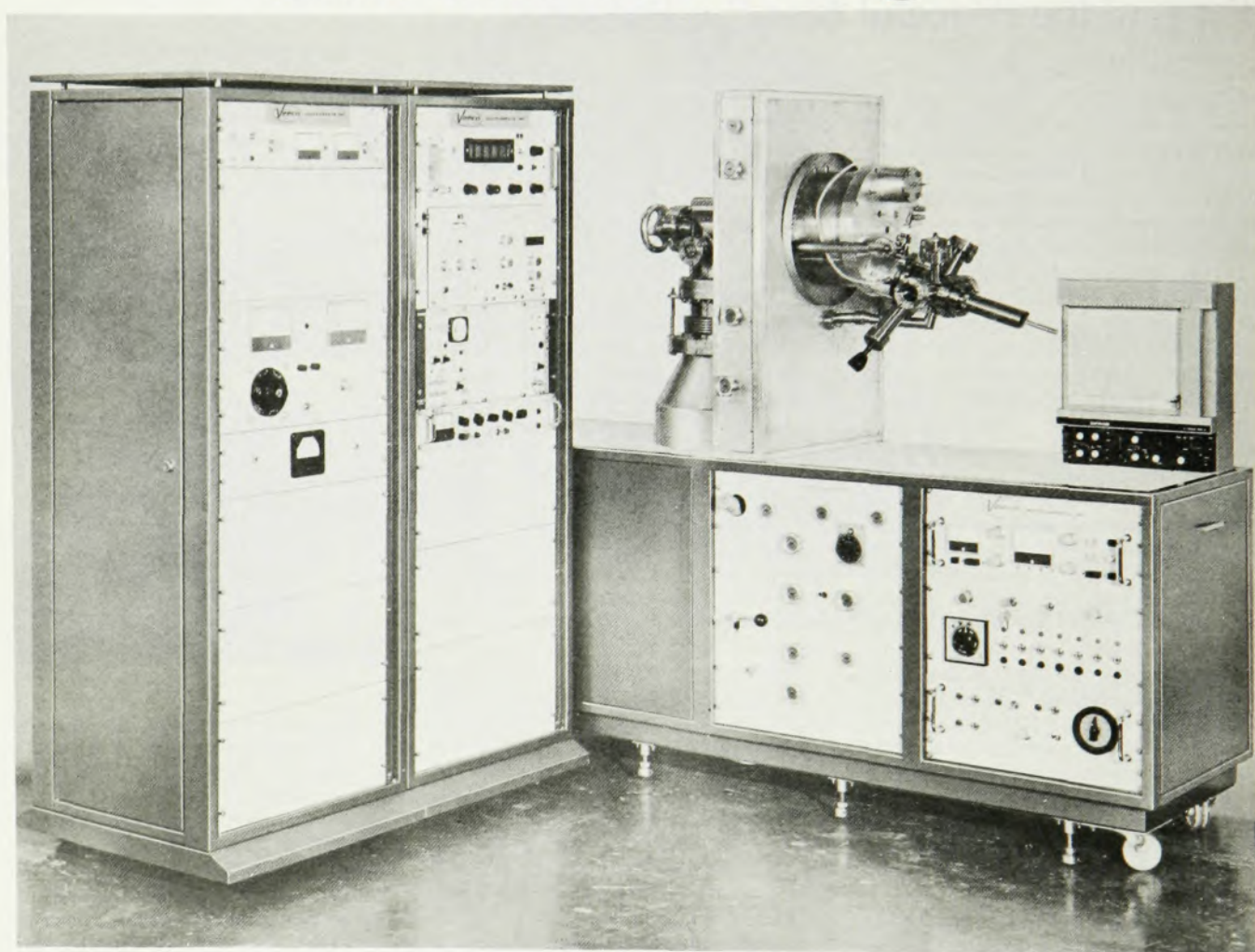


of such concentrated amounts of radiation (in his milk, fish, vegetables, and so on) added to the amount received in air and drinking water—and coming from an increasing number of reactors, reprocessing plants and other sources—makes the concept of anyone ultimately receiving a "small amount" unrealistic.

It is true that fossil-fuel plants involve their own health hazards—and they do emit smoke. But as Jordan himself notes we have the option of removing much of this pollution from the smoke stacks; not entirely, but to a very great extent.

Finally, it is unfortunate that Jordan and others are so deeply concerned that the supply of conventional fossil fuels will be exhausted "in 50 years or 200 years." Surely there is a reasonable hope that sometime in less than even 50 years man may have progressed to the point where he would be better able, psychologically, to handle the awesome power of the atom—should this prove necessary. It is also reasonable that a better understanding of alternative sources of power: solar energy, tidal and geothermal power, and so on, could make this unnecessary—in considerably less than even the minimal 50 years "grace" Americans have left

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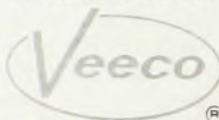
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## letters

if we clean up and use conventional fuels.

Instead, our government and industry seem determined to forge ahead with nuclear power plants.

Yet the failure of nuclear proponents to "see" the point: of several-thousand-fold concentrations of man-made radiation in certain foods, or large numbers of *different* sources—each of which are legally allowed to yield their "maximum permissible dose"—will not prevent the cancer, leukemia, and other injuries predicted from materializing.

ELIZABETH HOGAN  
New York, N. Y.

**THE AUTHOR COMMENTS:** For Miss Hogan, of all people, to complain that another's writing is not objective is truly incredible. She is coauthor of "Perils of the Peaceful Atom," which is surely one of the most biased books ever published. It was reviewed by James Beckerly and Norman Hilberry who pointed out that the book was filled with errors of fact and quotations that are deliberately misleading. They summarize the review by stating: "The reviewers conclude that this book is not a balanced account of the safety aspects of present and future nuclear-power production. It is strictly a biased, misleading, sensational political tract. It constitutes a public disservice. We are sorry to see it published, not just because it is a bad book, but because we sincerely feel that a factual, balanced, honest discussion of the problems of nuclear power, as they really are, is badly needed by the public. It could be written."

I see no point in debating the eco-

nomics of nuclear power with Miss Hogan; let the utilities beware when next they choose to build a nuclear plant. As for the "Brookhaven Report," my statement is borne out by the two sentences that Miss Hogan quotes. Since it was "assumed that, because of a breach in the container . . . all volatile fission products would be discharged to the atmosphere . . .," then it must surely be apparent that the authors "gave no credit for containment" even though there was a containment vessel. It is indeed the possibility that somehow the containment vessel will be breached or left open that is of greatest concern to all nuclear-power-plant designers and licensing officials. Nuclear accidents may be a possibility, however remote, but so long as the containment vessel is intact no one will be injured. I agree that locating a nuclear power plant at Indian Point would be too great a risk if it were not contained. I am sure that Miss Hogan does not speak for the majority of the 155 510 residents living within 10 miles, who prefer the small risk of a nuclear incident to the certain atmospheric pollution that would result from a fossil-fueled plant.

As she was in her book, Miss Hogan is again caught up in her misunderstanding of the radiation protection guides. The maximum permissible concentration of radioisotopes in gaseous and liquid effluents from a nuclear power plant is based on the restriction that the people living near the plant will receive no more than 170 millirem per year (mr/yr) under any circumstance. It is true that the limits given in Title 10, Part 20, of the Code of Federal Regulations are based on breathing the air and drinking the water at the boundary of the plant. However

if there should be a fishing community nearby that subsists largely on the fish they catch, and if these fish contain concentrations of certain radioisotopes, then these concentrations must, by controlling the effluent, be kept low enough that the residents of this community will receive no more than 170 mr/yr when all the pathways of all the radioisotopes are added together. As another example, the effluent limits for radioactive iodine are usually much less than that specified in 10 CFR 20 because of the possible concentration of iodine in milk. There has been and continues to be a conscientious effort to understand and identify all the possible food pathways to man; Miss Hogan does a great disservice in continuing to raise the spectre of an irresponsible nuclear industry and Federal Radiation Council who conspire to expose the population to damaging radioactivity. Recent surveys have shown that people now living near operating reactors are receiving less than 5 mr/yr above background; much below what they receive in x rays, less than the residents of Denver or Albuquerque receive in additional cosmic rays.

Finally, as to Miss Hogan's solution to the energy crisis, I recommended to her and to others a study of Chapter 8 of the recent report of the Committee on Resources and Man, National Academy of Sciences—National Research Council. The author, M. King Hubbert, points out that we are facing an energy crisis, that fossil-fuel resources are indeed limited, and that alternative sources, such as those suggested by Miss Hogan, are not feasible.

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## What interests nonscientists?

I read with interest the letter (July, page 17) by P. L. Walker, Jr concerning the role that applied-science departments are and should be playing in teaching science to nonscience majors. Walker seems to assume, as do so many "pure" researchers, that the only way to justify science to the nonscientists is to emphasize the practical applications, both actual and proposed, that result from basic research. Certainly there is a need to have students (both science and nonscience majors) understand

some of these applications as well as to have them better understand the role of science and technology in our society. Yet there is another aspect to this relationship between science and the layman that is often overlooked.

Why is it that the most popular science course for nonscience majors in many colleges is still "general astronomy," a subject with very few practical applications? Could it be that even nonscience majors are interested in such things as the origin of the solar

system, neutron stars, quasars, the age of the universe, the notion of hyperspace and so forth? I submit that they are. And that many are also interested in antimatter particles, what happens to matter at very low temperatures, the origin of life, how information is stored in the brain and many other areas of investigation now at the frontiers of science. I suggest that they also have some interest in how these investigations are carried on, what it is in the nature of science that makes such investigation valid, what are the limitations of the methods employed by scientists and what are the characteristics of the scientists who conduct such research. Of course they do not care to go into these subjects in the same depth and detail as science students do, but they are interested in knowing what these discoveries are and how they

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