

# **Radiation and Social Ethics**

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This is an excerpt from a paper of physicist and late Father Cullen, published in the ITEST Monograph, 1981.  
Many years later it is still up-to-date.



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...Let me now talk of the ethical obligation of the scientific community to inform and educate the general public. If we pay more than lip service to the ideals of democracy, we must admit that the people must decide on the question of nuclear power. Experts have their place, but the people run the risks.

The nuclear industry was the first to present its technology to the public, emphasizing all the elements of risk, because it had no choice. It came to world attention in the form of atom bombs. The task of explaining both benefits and risks to the people has been the task of physicists since 1945. In this duty we have failed miserably.

There are two difficulties: the media experts, and the difficulty of transmitting the ideas. It's not easy for scientists to communicate directly with the public. They might do well in the classroom, but they lack the sophistication of the media. Media experts have acted as a filter to the scientists' message and have distorted it...The sensational will be emphasized at the expense of the commonplace and reasonable. What might happen, becomes more important than what does happen. They have created what I call "science in the subjunctive mood."

We have behind us now eighty years of radiation history. We have fifty years experience working with radiation protection. It is in the past indicative mood of this human history that we should seek the wisdom we need, not in the subjunctive mood of what might happen. For example, there are some 1800 people with permanent body burdens of radium in their bones, and these include the luminous watch dial painters from the 20's. There are the atom bomb survivors of Hiroshima and Nagasaki. There are uranium mine workers. Here in our own country (Brazil) we have the steady population of the city of Guarapari in the monazite sand zone of Espirito Santo.

... in the study of such cases...we find what radiation dose produces, for example, cancer... We know that, of the radium dial painters and others with radium in bones, approximately 100 died of cancer; 1700 did not. Those who died of cancer can tell us something important about radium. Perhaps those who did not might also tell us something important.

Besides the impermeability of the news media, however, there is the added difficulty of communicating the subject matter. How can you tell the public what it should know about a radiation beam, when the units of absorbed radiation are so intangible, and necessarily so. When we think of ordinary physics we can use our imagination. Think of a meter, and you picture a giant step; of a kilogram, and you feel the weight of a book; of a second, and you count slowly. These are tangible. The units and the concepts of radiation are different, the roentgen, rem, rad, and the new sievert and gray. Like radiation itself they are colorless, odorless, tasteless, intangible and impalpable. How does one explain the cause-effect relation when the units of the cause, the dose, are so unknown?

These are difficulties, the media and the units. But if scientists had been really sincere in fulfilling their ethical duty to inform and educate public opinion, they would have found a way to break through. I recall only too well the painful case of the Brazilian Society for the Progress of Science. In a meeting not too long ago they discussed nuclear power and energy programs. They were only interested in being heard by the government, not in educating the people. They felt they should be heard because they are an elite. For them democracy begins from their level up....

In my course in Radiological Physics I discuss the interaction of radiation with the DNA molecule and the genetic effects. Every student has already been conditioned by the media to imagine the worst. When I mention that atom bomb survivors of Hiroshima and Nagasaki, I invariably get the push-button reaction: there must have been a lot of deformed children and monsters born there. Weary of this science-in-the-subjunctive, I ask them to look into the reports of the Atom Bomb Casualty Commission and the United Nations Scientific Committee. Any genetic damage would first show up in the item infant mortality. The U.N. Report on that score states: "Analysis of the data has shown that no significant effects of parental exposure on childhood mortality

can be demonstrated.” In other words, during the generation that has passed, or 35 years, they have not been able to find genetic effects due to radiation among the atom bomb survivors.

If you were surprised...at this story it is a clear proof that the scientific community has failed in its ethical duty to inform and educate the public.