

SCIENCE

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Clean Thoughts on Clean Air

Will the human species be able to save itself, or will it foul its nest so completely that all life will eventually be extinguished from the Earth? The apocalyptic views of the future of this planet receive many headlines, some from those who believe what every doomsayer says is true and some from those who work to belittle all such cries of alarm. The blunt truth is that the pollution problem is real, but exaggeration and misdiagnoses have not helped its resolution. More people are living on this globe today than ever before, and many are living better than ever. That means a higher standard of living, more use of energy, and more products and toxic wastes that must be disposed of. The first people to alert us to this problem, of whom Rachel Carson with her *Silent Spring* and Garrett Hardin with his *Tragedy of the Commons* are stellar examples, did so with eloquence and foresight and produced a movement that, to its credit, in large part alerted all the rest of us to the danger of drift toward an ever more polluted planet. The clear message is that preserving the environment is essential, but it will not be cheap, and it requires us to pay a price in jobs, in standard of living, and in sacrifice from each individual for the common good.

So far so good, but some environmental activists, probably afraid that nobody was listening, sometimes overstated their case and demanded actions that in some instances were not cost-effective (for example, regulations such as benzene protection, where the cost per hypothetical life saved is \$20 million) and in some other cases not effective at all (Superfund's requirement for superbly clean soils even at sites to be placed under freeways). It is time to take stock and develop strategies for a reasoned course of action from which exact implementation steps will follow.

First of all, it is important to identify the main villain as overpopulation. In the good old days (viewed through the myopia of nostalgia), the water, air, flora, and fauna existed in an idyllic utopia. But in truth there were famine, starvation, horses and buggies that contributed to pollution, fireplaces that spewed forth soot from burning soft coal, and water contaminated with microorganisms. The humans were so few, and the land so vast, that these insults to nature could be absorbed without serious consequence. That is no longer true.

In recognition of the population pressure, one of the other major errors of the past that can now be corrected has been to separate the manufacture of a product from its disposal. The customer wants a car that runs efficiently and is highly durable, but it is to be discarded in a city dump paid for by the taxpayers. If the law required the car to be designed to make its disposal easy, the corporation would have an incentive to design cost-effective disposal, and the user would pay the extra fee in the price of the car. This approach to pollution prevention is now being applied in a number of products and is the kind of scientific planning that must be extended. Perhaps somebody should have thought of biodegradable cars, or bioengineered humans, half of whom produced O_2 instead of CO_2 , or cows that ate plastics and newspapers. But none of those things happened, and it is silly to sit around blaming the evil corporation for producing what the public wanted or evil developed countries, whose standard of living is desperately wanted by underdeveloped countries.

In a letter to this journal (this issue, page 1373), the new Environmental Protection Agency (EPA) administrator, Carol Browner, brings a breath of fresh air to a political atmosphere that at times seems more polluted than any toxic dump. The agency for which she is the administrator has in the past been a source of difficulty because its regulations seemed more political than scientific. The EPA has had a scientific advisory committee, but its recommendations were largely ignored. Administrator Browner indicates that will no longer be the case.

The environment needs the kinds of basic research in long-term strategies and goals that are already present for health in the form of the National Institutes of Health and in physics and chemistry in the form of the National Science Foundation. A program of intramural and extramural research together with more scientific input at EPA headquarters would be a big help to an environmental movement whose goals are desirable and lofty but whose tactics are sometimes questionable. Administrator Browner indicates that she wants to bring the scientific community into the development of an environmental strategy, and that is an excellent beginning.

Daniel E. Koshland Jr.