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# Waste Management and Control

The committee on pollution of the National Academy of Sciences—National Research Council (*Science*, page 329) has produced an excellent report.\* The document is readable, rich in fresh viewpoints. In its recommendations it outlines major problems and points to gaps in knowledge, but it does not promise that the problems of waste management will be solved if only enough money is poured into research and development. Rather, it deals with the matter broadly, emphasizing both the technical and the political aspects.

The document's readability is due in part to the level of presentation but even more to the insights it provides. "Pollutants are the residues of the things we make use of and throw away. . . . As the earth becomes more crowded there is no longer an 'away'. One person's trash basket is another's living space."

The report states our present waste disposal problem concisely: "Our whole economy is based on taking natural resources, converting them into things that are consumer products, selling them to the consumer, and then forgetting about them. But there are no consumers—only users. The user employs the product, sometimes changes it in form, but does not consume it—he just discards it. Discard creates residues that pollute at an increasing cost to the consumer and to his community."

The problems of waste management and control are numerous, complex, and more serious in some regions than in others. In urban areas they take three major forms—air pollution, water pollution, and disposal of solid wastes. The major contributors to air pollution are motor vehicles, including automobiles, and generators of electricity. In many metropolitan centers the level of pollutants is already high, and unless vigorous efforts are made, the levels will become even more dangerous.

Water pollution, already serious, is destined to get much worse. Even with efficient waste treatment, by 1980 our effluents would be sufficient to consume all the oxygen of all the dry-weather flow of the 22 river basins in the United States. A factor of growing importance is the thermal contribution of electrical power stations which use river water for cooling. A warm river cannot dissolve as much oxygen as a cool one; hence it becomes anaerobic more readily.

The production of solid wastes is now about 8 pounds per person per day, and it is increasing; there are more people, they use more things. In addition, there is less salvage. Many cities have exhausted their cheap sites for dumps and must haul refuse farther and farther away. The area required for sanitary landfill is about 1 acre per year per 10,000 population for each 10-foot layer of waste deposited. Unless policies change, the urban centers will become surrounded by mountains of waste.

In dealing with pollution problems, the technological ones are not the main ones. New public policies and institutional arrangements are needed before technological possibilities can be exploited. Political boundaries often do not correspond to watersheds, and air pollution moves across state lines. Many problems can be dealt with on a local or regional basis. However, the federal government should take more initiative, especially to stimulate research on pollution and the development of new instrumentation. It should encourage adequate collection and proper evaluation of data and should develop standards so that local authorities may obtain informed advice.

The problems of pollution and waste management are difficult and complex, but they will yield if the public demands action and if political authorities utilize effectively our scientific and technical capabilities.—PHILIP H. ABELSON

\* "Waste Management and Control: A Report to the Federal Council for Science and Technology," *Nat. Acad. Sci.-Nat. Res. Council Publ. 1400* (1966).