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## Industry and Environment

In the 2 June issue of *Science*, the Autonetics Division of North American Aviation advertised its interest in employing scientists and engineers interested in helping "to make the desert bloom, the streets safe, the teacher more effective." A year ago, at the Twentieth Anniversary Celebration of Cornell's Department of Engineering Physics and Graduate School of Aerospace Engineering, Arthur Bueche, vice president in charge of the General Electric Research and Development Center, promised that "industrial companies must take a broad and imaginative look at the truly big and exciting challenges of the future." His examples included the rebuilding of cities, control of our environment, and education as a continuous and life-long process. Other persons might have included crime, transportation, and environmental health.

Government, universities, and industry must all help solve these problems, but not all of their responsibilities nor the interrelationships among them have emerged clearly. Government action can force industrial participation through tax incentives or by setting standards (for example, on air or water pollution), and so far these have been the chief forms of government-industry interaction on the problems of improving the quality of the environment. Government agencies might do more. For example, because most of the cost of polluting land, air, and water or of destroying the convenience and amenities of a city are passed on to others instead of being borne by those whose actions bring about these results, government agencies might conduct the studies necessary to determine the total costs of such changes more accurately, to provide a firmer basis for analyzing requirements, comparing alternative actions, and making decisions. The universities, too, could contribute more effectively, through analyzing problems and conducting necessary research.

But the industrial role is in some ways the most interesting, for practicable solutions can probably best come from industry, especially from the segments of industry that can apply extensive research-and-development competence to work on large social and environmental systems. But how is industrial effort to be enlisted? Perhaps some problems can be handled through the traditional, competitive, market economy. For example, establishment of government standards would create substantial markets for apartment-house incinerators, exhaust controls, and other devices designed to minimize air pollution. Industry, or at least its military component, has also adapted to situations in which there is only one major customer, the federal government. Perhaps some problems can be handled in this fashion. (Is crime control an example?) But neither the traditional market place nor the single-customer mechanism is sufficient. If it be agreed that the experience and skill of industry in solving large-scale technological problems will be necessary to solve large-scale environmental and social problems, means must be found for generating industry's interest and for rewarding effective work. Interest is already evident, as the first paragraph illustrates, but some of the appropriate incentives are still to be found. Among the developments to be looked forward to will be new social, economic, political, or organizational inventions that will motivate vigorous industrial competition to improve the quality of the environment.—DAEL WOLFLE