Solutions to Environmental Problems

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This symposium is cosponsored by the American Society of Naturalists and the Society for the Study of Evolution, two organizations noted for their theoretical emphasis and "ivory tower" approach to "pure" science. Even so, the members of these societies have been concerned with the symptoms of overpopulation for several decades. These symptoms, currently pressed on the public conscience, include pollution, environmental deterioration, exploitation of natural resources, elimination of environmental variety, irresponsible advertising practices, panic responses to prophets of doom, and frequent postures of self-interest groups in defense of positions. Too often proposed solutions to environmental problems are either placebos or merely treat symptoms. The solutions must be found in an adequate understanding of the basic environmental information, education, agreed goals, and basic changes in attitudes and behavior patterns.

The understanding of environmental information is hampered by the sparsity of broad-based approaches to knowledge. Historically an increase in knowledge results in specialization of scholars. By concentrating on one or at most a few variables or goals massive strides in petroleum discovery and utilization, nuclear energy release, molecular biology, and space travel have been accomplished. Occasionally even groups of nations have united in common military goals with varying success. Even so, the consequences of reaching these objectives have not been predetermined, or preguessed, and often not recognized after the fact. These specialized approaches have led to constricted visions of the whole system. The public, now fully aware that something is wrong, want quick (and preferably easy and cheap) solutions and particularly want to "return to normal."

The interrelated nature of all parts of the human-environmental complex is becoming increasingly, and sometimes, painfully clear. Because of this characteristic it is necessary to develop and utilize an adequate model which encompasses all of the kinds of function within the world system. Only in this way can there be hope for the solution of short- and long-range problems and the provision for adequate bases for rational, as contrasted with largely intuitive, planning.

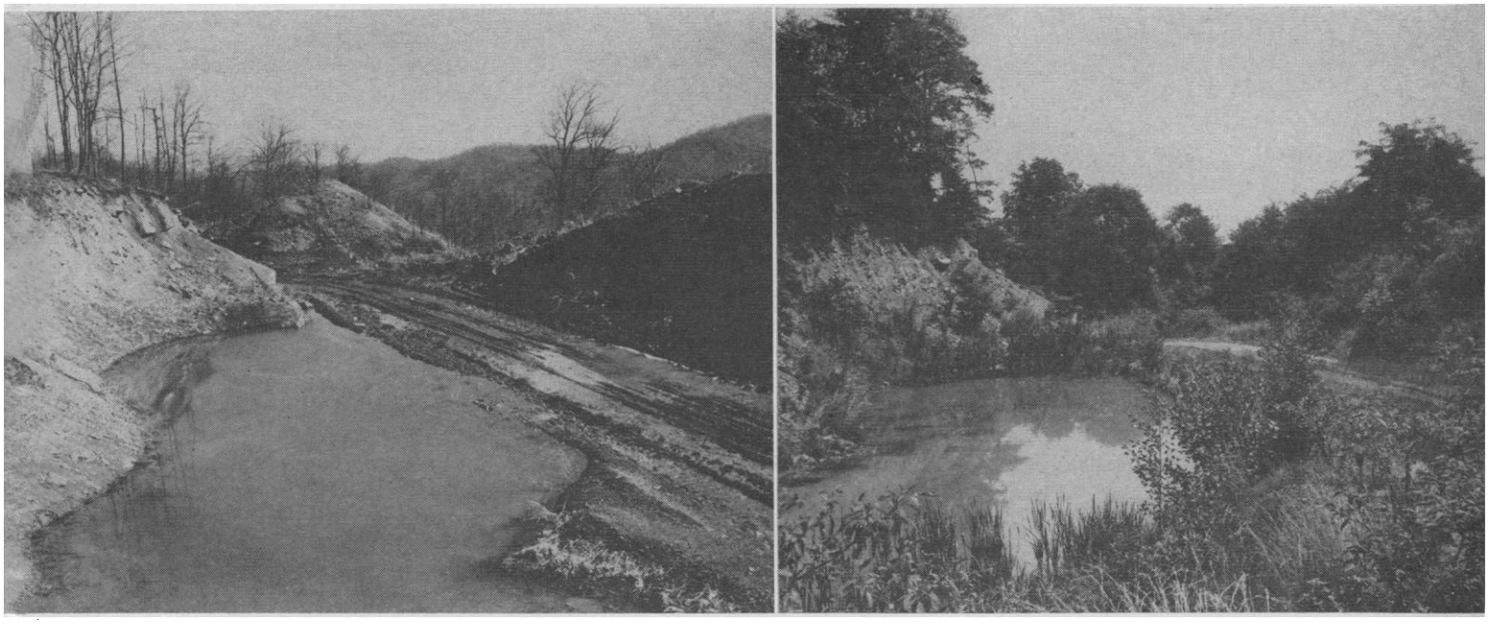
Bassett Maguire, Jr. (chairman, World Microcosm Project, University of Texas at Austin) will outline the progress which has been made and report on some of the problems which have arisen in one broad-based, holistic study. Many persons from government, business, and academia were mobilized to cooperatively bend their talents toward the production of a model. A fairly large portion of a state has been chosen to serve as an example of the world. This area contains natural areas, farms and ranches, villages, towns, cities, and a major metropolis. People so far involved come from the interest areas of agriculture, architecture, anthropology, biology, business, communication, education, economics, engineering, fine arts, geography, geology, government, law, management, medicine, philosophy, politics, psychology, sociology, and theology.

In models, such as this one, which may have a great impact on major planning decisions, it is critical that the goals are carefully and fully explicated in terms of determination and maximization of the quality of human life.

A major environmental problem in a rapidly developing country like the United States is the preservation of unusual and esthetically beautiful biotic communities, as well as of rare species of animals and plants that are endangered by urbanization, suburban and resort real estate developments, agriculture, and lumbering and mining interests. This problem is particularly acute where large areas are under the control of various governmental agencies, including federal, state, and regional, as well as large private landholders and multiple complexes of small owners. G. Ledyard Stebbins (Department of Genetics, University of California, Davis) will report on the compilation of an inventory of those valuable areas in California that need to be preserved, and steps that need to be taken to preserve them.

Effective solutions to environmental problems demand some degree of understanding on the part of the general public. A basis for such understanding must be laid in the schools. Haven Kolb (Hereford Junior-Senior High School, Parkton, Maryland) will discuss the role of the secondary schools where many curriculum areas can contribute to environmental understanding. These students are at a stage of development where a modicum of sophistication is possible and, most important, almost all future voters can be reached. One attempt to foster cooperation between social studies teachers and biology teachers in an approach to environmental problems will be described in detail.

Bruce Wallace (Department of Biology, Cornell University, Ithaca, New York) will describe the new courses which have been set up at Cornell and will discuss the role of student activities in finding solutions to environmental problems.



One solution to an environmental problem. Demonstration of strip mine reclamation. (Left) Area before work was started. (Right) Same area, about 3 years later. Proper drainage and tree planting stabilized spoil banks and made access road usable. Area was planted with black locust, European alder, bicolor lespedeza, and wildlife shrubs and grasses.

Both the attainment of research knowledge and the dissemination of that knowledge are required for the development of policies. In our society participation in the process of defining means and goals will lead to greater participation in the attainment of those goals. David L. Jameson (Department of Biology, University of Houston, Houston, Texas) suggests a preliminary goal and a set of criteria which may be used as starting points for expansion, development, amplification, and study. The basic position involves the utilization of renewable resources and concentration on increase in renewability of resources. Maximization of human variability is considered as a necessary renewable resource. Various levels of regulation of numbers and variety of people are identified and control by the use of responsible resource allocation is proposed.

Government regulation is not adequate to establish or maintain solutions to environmental problems. The pesticide problem illustrates that solutions depend not only on the quantity and quality of scientific evidence available, but also, in large measure, on public attitudes concerning the problem. Evidence concerning the ecology of the pesticide problem, the recommendations of the investigations, and proposed solutions will be evaluated by David Pimentel (Department of Entomology and Limnology, Cornell University, Ithaca, New York).

Robert Reis (School of Jurisprudence, State University of New York, Buffalo, New York) will discuss specific problems encountered with formulation and enforcement of government regulations. Experience has shown that good laws frequently are not accompanied by adequate administrative structures and budgetary support, while poor laws are often supported by impotent bureaucratic agencies.

Discussion by the participants and by the audience will be encouraged. To predict that this discussion will emphasize the need for basic changes in the behavior of people and their institutions and social structures does not require a crystal ball. This time there will be no return to normal.

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Program of the AAAS Annual Meeting appears in the 20 November issue of Science. *Reports of symposia are in the following issues: 28 August, "Human Behavior and Its Control"; 4 September, "Land-Use Problems in Illinois"; 11 September, "Aleutian Ecosystem"; 18 September, "Reducing the Environmental Impact of Population Growth"; 2 October, "Critical Issues in Research Related to Disadvantaged Children"; 9 October, "Women in Science"; 16 October, "Advances in Human Genetics and Their Impact on Society" and "Genetic Diseases and the Quality of Life"; 23 October, "The International Biological Program"; 30 October, "Mood, Behavior, and Drugs"; 6 November, "Urbanization in the Arid Lands," "World Cities of the Future," and "Industrial Approaches to Urban Problems"; 13 November, "Biocybernetics of the Dynamic Communication of Emotions and Qualities" and "The Developmental Sciences: State and Fate of Research Funding"; 27 November, "Crime, Violence, and Social Control," "Interstellar Molecules and Chemistry," and "Urban Ecology Today." Tour information appears in the 23 October issue.*