The Growth Question and Environmental Policy Issues

Limits to Growth?

Economic forecasts have been made for many years, and long-range growth studies have been carried on by various government and non-government groups, but value judgments concerning growth are a recent occurrence.

During the past year, the debate has sharpened with the publication of Jay Forrester's *World Dynamics* and Dennis Meadow's M.I.T. study *Limits to Growth* sponsored by the Club of Rome. Quite a different picture has been presented by the Resources for the Future study published for the Population Commission.

The symposium "Must We Limit Economic Growth?" (28 and 29 December), arranged by S. Fred Singer of the University of Virginia, poses a number of serious questions about future growth both in this country and throughout the world and seeks to develop some insights into the consequences of further economic growth or non-growth.

Must we take immediate actions to limit growth in the United States and in other developed countries in order to prevent a world catastrophe due to resource exhaustion and environmental pollution? Or, oppositely, should we encourage economic growth as much as possible in order to improve social conditions and wipe out poverty in the developed countries, as well as advance living standards in the developing countries?

Are we exhausting the resources of the world and thereby precluding a higher standard of living for the underdeveloped two-thirds of the world? Or can the underdeveloped countries improve their material well-being only by selling their resources to those who can make use of them?

If one assumes that population growth will be limited and confines the discussion entirely to economic growth or growth in per capita income, one may ask: What then would be the consequences of further economic growth and what would be the consequences of a situation of non-growth?

On the first day of this symposium there will be an exposition of different mathematical models of economic growth, together with a discussion of the disagreements surrounding the various studies—disagreements on facts, assumptions, scopes of studies, and on methodology.

The second day of the symposium will consider the key resource which, in essence, controls economic growth—the resource of energy. Limiting energy consumption, or making energy more expensive, is a means of slowing down economic growth, while providing abundant and low-cost energy would greatly stimulate economic growth.

Since the production and consumption of energy also cause some of the major assaults to our environment, while a higher energy consumption is often considered to be synonymous with a higher standard of living, this resource will be examined not only from the economic growth viewpoint, but its environmental, sociological, and technological contexts as well.

Participants will include: Dennis L. Meadows (Dartmouth College), Ronald G. Ridker (Resources for the Future, Inc.), Ronald E. Kutscher (Bureau of Labor Statistics), Vincent McKelvey (U.S. Geological Survey), Kenneth E. F. Watt (University of California, Davis), Allan Hirsch (Environmental Protection Agency), Leonard L. Lederman (National Science Foundation), Earl Cook (Texas A & M University), John Holdren (California Institute of Technology), Marc Roberts (Harvard University), Samuel F. Klausner (University of Pennsylvania), S. David Freeman (Energy Policy Project, Ford Foundation), Herman Kahn (Hudson Institute), and Lawrence Moss (Sierra Club and National Academy of Engineering).

Growth of Technology

The panel discussion "The Limits to Growth of Technology" (30 December), arranged by Glen P. Wilson, Professional Staff Member, U.S. Senate, will focus on the nature of technological growth, how it interacts with the other variables, and the necessity of such growth if there are any plausible non-catastrophic scenarios for the future of mankind.

Dr. Chauncey Starr will present a paper examining the historical genesis of some of our major technological capabilities. The generalized characteristics of these capabilities will be used as a basis for estimating the future production of technological options.

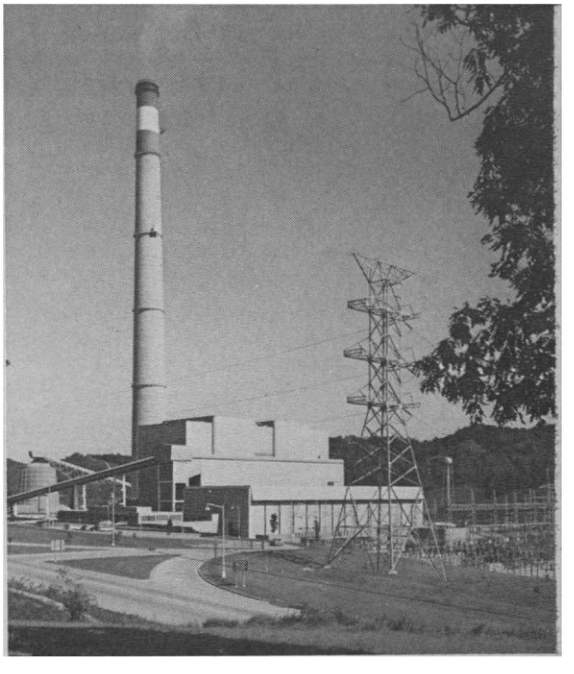
The panelists will discuss issues raised by the principal speaker and will offer contributions to the understanding of future technological growth based on their own areas of scientific and technical expertise.

Growth Models

Problems and uncertainties with attempts to produce environmental indicators and Forrester-type models are the subject of two programs arranged for this year's meeting.

The half-day symposium entitled "Statistical Methods and Problems in Ecological and Environmental Studies" (27 December), arranged by Stephen E. Fienberg of the University of Minnesota, will discuss constructive approaches to statistical and mathematical modeling problems in ecological, environmental, and health studies.

Environmental scientists and statisticians face many unresolved questions



TVA's Bull Run Steam Plant, with its 800-foot chimney. One of the largest generating units in operation, with a capacity of 950,000 kilowatts, At full operation the plant burns 7,584 tons of coal per day. Nearly 600 million gallons of water a day flow through the plant to condense spent steam from the turbines. [Tennessee Valley Authority]

regarding the nature and quality of the data produced by such studies, and the way in which the data can and should be used. For example, when is a threshold a true threshold and when is it a culturally determined number?; and how do we assign differential weights to the various components making up a set of environmental indicators?

Environmental scientists must come to grips with the problems of mathematical modeling of environmental systems. Some models are based on oversimplifications, while other models for smaller systems are highly multivariate with all variables incorporated in the modeling procedure. Which is the best approach for a given system? How sensitive are environmental models to changes in assumptions?

The half-day symposium entitled "An Evaluation of Forrester-type Growth Models" (26 December), arranged by Otomar J. Bartos of the University of Colorado, will examine growth simulations by comparing them with the known past. While these tests encounter numerous technical difficulties, a comparison of the actual development of four American cities with that predicted by the model suggests that the simulation is too pessimistic.

Does this comparison constitute a meaningful test of the model? What other ways of evaluating the model are there? What improvements, if any, are possible? The scientists participating in this symposium will seek answers to these questions.

Achieving Public Interests in Management of Land Resources

In Congress, in state legislatures, in county and regional planning bodies, and among the concerned public, there is a growing recognition that more effective land-use control is necessary to achieve more attractive, functional, rational, and environmentally sound patterns of land-use. The problems involved in the management of land resources are familiar, but rational solutions have been lacking.

Despite the apparent wide consensus on the importance of land-use controls to improve the quality of life, protect the environment, and meet the needs of population growth, the actual techniques of social control to accomplish land-use objectives are still quite primitive. Existing constitutional doctrines and legal theories for such control are narrowly based and social institutions for rationalizing the interrelated elements of land-use into effective public policies are woefully inadequate.

The symposium "Property Rights and Controls: Techniques and Institutions for Achieving Public Interests in Management of Land Resources" (27 December, Washington Hilton), arranged by Norman Wengert of Colorado State University, will examine what is known and what needs to be done to develop improved land-use controls.

Attorneys, economists, land management experts, sociologists, regional planners, political scientists, and others will be included in the program. Particular topics on which individuals will speak include: constitutional limitations on the control of land-use; relationships between population density or dispersal and land-use settlement and control; policies and problems related to land-use controls in megalopolis; managing growth in a fragile environment; prospects and problems of new towns; emerging federal interests in land-use controls and developing patterns of intergovernmental relations; and the political realities of land-use control.

This symposium promises to be one of the outstanding programs in this year's meeting as well as one having considerable relevance for the greater Washington, D.C., area.

NEPA: In Context, in Detail, in Court

Three programs in this year's meeting will focus on aspects of the National Environmental Policy Act (NEPA). One will examine broadly the act itself in the context of recent court decisions; the philosophy, methodology, and vigor of government agencies complying with NEPA; and the developments in environmental impact analysis.

A second will focus on the changes in the design requirements and the economic and national security issues surrounding the Trans-Alaska pipeline in order to examine the social-environmental decision process.

The third will examine and assess collaboration between lawyers and scientists in the environmental and public interest areas.

The National Environmental Policy Act of 1969 establishes a new standard of public accountability for the federal administrative agencies. NEPA places added responsibilities upon the agencies and the public alike to develop an environmental ethic and higher level of planning for public projects.

The act requires that the agencies now issue a comprehensive environmental impact statement on each federal action significantly affecting the quality of the human environment. As is now well known, noncompliance with the requirements of NEPA creates a cause of action enforceable by a citizen's lawsuit in the federal courts.

Despite the issuance of the primarily procedural guidelines of the Council on Environmental Quality and the development of the preliminary interagency draft review procedure, there is still a wide disparity in the quality of the statements which the agencies prepare. It has been the courts which have sharpened the substantive content of the impact statements.

Practical uncertainty still surrounds the state of the art of systematic environmental analysis and a proper balance must be struck between the data demanded for compliance with the act and the expense, staffing, and time limitations imposed upon the agencies.

At the Interface of Law and Science

The symposium entitled "The National Environmental Policy Act: At the Interface of Law and Environmental Science" (28 December), arranged by James W. Curlin of the Environmental Policy Division of the Library of Congress, will bring together lawyers, scientists, and administrators to discuss various aspects of NEPA in an interdisciplinary forum. Legislative history of the act will be discussed in the context of recent court decisions.

Agency representatives have been asked to discuss the current philosophy and methodology applied by their respective agencies in complying with NEPA. Representatives of the conservation organizations and intervener groups will comment on what they preceive as weaknesses or strengths of the agencies' approaches. Environmental scientists will discuss current developments in the methodology of envi-