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The Horseman and the Bureaucrat

by
Lindsey Grant

with contributions by
Clement Bezold
and
John Sterman

and a foreword by
Elliot L. Richardson

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In about 200 BC, when Liu Pang had conquered China, he was approached by Lu Chia, representing the Chinese literati -- the erstwhile officialdom. Lu Chia said to him:

"You can conquer the kingdom on horseback, but you cannot rule it on horseback."

A bureaucrat is not a very dashing figure, beside a man on horseback, but he had a point, and the Emperor took his advice. A large society is a complicated organism. No leadership will willingly abandon to the bureaucracy its prerogative to govern, but even the strongest leadership is wise to govern systematically and to solicit the best advice it can before it rides off in pursuit of its own enthusiasms.

Ancient China was big, but changes came slowly. The United States is bigger, and fundamental changes crowd upon the world in accelerating and bewildering confusion. Our government is regularly embarrassed by "surprises" -- by things it didn't anticipate or by unanticipated results of its policies.

In the United States, we get a new horseman every four years or so, and the best ways of conquering the republic are not necessarily the best ways to run it. There is justification for an inquiry into institutional processes that may help to bring foresight more systematically into government.

This book offers, not a conclusion, but a process: a systematic way of using the best knowledge available -- the longest and broadest possible perspectives -- when making national decisions.

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Foreword

by Elliot Richardson

Several years ago, I wrote the foreword for a booklet titled *Thinking Ahead: Foresight in the Political Process*. I was interested in the booklet because it dealt with a central issue for modern governments: in a complex world, how can the government, in making decisions, better weigh the side effects and long term implications of the policy alternatives it is considering?

The problem has not gone away. Efforts to address it are continuing, in the United States and elsewhere. In Washington, however, proposals for better foresight have been submerged in a budgetary crisis that is itself the result of short term thinking over the past decade or more.

I am delighted that the author has expanded that original booklet into a fuller treatment of national foresight and its connections with parallel processes in local governments, in business, and elsewhere in the world. Such a study is needed.

Since I still believe what I wrote in 1983, and since there has been lamentably little progress toward better national foresight, let me reiterate and restate some of the thoughts I expressed in that earlier foreword.

Abraham Lincoln once said, "If we could first know where we are, and whither we are tending, we could better judge what to do, and how to do it." To understand whither we are tending is to have foresight capability.

To know whither we are tending will not make us wise in our choice of goals. It cannot tell us how to weigh competing claims. If we have no heed for the morrow, it will not force prudence upon us. What foresight capability can do is make us better aware of the

consequences of our present choices. It can tell us that we can't get there from here by the path we're now following, or that the cost of attempting it is higher than we thought. It can make us aware of opportunities. It can warn us of danger in time to take preventive action. It can give us a precious chance to adjust our course, our goal, or both.

Frequently doubted in his own time, Lincoln's good sense is not often disparaged nowadays. It has been ignored, however, in the reaction to past attempts to improve the contribution of foresight to the political process. The melancholy fate of these attempts is, of course, partly accounted for by inertia.

Foresight, moreover, is said to stimulate planning, and planning implies effort to bring about a different outcome than the unimpeded flow of events would otherwise produce. This effort, to be effective, may require governmental intervention. Government intervention is bad. Foresight, therefore, is to be avoided.

Less muddleheaded reasoning would lead to the opposite conclusion. The planning stimulated by greater foresight capability can be that of the private sector, and better private sector planning would tend to reduce the need for government intervention. Recent history is weighed down with examples, some cited by Lindsey Grant, of botched regulation whose unintended and undesirable side effects could only be corrected by additional regulation. Better foresight capability would have resulted in less government intervention.

The unwillingness to address national issues is hardly a guarantee of our freedom, and the unwillingness to use the best available processes to inform those national decisions is hardly a compliment to our intelligence.

Notwithstanding these Lincolnesque considerations, inertia and irrationality have smothered virtually every past effort to improve the ability of the U.S. Government to take adequate account of visible trends. It is hard not to be discouraged by the unsung demise of such forward-looking initiatives as 1969's National Goals Research Staff, 1972's Commission on Population Growth and the American Future, and 1980's *Global 2000 Report to the President*.

Why, then, has Lindsey Grant, who knows this history all too well, seen fit to devote his intelligence, talent and energy to a renewed effort to improve the U.S. Government's foresight capability? He is aware both of the burgeoning complexities that compound the difficulty of choosing among competing alternatives and of the fallability of the data relied upon for the projection of current trends. Does he persist, then, merely because he is stubborn -- or a chronic hoper -- or a bit of both? No such assumption is necessary. He knows that, rather than stumble in total darkness, it is safer to aim our feeble flashlights in the direction we want to go -- and that it behooves us meanwhile to try to improve their candlepower.

We cannot, in any case, afford to be discouraged by past failures. The onrush of change has so radically augmented the need for foresight capability as to transform a difference of degree into a difference of kind. The depletion of nonrenewable resources is forcing reliance on low-grade, remote, and hard-to-extract ores; it also underscores the need for alternative energy sources. Population growth coupled with rising rates of consumption accelerates the production of pollutants and wastes; urban hypertrophy compels the creation of more elaborate municipal infrastructures; deforestation, soil erosion, desertification, acid rain, and the subsidence of the water table demand ever more costly countermeasures; and as all of these things occur, the competition for capital becomes more and more excruciating.

The same developments that are generating this capital crunch also make inevitable a suspenseful lag between the decision to commit large-scale resources and the stage when a return on this commitment can be realized. The combination of complexity, size and long lead-times multiplies the cost of being wrong. Even a marginal gain in the improvement of foresight capability can thus be worth far more than the expense of achieving it.

Other consequences, meanwhile, are an enormous ramification of the number of relevant variables and a quantum jump in the importance of understanding the ways in which they interact. No one is smart enough to work out such equations in his head. Indeed, before the advent of the computer, the effort to address such interactions on a global scale would have been inconceivable. Nothing less, however, than global projections -- and the capacity to break them down by geo-

graphical regions and individual countries -- can usefully address such massive yet subtle relationships as those between population growth, food and energy requirements, wood burning, deforestation, and climatic change. Lacking adequate capacity to make such projections, the world community could not hope to achieve the warning time needed to avert the disasters that might otherwise occur.

It is one thing, of course, to recognize the need for foresight capability and quite another to come forward with realistic proposals for acquiring it. The difference is clearly recognized in this book, and a major part of its value consists in the solid good sense of its effort to formulate such proposals. Mr. Grant lays bare with clinical objectivity the political and procedural considerations that proponents of greater foresight in the federal government would do well to reckon with in making their case and designing their legislation. He is surely right, for example, in recommending that such legislation should emphasize process and be divorced from specific substantive problems, that reliance should be placed on existing government machinery rather than new bureaucratic structures, and that foresight should be tied to the long-range or lateral implications of issues that actually have to be decided.

Mr. Grant's specific proposals for integrating foresight into the decision-making process may well stir debate. I hope they do. Such a debate would itself be a useful product of this book, if it helps to lead to a consensus as to what must be done.

If you have the imagination to grasp the importance of these issues, you will have the interest in the topic to appreciate his work in drawing together a synoptic look at the present state of foresight, and you will also have the wit to be intrigued and challenged by the resourcefulness of his effort to propose solutions. To you, particularly, I commend this book.

Elliot L. Richardson
Washington, D. C.
April 1987

Preface

My father was born in 1990 and died in 1984. In those years, he participated in one of the most drastic transformations any species has ever experienced. It is difficult to comprehend the extraordinary changes that people have witnessed in this century as a result of changes in science and technology. We are so deeply imbedded in the present that it takes a difficult mental effort to comprehend the time scale of human life on Earth and the recency of the kind of world that we live in now...

Opportunites arising from profoundly enhanced capabilities in science and technology are felt in every sphere of life from health to communication, yet each has side effects that take time to appear...

There is little in our history as a species to prepare us for this hypermodern world that we have so rapidly made.

--David A. Hamburg, President
of the Carnegie Corporation
and President-elect of the
AAAS.[1]

Well said. Dr. Hamburg's point leads directly into the purpose of this book.

The world is going through change at an unprecedented rate, and human activities are coming into a new scale of relationships with other natural processes -- changes such as the ratio of people to land and renewable resources, or the introduction of chemicals into the environment, or weaponry. The lead time to assess what humanity is doing, and if necessary to change it, has shortened dramatically. As a society, we need new and better ways of understnding the implications of what we are doing.

Modern societies have developed very effective ways of expanding human knowledge and of applying it to change the ways we all live. We have been much less successful in dealing with the by-products of those changes -- in foreseeing how change in one area of activity may affect our well-being in other ways. We do not adapt our behavior to avoid the by-products we do not want. We embrace an energy-intensive culture and are surprised to realize, belatedly, that the ways we produce energy may be killing our forests.

We are beginning to learn, as a nation, that one cannot ride pell-mell in the linear pursuit of every seemingly desirable objective without considering the interaction with other objectives. To put it in the soberer language of the scientist (and again to quote an AAAS president):

> *It is essential that decision-makers understand the probable consequences of each available option (including the option to do nothing) sufficiently to make decisions that are consistent with the values of society. This is as true for positions taken in regard to social, economic and political negotiations and actions as for positions taken in regard to technological changes...*
>
> --Anna J. Harrison, Professor emeritus of chemistry, Mount Holyoke College, and outgoing President of the AAAS.[2]

One senses a widespread and growing recognition that linear thinking is an insufficient approach to today's problems. In scientific research, the outgoing Director of the National Science Foundation called for a more orderly approach to organizing multi-disciplinary research in complex areas. He argued that "this helps unify the research community, bringing developments in various disciplines to the scrutiny and attention of colleagues in other fields. This, in turn, builds bridges between disciplines and helps generate exciting new approaches to old problems."[3] The new Director is blunter. He argues that science has come too much under the control of those who define their subjects too narrowly, who fail to see the connections between disciplines and between science and

the practical world. He has made the creation of interdisciplinary research centers central to his policy.[4]

In education, the dean of a graduate school has suggested that "the graduate curriculum today may need to address issues and problems that cut across disciplines and that are not usually embraced by primarily discipline-oriented programs." He has observed that industrial research is relying increasingly on multi-disciplinary research teams, and he calls for a new interdisciplinary approach to graduate studies, with a "new seminar focusing on the process rather than the products of inquiry..."[5]

In the White House, a senior National Security Council (NSC) official calls national security planning a "myth" and argues the need for systematic ways of coordinating political and military planning and for developing systematic procedures for crisis management.[6]

Among state and local governments, there is a surge of interest in "issues management" and "alternative futures." The National Governors' Association has passed a resolution stronger than anything at the national level, endorsing worldwide foresight processes in order to protect the Earth's resources (see Chapter V).

American business has long seen the need for "strategic planning," and businessmen have some strong opinions as to how the government could be of greater help to them (see Chapter VI).

A non-profit umbrella organization, the United Way of America, has felt the need for a systematic process of identifying societal needs and trends that may affect charitable programs or that may require action.[7]

New institutional arrangements are cutting across the traditional disciplines and compartments of American society, as the need is felt for a wide perspective. The AAAS in 1985 broke its pattern of organizing itself by disciplines and created a Population, Resources and Environment Program to encourage analytical work integrating those three disciplines.[8]

The Issues Management Association (IMA) was created in 1981 and has grown to some 400 members,

largely from business but including members from government, academia and non-profit groups. The IMA defines issues management in several ways, most succinctly as "a program that enables a company to anticipate sociopolitical issues that may affect it rather than just react to them..." The IMA sponsors annual meetings, publishes a newsletter, and invites its members to "participate in the Issues Resource Network, a directory of experts in eighty issue areas."[9]

The World Future Society is something of a grand old presence in the field of futurology, and as early as 1977 it attempted to begin the building of networks in the futures field, with "The Future: A Guide to Information Sources." The Society has recently created a Professional Membership program and initiated the *Futures Research Quarterly* to promote intercommunication among those professionally involved in planning and related fields.[10]

More informally, a Global Foresight Roundtable has evolved in Washington, bringing together members of government, academic institutions and non-profit groups to "stimulate attention to...the need for better global foresight and to encourage the creation of an informal network of professionals interested in talking about this issue."[11]

I could go on. Among private advocacy groups, in business and among association executives, religious groups and elsewhere, there are new ideas and new organizations dealing with change, its cross-sectoral ramifications and their effect upon the decisions one must make.[12]

All these diverse groups are linked by the common recognition that traditional ways of making decisions are too narrow for a complex and changing world. Most of them seek to improve the **ways that society organizes itself** to anticipate change; they are not simply interested in making forecasts.

The call for better "foresight" is the application to government of this felt need for systematic, interdisciplinary approaches in addressing complex issues. It is the appeal for a broader horizon in decision-making and for the establishment of procedures to bring lateral and long-term issues into the process.

There is no shortage of books advancing knowledge and analyzing change in one sector or another. Foresight, however, is more than that. In itself, it embodies two distinct elements: cross-disciplinary forecasting, and the process of getting the results of those forecasts into the decision-making process. There is more literature on forecasting than on that second process,[13] and it is to that second question that this book will be principally addressed.

This book is focused on the political decision process at the national level. It is not simply descriptive. It is an instrument of advocacy, a call for improved decision-making to match the complexity of "this hypermodern world that we have so rapidly made."

The plan of the book is straightforward. Part One is an attempt to define the issue and to describe foresight. Part Two summarizes what has been tried and what is being done now at the national level in the way of deliberate cross-sectoral foresight; the connections are shown between the foresight process at that level and at other levels and centers of decision-making; and the potential contribution of computer tools is described and evaluated.

Part Three describes the foresight proposals that have been before Congress. It surveys the political realities within which a foresight proposal must be framed and then offers such a proposal.

The machinery proposed here would consist of an "ombudsman" office in the White House, linked to the government agencies through a Foresight Policy Group and Foresight Working Group. These groups would bring the lateral implications into current decision-making, and they would undertake periodic interdisciplinary studies of current and anticipated trends, to identify looming issues that merit the government's attention. I propose ways in which this machinery should be connected to related processes in Congress, the private sectors, the states, and international activities.

The approach is evolutionary, not revolutionary. The basic American political processes have held up remarkably well through a period of extraordinary change. The solutions proposed are meant to be compatible with our national political structures and habits. As a practical matter -- quite aside from the conceptual advantage of building on what we have -- any

proposal is more likely to succeed if it enlists rather than antagonizing the political forces in Washington.

Part Two is the product of collegial effort. The chapters are identified by author. Each of the authors is responsible only for the conclusions in his own chapter, but our very ability to collaborate in such an effort speaks to a shared view that there are problems with the nation's foresight machinery and that they should be addressed.

The footnotes and the appendices constitute something of a directory of organizations in the foresight field. They are intended to assist in establishing contacts among serious students, foresight specialists themselves, and the political practitioners who may, one hopes, be translating some of these ideas into political reality.

The impetus for improved national foresight has come primarily from people and organizations that, like myself, are concerned about population growth and its pressures upon "renewable" resources and the environment. One may wonder: "why this interest in a topic so far from those issues as 'foresight'?"

The answer is simple. If population, resource and environmental issues can be brought systematically into governmental decision making, their importance will become as obvious to others as it is to environmentalists. If, for example, the government can be brought to recognize that its own actions help to shape population change in the United States -- i.e. that demographic change is not an independent variable beyond governmental influence -- I will have achieved a major objective. If I did not have that confidence, I would not be in the foresight business.

Finally, let me express my appreciation to the many people who gave me help and advice in writing this book. I am of course particularly grateful to my co-authors, Clement Bezold and John D. Sterman, who gave much time and knowledge to the book.

Two other people were instrumental in preparing Part Two of the book. Col. Thomas Magness (USA-Ret.) was the Executive Director of the Global Issues Work Group during its early and most active period, and he provided most of the research on which Chapter III is based. Joel Horn conducted the study on which Chapter VI is based, and he did much to shape that chapter. I

am deeply indebted to both of them. I will be arguing that effective foresight requires a pooling of perspectives and expertise. A book on foresight is a good place to put the belief into action.

Special appreciation is due to Elliot Richardson, who has written the foreword for this book and its predecessor booklet. It is comforting to know that my belief in the importance of improving our national decision processes is shared by a man who has spent so much of his career at the center of the national decision making process.

Dr. Ralph C. Bledsoe (Executive Secretary of the Domestic Policy Council) and Lt. Gen. Colin Powell (Deputy Director of the National Security Council) were most generous of their time and of great help in explaining the current decision processes in the White House. I wish also to thank Dr. Michael H. Armacost (Undersecretary of State for Political Affairs), Drs. Theodore Harris and Paul Werbos of the Department of Energy, and Coleman Nee of the Council on Environmental Quality for their advice, suggestions and help. I am indebted to Dr. Gerald O. Barney of the Global Studies Center, Arlington, for many ideas about foresight over the years and for permission to print the Appendix on global studies overseas.

Edward Cornish and Frank Snowden Hopkins of the World Future Society read the manuscript and offered much useful advice. Let me also thank the two anonymous reviewers for their advice.

This book is an outgrowth of my booklet entitled *Thinking Ahead: Foresight in the Political Process*, published in 1983 by The Environmental Fund (now Population Environment Balance), which generously gave permission to draw heavily upon that booklet in writing this book.

My appreciation to Marjorie Wilkinson for unscrambling and typing my drafts, to Roger Conner and the Federation for American Immigration Reform (FAIR) for administrative support, to Production Editor Helen Hudson of the University Press of America for her guidance, and not least to my wife for putting up for years with my preoccupation with this intractable topic.

Lindsey Grant
Bethesda MD
July 1987

FOOTNOTES

1. *Science*, Vol.224, 1 June 1984, p.943. Reprinted by permission of the publisher. Copyright 1984, the American Association for the Advancement of Science (AAAS).

2. *ibid*, p.941. Reprinted by permission of the publisher.

3. Dr. Edward A. Knapp, in *Science*, Vol.225, 31 August 1984, p.881. Reprinted by permission of the publisher. Copyright 1984 by the AAAS.

4. Erich Block "Basic Research and Economic Health: The Coming Challenge," *Science*, 2 May 1986, pp. 595-599. See also the *New York Times*, February 15, 1987, p.6F.

5. Robert B. Lawson, Dean of the Graduate College, University of Vermont, in *Science*, Vol. 225, 17 August 1984, p. 675. Reprinted by permission of the publisher. Copyright 1984 by the AAAS.

6. See Chapter II, footnote 11.

7. The United Way of America, 701 North Fairfax Street, Alexandria VA 22314; (703) 836-7100; Linda Forbes, Director, Strategic Planning Division. The United Way has created a multidisciplinary Environmental Scanning Committee (drawn mostly from business planners and academicians) to help identify those trends for the benefit of the United Way and its member organizations. Under the direction of the Scanning Committee, the Strategic Planning Division drafts Issues Papers, Study Papers and Recommendations. It also publishes and periodically updates a book identifying trends thought to be of major importance to charitable organizations (*What Lies Ahead -- Looking Toward the '90s: An Environmental Scan Report*; $15.)

8. AAAS, Office of International Science; Population, Resources and Environmental Program (PREP), 1333 H Street NW, Washington DC 20005. Program Director Dr. Amy Auerbacher Wilson, (202) 326-6650. The Program is supervised by a Committee chaired by the Vice President, Corporate Strategy, the Xerox Corporation, and includes academicians, think tank officers, World Bank officials and Congressman Buddy McKay.

9. Brochure of the Issues Management Association, 1615 L Street NW - Suite 925, Washington DC 20036. Executive Director Marie W. Kleeman, (202) 296-9200.

10. For further information, contact the World Future Society, 4916 St. Elmo Avenue, Bethesda MD 20814, (301) 656-8274; Edward S. Cornish, President.

11. Administrative support for the Roundtable is provided by the Global Studies Center, 1611 North Kent Street, Suite 600, Arlington VA 22209; Dr. Gerald O. Barney, Director, (703) 841-0048. The Center, in an effort to promote the development of methodologies for global modeling, also publishes "Global Perspective Quarterly," offers a descriptive list of models entitled *Microcomputer Software for Development: A Sourcebook*, and offers a computerized bulletin board on new developments in global modeling (accessed at the above number). Its activities in promoting global forecasting abroad are described in Chapter VII.

12. A very broad group of U.S. non-governmental organizations (NGOs) have gotten together, formed a Steering Committee, and developed a Statement and an Action Plan for sustainable development, the first such private effort to cross the gaps among development, environmental, resource and population organizations. Published as *Making Common Cause* by World Resources Institute (1987) in behalf of the Committee. Contact: William J. Nagle, WRI, 1735 New York Avenue NW, Washington DC 20006; (202) 638-6300.

In business, The Futures Group (76 Eastern Boulevard, Glastonbury CT 06033) has for years been involved in cross-disciplinary modeling for government and business clients. It is perhaps best known for the computer models RAPID and RAPID II (Resources for the Awareness of Population Impact on Development), developed as an educational device for the Agency for International Development.

The American Society of Association Executives (ASAE) in 1983 queried association executives as to what it should be doing. It was told to "conduct research into what associations can do to better prepare for the future." In response, the Society sponsors futures studies, beginning with D.P. Snyder & G. Edwards, *Future Forces: An Association Executive's Guide to a Decade of Change and Choice* (Washington: ASAE Foundation, 1984). (ASAE, 1575 Eye Street NW, Washington DC 20005; President R. William Taylor, (202) 626-2791.)

Among religious groups, the most ambitious foresight project is perhaps the Methodists' "Global

2000 Project: The Churches' Social Witness to the 21st Century," under the direction of Rev. Norman E. Dewire, President of The Methodist Theological School in Ohio, 3081 Columbus Pike, Delaware OH 43015.

13. One of the few such studies is by John M. Richardson, Jr., "Towards Effective Foresight in the United States Government" (unpublished; prepared under contract for the U.S. Department of State, OES, 25 June 1980). An earlier exploration of foresight at the federal, state and local levels, and of the role of private organizations is Clement Bezold, *Anticipatory Democracy: People in the Politics of the Future* (New York: Random House, 1978).

The most detailed exploration of foresight is a four-volume study done by the Congressional Research Service; see Chapter IV, footnote 5.

See also the Office of Technology Assessment, *Federal Government Information Technology: Management, Security and Congressional Oversight* (Congress of the United States: OTA, 1986). It is a wide-ranging survey of federal information management, with recommendations for improvement. Chapter 6, "Computer Modeling, Decision Support and Government Foresight," is a useful survey of the uses of models and other systematic decision processes in government, with an extensive bibliography and a brief description of proposals for cross-disciplinary foresight machinery.

Peter W. House and Edward R. Williams, *Planning and Conservation: The Emergence of the Frugal Society* (New York: Praeger, 1977) is focused primarily on non-renewable resources, but it contains interesting information on proposals for planning processes during the 1970s and the then-current attitudes toward them.

Part One

The Issue Defined

Governmental foresight has existed in some form, presumably, since some primitive tribal leader pondered what would happen if he disposed of a rival or picked a fight with a neighboring tribe. Since then, in varying degrees of formality and sophistication, governments have developed procedures for identifying and evaluating the likely results of proposed courses of action.

If the idea has been around for so long, why the current proposals for the creation of a "foresight capability" in the United States Government?

The answer is that the current governmental decision processes do not meet the criteria for a modern foresight capability.

Let us begin with an attempt to describe what the process should be like.

I.

What is Governmental Foresight Capability?

About forty years ago, the population of the developing world took off on a spurt of growth unprecedented in human history, largely because of the rapid application of disease control and agricultural technologies developed during the preceding century in the West. American aid policies promoted that change. Any humane observer would sympathize with the desire to bring mortality down and to keep children from dying. Nevertheless, a profound disturbance of the demographic balance was generated when mortality was lowered while nothing was done about fertility. World population has doubled in that very short time, and it will probably double again -- if the Earth can sustain it -- even if the developing world should achieve replacement level fertility within the next generation. National leaders trying to slow the surge of population growth must bitterly wish that they had started earlier. The ironic point is that demographers could have told policy makers the results of their policies. But nobody asked. That is what this paper is about: to find out how the decision process can bring the implications of proposed policies to policy makers' attention before they set such trains of consequence in motion.

"Foresight" is simply a systematic process of bringing lateral and long-range implications into policy decisions.

It is an attempt to widen the tunnel vision characteristic of much governmental decision making and to bring the probable secondary and tertiary effects of courses of action into the decision process before decisions are made.

It is, if you will, an effort to institutionalize the questions "what if . . . and then what?" In the example above, somebody should have been asking "what if birth rates don't fall as we lower death rates?" Such questions should be asked of every proposed policy. They seldom are.

Proponents of better foresight would agree that an effective government foresight capability must meet all the following criteria:

* It looks ahead. Its function is to provide both a wider perspective and a longer horizon to government decision processes. It should inform policy makers

- how policies under consideration relate to other national policies -- i.e. how they may reinforce or conflict with each other. ("As to the proposed new agricultural policy: if we need to keep Egypt afloat, we are going to need some of the budgetary savings from that policy to buy them the food they are now getting from PL-480.")

- how the pursuit of the proposed policy may be affected by events and forces elsewhere in the system ("There are new breakthroughs in super-conducting magnets that will probably make that proposed neutron accelerator a lot cheaper if we wait for two years.")

- how long-term trends and their potential intersections may foreshadow looming issues that could justify anticipatory action. ("We have summed up the anticipated capital costs of maintaining growth at present rates throughout the economy for the next twenty years, and they are about three times the current national savings rate. Perhaps we need a study as to ways of promoting increased savings, or alternatively of accommodating a lower growth rate.")

* It is systematically organized. It requires institutional arrangements which assure that the potential results, by-products and implications of proposed courses of governmental action are examined before decisions are taken. It requires periodic review of current trends and their interactions, and a

means of alerting the government to changes that may affect its interests.

* It is **coordinated.** It requires that specialists be in communication and be able to draw upon each other's expertise in conducting their analysis. That the energy specialist, for instance, be in touch with the agricultural specialist to know when they are competing with each other for water resources, that both be in touch with the water resource specialist to get the best estimate of the water resources available, and that all three be in touch with the macro-economists to learn whether their requirements for capital are realistic.

This communication in turn requires that the different components of government use mutually **compatible definitions and terminology.** If, for instance, each department compiles its data by different measures or by differing geographic divisions, the data will be mutually useless.

* It deals with **all the significant ramifications** that can be identified. The most important results of human activities are frequently the unexpected ones. The originators of a proposal may simply be unaware of the likely impact of that proposal in some other area of governmental concern. Who gets invited into the "clearance" process may be the result of tradition, formal lines of authority, bureaucratic competition or accident. The current agitation for governmental foresight capability has come principally from people active in the "new" areas of governmental concern -- population, resources and environment -- who have abundant evidence that their interests are not considered in the governmental decision making process. As a result, decisions with potentially disastrous consequences for population, resources or environment are being made by people who may be unaware that their decisions affect these fields.

* It makes use of the **best available technologies.** The advent of the computer, coupled with improving statistical data and sophisticated foresight modeling, has made it possible to quantify trends and implications in ways that were never before possible. These techniques are simply the handmaidens of the decision making process. They should never dominate it, but they are such useful servants that the decision maker may be simply overwhelmed with data if he or she refuses to use them.

* Its **scope is the world.** Some issues may be truly local; others involve the whole Earth. Governments have long recognized the potential importance to them of political or military developments arising abroad. By now, the same may be said of economic issues. It remains to convince governments that comparable importance must be attached to world-wide trends arising in the areas of demography, resources and the environment. National security is no longer simply a matter of weapons. Mexican migration, fed by population growth and unemployment and perhaps by political instability, may influence the United States' prosperity and security more than a foreign military threat to an oil producer in Arabia.

* It is **holistic.** The term itself is generally associated with the environmentalists who recognize, if governments do not, that political/military/economic/demographic/resource/environmental classifications may be artificial. They must be understood and analyzed together. A threat or issue under any of those headings may be generated by developments in any of the others.

For Example. . .

It would perhaps be useful to make these abstractions more real by attempting to imagine how the process would actually work in the government.

Let us examine an idealized example. You are an energy planner exploring the question: "How much use can be made of biomass to meet future energy needs, if traditional oil sources become expensive or unavailable?"

You are undertaking this inquiry because your superiors are exploring energy alternatives. Other agencies have been alerted to consider the implications of such a shift, and the Department of Agriculture has been asked for an agriculturalist's response to the same question.

You will have a good idea of costs and potential production from various biomass sources, and in this sense you could answer the question alone. In the present state of affairs, you would probably do just that. However, in our newly-foresightful government, somebody will need to pose the collateral questions to

other experts. On the demand side, what are the population projections and anticipated energy consumption requirements? On the supply side, what is the range of estimates of domestic production, import availability and prices for the next twenty years?

When and under what conditions would biomass become competitive with oil? Could this happen through natural economic processes? Or is the lead time such that some form of government encouragement is necessary?

What would be the net impact on balance of payments? What, if any, shift would occur in fertilizer/pesticide/herbicide requirements? How would this affect their price and availability? What would be the effect on soil productivity and erosion of diverting organic matter from soil conditioning to energy production? What, if any, shift in water requirements would there be? And what would be the effect on competing uses? on groundwater quality? on fishery production? Would the proposed change bear upon national security by preserving the nation's indigenous energy capacity? Upon the stability of friendly countries? What would be its impact on worldwide atmospheric and climatic issues such as acid rain and the introduction of CO_2 into the atmosphere? Would the biomass option justify an artificial price advantage compared with coal simply to avoid an ecological calamity? What part could other energy systems such as direct solar conversion be expected to play?

What would be the impacts of a shift in the geographic location of the energy source from overseas, and from mining and oil-drilling areas to the agricultural heartland? How much cropland diversion would there be, and how would it affect food production and food exports?

What, if any, steps could the government take to encourage or discourage such a shift to biomass? And what would be the budgetary implications? How do these proposals relate to the new Conservation Reserve Program? Should the government consider encouraging the shift of food-producing areas to biomass, instead of idling them as at present in order to reduce food surpluses?

Can the initial problem be addressed by changing the parameters? What could energy conservation measures achieve, and how could they be encouraged?

Would the need for additional energy sources be ameliorated by a reduced projection of population growth? Could this reduction in turn be achieved by changing immigration policy? Should the appropriate departments be looking at this?

After you and other experts have looked at these ramifications, you may need to approach the questions again, changing your assumptions concerning population growth, or selecting another crop mix for biomass, picking up synergisms such as joint production for food and biomass, etc.

You will need to combine these results with parallel calculations for other energy sources, made by other specialists.

And finally, you will need to be able to package your conclusions, along with those of other agencies, into a manageable set of choices for the White House when it addresses national energy policy.

By this point in my narrative, any reader familiar with the government will cry "stop." The variables are too many, the choices too complex, the trains of possible implications from each potential decision too vastly ramified. In the real world, there is no chance that a president could be offered all those choices in a manageable package for decision.

Agreed. No such exploration can be started up to produce instant answers. The value is in the exploration itself, and in the communication among all those experts. The questions I have posed are real and they are important, and any specialist could probably ask a dozen more. If there is a continuing system for exploring such issues within the bureaucracy, each expert will have begun to understand the limitations of his own pet project. The non-starters will have been eliminated, the externalities such as limitations upon water and capital better understood, the benefits and dangers for other players in government better understood. The Department of Defense, for instance, might find itself agreed with EPA on the desirability of an expanded domestic alcohol production capability. If industry and outside experts have been brought into the game, the process will have begun of framing the terms of a national consensus about what can be and should be done.

When the real question becomes insistent enough to demand White House attention -- probably when oil prices start rising and older fields dry up -- the question will probably be posed to the experts in very broad terms: "What do we do about energy?" Because of the foresight work that has gone before -- the systematic exploration of these coming issues -- the experts will be well down the road to offering a manageable set of alternatives. The different departments will have a sense of the implications of different choices for the pursuit of their own responsibilities. The more horrifying unintended consequences -- such as the failure mentioned in the headnote to this chapter to consider fertility and mortality together -- would be identified and, one hopes, avoided.

The fanciful idealization of the foresight process underlines the need for cross-communication, the importance of illuminating the interpenetration of issues usually kept far apart (such as balance of payments, soil erosion, and demography), and the need to bring in long-term issues such as soil fertility and water degradation. It suggests how the process would eventually influence actual policy recommendations.

This would not require an expanded bureaucracy. The people are there, but they are not in touch with each other or with the decision makers. They write voluminous studies for which nobody can find a use.

Some idea of the correlation -- or lack of it -- between this idealized model and current practices may be gotten from the following true story.

There is an analyst in the Department of Energy with particular responsibility for modeling the future path of energy requirements in agriculture and mining. The present analyst reports that, upon taking up this responsibility, he noticed that the energy requirements for this entire sector were represented as a constant coefficient of energy use in manufacturing. This procedure had been used for as long as anybody could remember.

That simplification is the kind of crutch that makes forecasts go wrong. There is no justification for assuming such a correlation. In fact, since 1972 -- while manufacturing has been becoming more energy-efficient -- agriculture has been going through several adjustments, most of them unrelated. Energy

application requirements in terms of fertilizer per unit of output have risen. Irrigation and its energy requirements have been going through a series of galvanic changes, with the widespread new exploitation of groundwater supplies, the beginning of overuse and exhaustion in the Ogallala aquifer and elsewhere, the two oil shocks, which raised the cost of raising water from underground, and finally the credit bind resulting from farmers' misreading of price and demand trends. If anybody could sort out these vectors, it would not be a single energy specialist. For starters, he needs a specialist on irrigation practices, an agronomist and an agricultural economist.

This energy specialist recognized that he needed other specialized advice. He set out to find somebody who could answer the basic questions about what is happening in agriculture. His search led him from the Department of Agriculture modelers, to the agricultural participants in *Global 2000*, to the private Worldwatch Institute, to Resources for the Future and to Data Resources Inc., before he found agricultural specialists -- back in the Department of Agriculture -- who could help him refine his projection.

The point here is that there was no network to which the energy specialist could turn to identify the people in his own government who might help him to refine his thinking about a very important question.

This shouldn't happen.

What It Isn't. . .

Foresight is not prediction. It is not simply forecasting. There is a stubborn myth that foresight is synonymous with futurism and that the object of both is to paint pictures of what the future will be like. Nobody can predict the future, notwithstanding the popular books and articles that appear regularly, purporting to tell us what the world will be like in one hundred years or so. The world is too complex. The prediction will be buffeted by too many unexpected variables. The idea of prediction itself embodies an unspoken fatalism; it assumes that people cannot change the course of events. The best prediction that can be made about predictions is that they will be wrong.

Foresight is a rolling process of identifying trends and how they may intersect, and what that means

for policy. The projections must be constantly changed as the vectors evolve and as knowledge improves. Foresight cannot pretend to do more than to offer the best available description of the potential implications when a decision must be made, and to forewarn the political leadership when it appears that an issue demands attention.

This having been said, one must admit that most "foresight" literature, here and abroad, has in fact been presented as projections of "The World in the Year XXXX," and many foresight advocates see their mission as one of creating an office somewhere near the President, to make such projections.

Such "World in XXXX" exercises can have a useful function, if they are viewed with sufficient skepticism. They can force the bureaucracy to lift its eyes beyond its normal preoccupation with current crises. They require a communication among different specialists that may reveal the likelihood of problems ahead (e.g. they may force the specialists to realize that their sectors cannot all hope to use the same water and the same capital). They force the specialists to think systematically about their own assumptions and thought processes.

Such global exercises force the specialists to begin a process that may lead the government to anticipate issues. In drafting the global projection, they have to begin to answer some key questions about projected change:

* how proximate?

* how certain?

* how important is it if it does happen?

All the forces of inertia conspire to make the government reluctant to take preventive or anticipatory action, unless the need for action is apparent and a political constituency has developed demanding action. Particularly if outsiders such as academicians are brought into the process, the "World in XXXX" exercise can generate publicity that in turn mobilizes public opinion and pushes an issue into the zone of the politically doable. Something of the sort seems to have been happening with the acid rain issue, and the 1980 *Global 2000 Report* was an element in that progress.

Beyond these functions, however, the utility of periodic global projections to decision making is probably limited. There is a central point that is too often overlooked: foresight is irrelevant unless it is brought to bear on real decisions. The "What if . . ." question must be connected with the choices that the political leadership is facing. A detached group of modelers, preoccupied with developing their own projections, courts the danger of being too far from the action to realize what questions they should be answering, and when.

Foresight is not a mathematical model. As a nation, we are beguiled by the moon landings. With a powerful enough computer, can one not analyze all the variables and predict what will happen?

Here on Earth, it isn't that easy. Some principle of entropy seems to be at work as the systems become more complex. Even with supercomputers, mankind does not do very well at predicting the weather. Enter the human element -- perhaps itself trying to beat the system -- and there is no model or set of formulae that can **predict.**

Perhaps the best-known models in the United States today are the econometric models used to forecast the performance of the economy. They don't necessarily work very well.

In Chapter VIII we will explore how such mathematical models can and cannot assist the foresight process. The present point is that they cannot substitute for it. There is no substitute for communication among experts, involved in a constantly reiterated process of asking "What if . . . ," changing the assumptions, and asking the question again. This probing approach, sometimes almost intuitive, is at the heart of the policy process. With its nuances, its instinctive winnowing of potential consequences, this thought process cannot be matched by computers; they can only serve it.

There is no "cheap fix" approach to foresight.

Foresight is not a solo sport. Even if one mind could contain all knowledge, one person could not constitute a foresight capability. Government is not a business; it is a maze of different perspectives and objectives and interests. The problem is not simply to

develop a long-term perspective. One must also find ways for the compartments to communicate. They must seek mutually beneficial courses of action where possible. At least, they should bring the relevant perspectives into the decision process so that the myriad competing benefits and penalties of alternative courses of action can somehow be examined together. This means that those benefits and penalties must be organized and presented in a way that enables the political leadership to make a deliberate and informed choice among them.

Foresight is not central planning.[1] The criticism is regularly heard that "this sounds like a planned society." Not so. It is neutral. (The proper use of foresight at this stage in history would probably remind us, in fact, that market economies are doing better than planned economies.) Foresight is simply a way of bringing better information to bear in government. What government decides to do about it is a separate issue. Whether it passes a law, provides a subsidy, changes a rule, or does nothing must remain a political decision. It is hard to see how critics of any political stripe other than the most extreme Libertarian could oppose foresight in principle. It would be a conscious decision not to make use of available instruments in steering the ship.

Basic Questions About Foresight

So far, most proponents of foresight would probably say, "Yes, this is what we are seeking." Beyond this point, however, the consensus vanishes. There has been no consensus, or even an attempt to develop one, on some fundamental issues.

* What basis exists in Congress and the government for such a foresight capability?
* In what respects is it inadequate?
* What machinery must be created to improve the foresight process?
* What should be its scope? Should foresight proponents simply press to bring population/resource/environment into the decision process, or should we attempt to bring other issues -- balance of payments, full

employment, social equity, and so on -- into the same system?

* Should environmentalists be pressing for a process or for substantive acceptance of their conclusions? (e.g. should proposed legislation simply create a procedure for bringing demographics into policy, or should it state a conclusion about U.S. population growth? My own predisposition is probably already foreshadowed by the definition in this chapter. If the purpose of foresight is to bring the widest possible range of perspectives to bear upon decisions, it would seem inappropriate to freight it with a preordained viewpoint as to the conclusions it should reach.)

* What is the most practical way to go about seeking improved foresight in government? What are the obstacles, and how can they be avoided or even exploited?

* Who are the players? Should the effort be directed toward the Executive branch or toward Congress? Should it be run by environmentalists alone, or should allies be recruited among other interest groups, labor, business...? Who are the people to reach in government?

Those questions interlock. Some preliminary answers will be attempted before the close of this book.

FOOTNOTES

1. The definitions of "planning" are many and frequently amorphous. For a sample of the range of viewpoints, I would refer the reader to three very different perspectives:

   Rachelle Alterman & Duncan MacRae, "Planning and Policy Analysis: Converging or Diverging Trends?", *Journal of the American Planning Association*, Vol. 49, No. 2, 1983.

Otis L. Graham, *Toward a Planned Society*. New York: Oxford University Press, 1976.

Robert L. Rothstein, *Planning and Policymaking in Foreign Affairs*. Boston: Little, Brown, 1972.

One can easily defend the categorical statement that foresight is not central planning. To attempt to compare foresight with all the other definitions of planning would require a book, and one as diffuse as the definitions themselves. Foresight is a new term to describe rather specific proposals for improvements in the decision process. It does not envisage any shift in the formal locus of authority for political decision making. The term should not be loaded with all the inclarities and connotative associations of "planning."

For example, most but not all descriptions of planning include a goal-setting function (as indeed does "foresight" in its local applications as described by Dr. Bezold in Chapter V). National "foresight" as defined in this chapter would inform decision making and goal setting, but the decisions themselves would rest with the existing political machinery.

Example 2: Planning is not necessarily or even frequently holistic; foresight necessarily is. The historical description of foresight in Chapter II and the critique in Chapter IX are confined to those issues that fall within "foresight" as it has been described above. I will not endeavor to cover all the activities that by one definition or another might be subsumed under "planning."

Part Two

The State of the Art

In Part One, an effort has been made to show what "foresight" means. Let us now undertake to trace a brief history of conscious efforts to introduce better foresight into the United States Government. This may illuminate how far the nation is from a working foresight system.

Then let us look afield. It is easy in Washington to forget that foresight is also necessary to decision making in local and state government, in business, and in other countries and the world community. The decisions that those people take may be as important to the future of all of us as are the decisions taken in Washington. Local governments and private businesses need information that only the federal government can assemble, and their data in turn contribute to the national foresight capability. As mankind's understanding of the environment grows, we are ever more forcefully reminded that the world is interdependent. We can learn what is happening to the Earth only through international cooperation, and some of the issues we face as a nation--particularly those related to the atmosphere--can be successfully addressed only if they are addressed multilaterally. Before proposing how to improve national foresight, it would be well to consider how that process relates to other centers of decision making and other sources of information.

II.

The Federal Executive:

What Has Been Tried?

A brief historical survey is in order as to what has been done in the Executive branch of the government

* *to bring lateral and long-range implications into policy decisions;*

* *to introduce the specific areas of population, resources and environment into these policy decisions.*

These two issues are very different, though both are elements of foresight. A government could develop an effective, integrated decision making process and yet be deficient in foresight if it failed to bring population, resource and environmental questions into it. Conversely, the government could enunciate the most elegant policies about those three matters and yet not have foresight if it failed to connect those policies with the actual decisions it was making. Everything is connected, and a routine decision about foreign aid policy may have more demographic impact than an eloquent statement of population policy.

Let me hazard a few generalizations, and then justify them with a brief survey of past and current U.S. Governmental foresight processes.

* Efforts to improve **cross-communications** within the government, the struggle to escape tunnel vision, have been continuing at least since the turn of the century, and there has been wavering progress. The recent experiment with the Cabinet Council system appears at least on paper to be the most systematic technique for cross-communication yet developed in the federal

government in peacetime. It has been scrapped and replaced with a new triad: the Domestic Policy Council (DPC), the Economic Policy Council (EPC) and the National Security Council (NSC). Particularly since the NSC was reorganized following the 1986 Iran-contra fiasco, this new system seems to offer real hope of better coordination than ever before between "domestic" and "national security" issues at the White House level. There are still holes in the system, however, and below the top level the processes for coordination and cross-communication are still chaotic.

* Efforts to address **resource** issues have at least as long a history. The much more recent concern with the **environment** culminated a decade ago in major legislation dealing with many environmental issues. These efforts, unlike the attempts to improve cross-communications, focus on the long term. However, the environmental legislation itself has tended to set absolute goals (such as zero water pollution), rather than to relate environmental and resource goals to each other or to national goals. The third element of the triad--**population** change--has been brought into governmental thinking processes only tentatively, and only as a parameter to be reckoned with, not as a variable itself influenced by governmental decisions.

* Governmental **studies** of these three elements and their interconnections with technological, social and economic changes consist of a very few reports, most of them from the 1970s.

* With the single exception of the National Environmental Policy Act of 1969 (NEPA), there has been little effort to **integrate** resource, environmental or demographic issues into the ongoing process of governmental decision making, or to relate them to technological and socio-economic change.

Without pretending to be definitive, let us take a somewhat more leisurely look at each of those four generalizations.

First, the Coordination (Cross-Communication) Efforts.

The government is laced with traditional and **informal cross-agency review and clearance procedures** when the interconnections between issues are readily recognized. Examples are the long-standing clearance arrangements between the Department of State's Bureau of Politico-Military Affairs and the Defense Department's Bureau of International Security Affairs on political-military relationships; the State/Treasury connections concerning international financial relationships; and the State/Commerce interactions on trade. It seems unlikely that anybody knows all these connections or their origins.

Formal interagency structures: their history. Legislation requiring the Executive branch to submit a formal **annual budget** to Congress was passed only in 1921[1]. Since then, the process has been increasingly formalized, and Congress in recent years has elaborated its own procedures. Because it forces choices, the budget process necessarily involves an element of cross-departmental analysis, the weighing of objectives against each other, and an effort to look at the whole before making decisions about individual programs.

The early efforts at creating formal lateral coordinating machinery seem to have been forced by wars or the Great Depression, which dramatized the need for coordinated action. President Franklin Roosevelt had an abiding interest in improving the government's capability for coordinated planning. A National Planning Board was established in 1933 to coordinate the planning of public works projects. This Board was transformed into a Cabinet-level National Resources Board under the Secretary of the Interior, and by late 1934 it issued a detailed report which claimed to bring "together for the first time in our history, exhaustive studies by highly competent inquirers of land use, water use, minerals, and related public works in their relation to each other and to national planning." The report addressed itself to such problems as "Maladjustments in Land Use and in the Relation of Our Population to Land, and Proposed Lines of Action." It also included an inventory of water resources, a discussion of policies for their use and control, recommendations for a national mineral policy and a discussion of its international aspects.[2]

One wonders how far we have really come since then.

The Board evolved eventually into the National Resources Planning Board, which survived until 1943, when the President dissolved it in the face of unrelenting opposition from Congressional and other opponents.

The modern Executive Office of the President had its origins in an almost forgotten 1937 report: the Report of the Committee on Management in the Federal Government (the "Brownlow committee").[3] The Report had been requested by the President and commissioned by Congress to address the problem of managing the government. Over the years, the bureaucracy had sprawled into over 100 separate organizations, and the President lacked any central staff to coordinate or even to keep track of it. A remarkably concise document, the Report was prepared by a three-man committee chaired by Louis Brownlow. First among its five recommendations was a proposal to provide the President with executive assistants (he already had a staff to deal with the press and the public, but no regular staff to deal with the government itself). The Report recommended that there be

> *...executive assistants...probably not exceeding six in number...to deal with agencies of the Government... These aides would have no power to make decisions or issue instructions in their own right. They would not be interposed between the President and the heads of his departments. They would not be assistant presidents in any sense. Their function would be, when any matter was presented to the President for action affecting any part of the administrative work of the Government, to assist him in obtaining quickly and without delay all pertinent information possessed by any of the executive departments so as to guide him in making responsible decisions; and then when decisions have been made, to assist him in seeing that every administrative department and every agency is promptly informed. Their effectiveness in assisting the President will, we think, be directly proportional to their ability to discharge their functions with restraint. They would remain in the background, issue no orders, make no decisions, emit no public statements....*

I would urge the reader to fix in his mind images of Henry Kissinger, Alexander Haig, Zbigniew

Brzezinski, Patrick J. Buchanan and Donald Regan, and then to go back and read that passage again.

The Committee also proposed that the Civil Service Commission, the Bureau of the Budget and the National Resources Board be placed within the Executive Office of the President, since their responsibilities crossed departmental lines.

The President passed the recommendations unchanged to Congress, and many of them were incorporated in the Reorganization Act of 1939, including the six executive assistants. Thus was created the core out of which the modern Executive Office of the President, a $100 million enterprise, was born.

The experience of World War II led to the creation in 1947 of the National Security Council (NSC) system, the first of the formal coordinating systems presently in use. The machinery has changed from administration to administration, as have the names and formats of the decision documents that the system produces. It is a statutory body, chaired usually by the President's Assistant for National Security Affairs, with participation by relevant agencies including State and Defense. Its scope is limited. It deals only with foreign policy/defense issues, and it is institutionally ill-fitted to deal with the interactions of domestic and foreign policy issues.

The Domestic Council was created by President Nixon to provide a parallel coordinating mechanism on the domestic side, but it never developed its goals and procedures sufficiently to rival the NSC in importance.

The Cabinet Council system. In 1981 President Reagan created a series of Cabinet Councils with overlapping memberships that functioned as subgroups of the full Cabinet and were entitled Commerce and Trade, Human Resources, Economic Affairs, Natural Resources and the Environment, Legal Policy, Food and Agriculture, and Management and Administration. Each Council was supported by an Executive Secretary located in the White House, with a secretariat drawn mostly from the participating departments.

On paper, at least, this system elevated the Cabinet to an importance it has probably not had in modern times. (Presidential Cabinets are usually selected with objectives in mind other than coordinated planning, and the Cabinet as a collegial body has not

usually played a very important part in decision making.) Coupled with the NSC system, the Cabinet Councils constituted an impressive machine for lateral coordination. (The official description of the Cabinet Council system is attached at Appendix A.)

There was a provision for the circulation of Cabinet Council papers to all departments, not simply to those participating in the Council in question. This arrangement could provide the nucleus for improved systematic consideration of lateral implications of proposed decisions.

The Cabinet Councils did not produce much that is visible to the outside eye, and it is probably too early to evaluate their work. How did they relate to each other and to the NSC? How were lateral implications crossing the seven defined categories brought into the decision process? How did the Councils determine when there might be such lateral implications? Perhaps the memoirs of some of the participants will help to answer those questions.

As with all governmental organizational charts, there is always the question as to whether the real decisions were made in such formal structures or in more informal and less public councils. Some Councils, I am told, would go a year without meeting, which suggests that they were simply cosmetic. Brent Scowcroft, erstwhile National Security Adviser to the President and a student of the workings of the White House, has characterized them as ineffective, and for a very human reason: Cabinet officers, he says, "don't like to work for other Cabinet officers." Unless the convenor of a committee has recognized status as first among equals, the others will attempt to conduct their business through other channels. This deficiency in the Cabinet Council system, at least, has been remedied in the successor arrangements.

Beyond that question, there is another concern. An administration with a specific mind-set on an issue can simply bury problems by putting a fox in charge of that particular hen house. Environmental and resource issues, for instance, were dealt with in a Council initially chaired by Secretary of the Interior James Watt. (The Environmental Protection Agency was not even a member, originally, but it was formally included in 1983.)

These Councils were abolished in April 1985, so the description is only of historical interest. It is given in some detail, however, because the Cabinet Council system offered some interesting possibilities for systematic coordination.

The present system in the White House. The Cabinet Councils have been replaced by two bodies: the Domestic Policy Council and the Economic Policy Council. (They are described in the Presidential Statement of April 11, 1985, at Appendix B.)

The change seems to reflect the power realities around the President. In effect, domestic policy coordination has been given to Attorney General Meese and economic policy to Secretary of the Treasury Baker.[4]

The overlapping memberships that had offered the hope of a wider perspective in the Cabinet Council system have been wiped out. Only the Director of the Office of Management and Budget (OMB) and a White House staffer sit on both Councils. The practice of sending copies of agendas and documents to other departments has been terminated, and no agency head below Cabinet level can even request a copy, if he should learn of its existence. The Council on Environmental Quality (CEQ) and Environmental Protection Agency (EPA) are not on the new Councils. They may attend only when invited. The circle of decision makers has been dramatically shrunk. One staffer remarked that "Cabinet members are not around (the White House) so often."

The survivors seem to feel that they have a much better decision making process with fewer participants. That may well be true, in the traditional view of decision making. A smaller group can engage in a more fruitful dialogue and come more easily to decisions. From the standpoint of this book, however, the question is whether they have achieved simplicity at the expense of breadth of perspective.

There are some unannounced features of the new system that give it substantially more flexibility than the brief description above would suggest. These features may help to avoid tunnel vision.

For one thing, the foreign/national security policy apparatus is better connected with domestic and economic policy than ever before. By Presidential

order, Attorney General Meese and Secretary Baker sit regularly on the National Security Council. The reciprocal is not true: National Security Assistant Carlucci does not sit by right on either of the other Councils; and there is no regular overlap of staff attendance across the "foreign/domestic" line (though it is said to be under consideration). However, Carlucci and his aides have regularly been invited to attend meetings of the Domestic and Economic Councils and their working groups when it seemed appropriate, and the Executive Secretaries of those Councils have been invited into NSC Senior Interagency Groups (SIGs).

Another important change has been the changed perception of the role of the NSC since the 1986 Iran/Nicaraguan contra affair and the NSC reorganization that followed it. The Iran/contra scandal has been widely perceived as a failure of the government's decision making processes. Failure it was, indeed, but the failure was the misuse of the system rather than the lack of it.

I have pointed out that the Brownlow Committee fifty years ago, in recommending the creation of the Executive Office of the President (EOP) stressed that **it must be impartial.** Its function should be to coordinate and digest the advice coming from the departments and agencies of the government, so that the choices before the President can be put before him in a manageable way, and so that he can see the implications of each choice. That is an excellent idea and a good beginning at foresight.

The problem is that strong-willed people usually have their own agendas, and it is very tempting to use one's proximity to the President to pursue one's own goals. The NSC, except perhaps during the Eisenhower presidency, has seldom functioned as it was intended. The National Security Assistant has, since the incumbency of Henry Kissinger, emerged as a partisan advocate, often more powerful than Cabinet members.

The public tends to confuse the NSC with the NSC staff. In the Iran/contra case, the National Security Council and the National Security Planning Group existed to provide a balanced summary of the advantages and penalties of proposals such as the Iran deal. For whatever reasons, the President chose to bypass that advice and to allow the NSC staff to function as an operating agency to pursue objectives dear to his heart. No institutional arrangements will work if the

President simply elects not to use them. In that case, the redress lies -- not with the Executive branch institutions -- but with Congress, the Supreme Court and ultimately with the people.

The 1987 Assistant for National Security and his staff represent a viewpoint very different from their predecessors. They do not go so far as to disclaim the right to policy views on their own, but they do argue that others must have the right to be heard and to have their views represented to the President. Otherwise, those other agencies will try to circumvent the NSC system. The practical upshot has been a conscious effort to involve all the appropriate players in developing policy options.

One of the most effective devices for widening the participation in developing policy options is the informal working group. Each of the three Councils employs the device. Senior Interagency Groups (SIGs), organized by geographic region or by subject, have long been a part of the NSC system, and other interagency groups function at a lower bureaucratic level. Since 1985, the Domestic and Economic Policy Councils have from time to time organized similar working groups as the need is perceived. There may be eight or ten of them in existence at any given time. They deal with some interesting topics. Consider this list (probably incomplete) of working groups created by the Domestic Council:

* biotechnology;
* federalism;
* privatization;
* torts;
* patent law;
* anti-trust policy;
* productivity;
* civil service simplification;
* emergency management.

This is an impressive group of topics of legitimate interest to the government in the 1980s. Some of the groups are co-sponsored by the EPC.

At least two of the working groups seem likely to exist more or less permanently. The Working Group on Government Operations, Administration and Management is a direct outgrowth of Meese's old Cabinet Council on Management and Administration. The indefatigable Ralph Bledsoe was Executive Secretary of the old Cabinet

Council; he now chairs the Working Group -- aside from his job as Executive Secretary of the Domestic Policy Council.

Bledsoe is also (at least for the present) chairing the other more or less permanent Working Group on Energy, Environment and Natural Resources. Thereby perhaps hangs an illustration of the problem of conducting coordinated policy in Washington. The comparable Cabinet Council was chaired by the Secretary of Interior. In the reorganization of 1985, Interior lost it to the Deputy Secretary of Energy, a man with impressive White House connections. When that Deputy Secretary left to become a federal judge, Bledsoe was assigned the job. It seems a good guess that both Interior and Energy would prefer to have the Chair given to a White House staffer of known impartiality and good sense, rather than see it go to the other agency. There is a lesson in this for the organization of any foresight capability.

These working groups draw in participants from the rest of the government on an ad hoc basis. This provides an avenue for traditional agencies' participation in drafting decision documents, below the Cabinet Secretary level. CEQ and EPA participate (as of the time of writing) in the Working Group on Energy, Environment and Natural Resources. They thus have a chance to be heard, though they depend on others for an invitation to participate at the policy level when the President sits with the Domestic Policy Council to make decisions.

Another informal feature tends to broaden the access to the White House for non-Cabinet agencies. There is something of a "ward" system (the term is mine, not from the White House). When EPA, the Veterans Administration (VA), the Office of Personnel Management (OPM) or the General Services Administration (GSA) have issues that need resolution at the White House level, they tend to come to the Domestic Policy Council. Similarly, NASA, the Small Business Administration (SBA), the Office of Science and Technology Policy in the White House, and economic regulatory agencies tend to go through the Economic Policy Council. Presumably, this implies that the Executive Secretaries of the relevant Councils are also keeping those agencies' interests in mind when inviting participation in working groups.

The recent handling of the "acid rain" issue provides a good case study of the strengths and weaknesses of the new arrangements. The Canadians for several years have been pressing the United States to reduce cross-boundary transport of acid precipitation. In 1985, the President and the Prime Minister agreed to appoint binational special envoys to study the problem. They reported in 1986, and it was certain that acid rain would be a principal Canadian issue when the President and the Prime Minister met again in April 1987.

Foreign, domestic and economic policy all come together on acid rain, since any effort to reduce it would go to the very guts of the domestic economic system. The Chief of Staff assigned the Domestic Policy Council the task of developing a position paper with the policy options spelled out. The DPC gave it to the Working Group on Energy, Environment and Natural Resources, which in turn asked the Department of State to chair a sub-group at the staff level. That sub-group is designated the "BACG" -- the U.S. side of the Bilateral Advisory Consultative Group set up at the recommendation of the Canadian and U.S. special envoys. The BACG is chaired by the Assistant Secretary of State for Oceans, International Environmental and Scientific Affairs (OES). It includes staffers from the Departments of Energy, Interior, State and Justice, from EPA, from the National Oceanic and Atmospheric Administration (NOAA) in Commerce, and from five White House units (the Domestic Policy Council, the Office of Policy Development, the Office of Science and Technology Policy, OMB and CEQ). Membership is flexible, and this list may be incomplete. The BACG is a continuing group, though it has no formal charter.

The BACG prepared a policy options paper and sent it up the ladder to the DPC. Meanwhile, in the NSC, the Policy Review Group (a deputy-level oversight group) was keeping up with its progress as one element of the impending bilateral summit.

The acid rain options were presented to the President at an expanded DPC/NSC meeting, with the Director of EPA and the Chairman of the CEQ, among others, invited to participate. (It is perhaps a good sign that, among the participants themselves, there is uncertainty but no apparent concern as to who formally convened the meeting. It was apparently the DPC.)

The President selected an option: to promise the Canadians that the United States would undertake a $2.5 billion study over the next five years. In fact, while in Ottawa, the President himself decided to add a sweetener: an offer to discuss an acid rain agreement with the Canadians. He told National Security Assistant Carlucci of his decision. Carlucci passed the word to others. Whether or not he consulted with Carlucci or others is unclear; in any event, he had had the exposure to their views earlier, at the expanded meeting.

This policy process did manage to bridge the traditional foreign policy/domestic policy gap, and it has brought in an impressive collection of perspectives. From the foresight standpoint, the question is whether the process started in the middle and was defined too narrowly.

The potential seriousness of acid precipitation has been recognized by specialists for a decade. The Carter Administration began the process of studying it nationally and through international cooperation. Since then, there were reports by expert study groups to the National Research Council and to the White House in 1983. An ongoing governmental study group ("NAPAP" -- the National Acid Precipitation Assessment Program) is chaired by the EPA Director and is scheduled to report in 1990. The policy group, BACG, is informally linked with NAPAP, but there is no unified direction.

More important, perhaps, is the list of missing players: the Departments of Transportation, Commerce (aside from NOAA), Housing and Urban Development, Agriculture, Treasury. The acid precipitation problem may well require a fundamental reordering of national priorities and the directions of growth. There is hardly a Cabinet department that does not have a stake in the decisions. The interagency process should be bringing in the "tangential" departments that may not yet even recognize how acid precipitation control policies may eventually affect them. It should inform the Administration on issues such as the priority to be given to acid precipitation in research budgets, the view to take of Congressional initiatives on acid rain, and on issues as diverse as energy, housing and transportation policies, the view of population growth and of immigration reform. The approach to the Canadians should have been dovetailed into the broader and more systematic examination. The answer to the Canadians would have emerged naturally from the broader

perspective. And the broader process should be continuing.

Participation by EPA in the critical meeting with the President depended upon an invitation from the Domestic Policy Council (which probably meant its Executive Secretary). This will work if the DPC has a broad enough viewpoint to recognize all the potentially relevant viewpoints that should be heard, and if it is impartial and therefore interested in getting all those viewpoints heard. (A DPC with its own policy interests may be tempted to exclude those voices with different viewpoints.)

In this instance, the criteria seem to be met. However, the recent experiences of the NSC would suggest that, if the President is to rely upon this process for assuring that he hears all the relevant views, the Councils' mandates should be spelled out -- as they have not been -- and there should be an obligation of impartiality upon the Council staffs themselves.

A better way might be to lodge that responsibility elsewhere, perhaps in the Chief of Staff or his Deputy. The idealization of the Brownlow committee about the Presidential assistants' role perhaps could be made to work -- it has not really been tried -- but the experience of fifty years would suggest that the original task of bringing all opinions to bear should be separated from any substantive responsibility.

There is a whiff of the Star Chamber about these working groups and their work. All of these issues -- not least among them acid rain -- are of interest to the government precisely because they are important to society. Awareness of the acid rain problem first came from academia. The working group members are not barred from exchanging information outside the government, so long as they do not divulge classified information, but they are not particularly encouraged to do so. There is no procedure for informing the public of the results of the working groups' deliberations. An opportunity is missed. If, for instance, something is to be done about ballooning damage claims in lawsuits, a national consensus or at least a majority will need to be mobilized, and discussing publicly the conclusions of the working group on torts would be a step toward building that consensus. Some things of course need to be kept secret. It would hardly be a good idea to publicize

one's negotiating position before meeting with the Canadians. However, with these groups as with the Global Issues Work Group (see Chapter III), the general policy has been one of secrecy.

A final point of concern is that the new coordinating machinery is directed usually toward operational issues, not toward the long term. Somebody should be looking ahead. Some of the groups have undoubtedly tried to look ahead at emerging trends, but it has not apparently been an ongoing responsibility of the work groups, and their temporary character does not encourage the long view.

At the start of the Reagan administration, one small and tentative step was taken to bring long-term trends to the President's attention, if not directly into the decision process. The National Indicators project was set up under Presidential Assistant Richard Beal to brief the President on trends of potential importance. A few such briefings were given, but they have been dropped.[5]

The Office of Planning and Evaluation, created in the White House early in the Reagan administration, seems never to have been plugged into the system, and the office withered away early in the administration.

From the foresight standpoint, there is one potentially promising feature of the new arrangements. The White House Office of Policy Development (OPD) has not disappeared, and its director sits on both the Domestic and Economic Policy Councils. His Office is charged with the medium and long term view. In a bureaucracy, this usually means that one has been told to stay out of the current decisions. However, the right person sitting on that job could, by virtue of his participation in the Policy Councils, serve a significant foresight role. He could become more valuable in that role if his office should establish regular connections with the planning elements in the government departments. Through this network there might, under the best of circumstances, emerge a sort of "back door" foresight function.

Decision structures must change to fit comfortably with the different styles of different presidents. This can be taken too far. From experience, I know that each new NSC staff, at the beginning of each administration, walks into empty offices with no files and no institutional memory.

It is too early to judge the new structure. At least, it contains some institutional arrangements that could be used for the elaboration of a systematic foresight process. The problem is that each president must learn the job anew. This time, it has taken six years of an eight-year presidency to get this far. Without derogating from the right of each president to organize his staff to fit his needs, it would seem that a more formal description of what needs to be done, and the formal establishment of the institutions needed to achieve those ends, would show what has worked before. Once the institution exists, and the need for it is perceived, it tends to survive. The formal budget process did not exist before 1921 but since then I don't believe that anybody has seriously proposed reverting to the haphazard earlier process. Even in the wake of the Iran/contra crisis, there have been proposals to reform the NSC, but not to abolish it.

Coordination at the working level. The commitment to foresight must come from the top, but the process itself must begin much farther down. The principals in the government have neither the time for the expertise to identify and evaluate all the ramifications of a policy issue. They need the experts' help, and the experts in turn need to be able to identify each other, to have their responsibilities clearly identified, and to learn from each other through a systematic process of communication. The hypothetical example of Chapter I can exist only when those conditions are present.

The government does not have the underpinnings at the working level for such foresight.

In such an information void, the federal failure affects the quality of local government and business foresight, since those institutions cannot find the information they need from the federal government.

The failure of course affects the federal government itself. The White House can hardly get the full range of inputs into decisions if it cannot identify the inputters. Moreover, the failure fragments the bureaucracy. Outside his own circle, the government bureaucrat is likely to be nearly as lost as any outsider from business or academia or a state government.

At the most fundamental level, the process of foresight begins with communications, and the need for better communication is a *leitmotif* throughout this

book. The energy analyst cannot find the irrigation specialist. The policy maker does not hear the relevant perspectives. The businessman complains that he cannot penetrate the bureaucracy to find where the data are.

First, there is the problem of finding where the information is.

It sounds simplistic, but the first important contribution to foresight would be a usable functional directory. At football games, the hawkers warn that "you can't tell the players without a program." The warning is relevant to government.

To demonstrate the problem to the reader, let us set up some hypothetical searches.

If you were looking for the expert on a given topic, you might begin with the U. S. Government Printing Office, which publishes a bibliographic "Directories and Lists of Persons and Organizations."[6] You would probably start with the *U.S. Government Manual*, which describes departments' and agencies' formal responsibilities down to the bureau or office level. The *Manual* is, however, a very formal document, reflecting a formal process of establishing responsibilities and couched in opaque bureaucratic English. It is organized by agency, rather than by topic, and it doesn't give names and telephone numbers. The *Congressional Directory*, organized for the convenience of Congressional staffers, is actually a more accessible source of addresses and telephone numbers for the Executive branch, as well as Congress, but it is not functionally organized.

The next step would be the departmental directories. They vary widely in usefulness (and some agencies -- Health and Human Services, for instance -- do not have unified directories).

An inquirer with a question about Brazil can buy the *Department of State Telephone Directory* and look up the address and telephone number of the Brazilian Embassy in Washington, plus the State and AID "Country Officers" for Brazil, plus an indication of which officers have responsibilities for economic and consular matters. There are even home telephone numbers. Those officers can answer some questions immediately or in turn can guide the inquirer to other sources and bibliographies.

The more traditional the category of information sought, the better the prospects of success. A chemist interested in existing patents on polymers need only know that the Patent and Trademark Office is in Commerce, and he will find telephone numbers for different classes of polymers under "Chemical Examining Groups." But what if the inquirer is interested in finding indicia of the rates of technological change? The query is valid, and the issue is vitally important to any projection of the future. As an experiment, this author called the office of the Assistant Commissioner for Patents and said that he was seeking information as to the annual rate at which new patents were being issued in certain specific technological fields. Whom could he call to get the information? An earnest voice at the other end of the line didn't think there was such information and couldn't even think of anybody to call to find out if there was.

We have described how to learn something about Brazil. Let us hypothesize that you, the inquirer, are a Department of State desk officer making a projection of US-Brazilian relations -- or perhaps a businessman planning investment or trade, and interested in making an assessment of your chances of getting your money out. Who would you call to learn the government's projection of the balance of payments with Brazil? The Planning and Economic Analysis staff or the Office of Monetary Affairs in State? The Bureau of International Policy and Research, or the Office of Economic Development Policy and Planning, or the Associate Director for National Economic Accounts, or the Associate Director for National Analysis and Projections, or the Associate Director for Regional Economics, or the Associate Director for International Economics in Commerce? The Deputy Assistant Secretary for International Monetary Affairs, the Deputy Assistant Secretary for Trade and Investment Policy, or the Deputy Assistant Secretary for International Economic Analysis in Treasury? All of the above? None of the above?

The directories we have been talking about are at the simplest conceptual level: lists of people, alphabetically, and lists of offices by organization.

The communications revolution is in explosive growth, and the government is not keeping up. Private data banks and computerized directories of information sources are burgeoning, even in Washington. If they

function properly, such systems should permit a survey of available sources by functional area or responsibility, by topic or by key words. For the purposes of foresight, it is critical that the inquirer be able to find precisely who has information and/or policy responsibility for every area of potential interest to government. Such cross-referenced guides can be public or private, or a combination, so long as they work.

Private enterprise has moved into the vacuum left by the disarray of governmental directories, and there is at least one good and up-to-date privately-published listing of Executive branch and Congressional offices and key staffers, the *Federal Executive Directory*. It has a key-word index.[7]

Congressional Information Service, Inc. (a subsidiary of the Dutch publishing conglomerate, Elsevier) publishes the *American Statistics Index*, a state-of-the-art guide to U.S. Government statistical publications. It alone is a sufficient guide to published federal statistics for most imaginable purposes -- if the government and the private sector know about it. Perhaps there is something to "privatization." (Appendix C gives details on these and other guides to federal statistics.)

It is not customary to praise the United Nations for efficiency, but in this respect they are far ahead of the United States. The inquirer can walk down to the U.N. Bookstore in Washington and buy a three-part *Directory of U.N. Information Systems*.

For an example of the second step -- the clear assignment of responsibility -- let us go back to the question of demographics. Few would challenge the statement that demography is of some importance. The responsibility for demographic data collection and analysis clearly lies with the Bureau of the Census, but it disclaims any responsibility for policy.

The policy responsibility concerning population issues outside the United States resides fairly clearly with the Department of State Coordinator for Population Affairs, who chaired a now-defunct Interagency Ad Hoc Committee on Population.

The most senior population official in a domestic agency is the Deputy Assistant Secretary of Health and Human Services for Population Affairs. The author, in

a six-week effort by letter and telephone in the summer of 1984, attempted unsuccessfully to obtain any statement from that Deputy Assistant Secretary as to whether

* the United States has an official view of the desirable size of the United States' population. (In fact, it does not.)

* her office constituted the "population unit at a high level of the national administrative structure to integrate population measures and programs into comprehensive social and economic plans," called for by the Bucharest World Population Plan of Action in 1974 and signed by the United States.

* if her office was not such an office, was there one in the United States Government.[8]

The point is not whether the Deputy Assistant Secretary could answer those questions the way I would have liked. The point is that she did not feel empowered to answer them at all. Is it surprising that outsiders look in vain for clarity from such a fudge factory?

Policy makers can hardly begin to consider "all the significant ramifications that can be identified" if they have no system of identifying who may know about those ramifications, and if the bureaucrats do not even know whether they are responsible for knowing about a specific issue.

This sort of confusion can lead to dangerous policy failures.

The third element of mobilizing the working levels to participate in foresight is communications: creating a process that will encourage and require the experts to be in regular touch with each other across the departmental and agency boundaries as in the hypothetical example in Chapter I.

This process is almost totally missing in the U.S. Government, except for the sort of informal and traditional "clearance" channels mentioned at the start of this chapter.

In fact, departments may actively discourage their people from communicating "out of channels." When I

was on loan from the Department of State to the National Security Council, my erstwhile cohorts at State were under instructions not to communicate with NSC staffers except through the Secretariat. (Fortunately for all, the instructions were regularly ignored.) The fear of course was that the NSC would pick the experts' brains and cut the top levels of State out of the policy process, or that State employees would take ideas to the NSC that they had been unable to sell at home.

The fear was legitimate, but the effort to solve the problem by building stone walls was ill-advised. One can easily envisage a system in which the cross-communication exists, but with the knowledge and encouragement of the top officials. If it should produce information raising doubts about a particular policy, so much the better for the formulation of good policies.

The fostering of such communication should be an element of any proposal for better federal foresight. One way of doing it -- once the community is identifiable -- is to pose questions to it as in the hypothetical example, even long before the question is of interest to the White House -- questions, perhaps, about acid rain. "Year XXXX" exercises are another way of doing it; the *Global 2000* study brought many of its participants together for the first time.

At the working level, coordination is not simply a question of integrating policy development. It is the less glamorous but very important business of developing **compatible data** (e.g. common measurements, a common system of geographical nomenclature and computer programs that can talk with each other) so that information can be exchanged. It is also the process of clarifying and rationalizing the planners' assumptions (i.e. learning when two agencies' conclusions on an important issue diverge simply because one of them is basing its calculations on false assumptions).

The need for improvement in these areas has been recognized, but not much has been done about it. There have long existed recognized sources of data in specific areas--the Bureau of the Census and the National Bureau of Standards are probably best-known--but inter-agency coordination to make data mutually useful has lagged far behind. There existed a Statistical Policy Branch, variously named and located

at one time or another in Commerce or in the Office of Management and Budget (OMB), but it was abolished in 1982.

Moreover, the data base itself may be shrinking rather than expanding as the Reagan administration seeks to reduce governmental paperwork. An authoritative commentator, Joseph Duncan, argues that the declining quality of federal economic statistics may be a basic source of present "confusion and contradictions in economic forecasting." He cites the decline of statistical data and the failure to adjust the reporting system to reflect a changing economy. As an example of the "profound implications" of this deterioration, he suggests that analysts may have been thoroughly misled as to the impact upon the economy of the recent strong dollar.[9]

As this chapter is written, there are reports of a governmental study underway to find ways further to reduce the government's data collection and statistical systems.[10]

In urging the rationalizing and coordination of the present chaotic state of data collection and processing, I am somewhat surprised to find an ally in the Grace Commission, which excoriated the present statistical practices and identified two central problems:

> *The first is a major leadership void in the overall management of information. There is no focal point to provide the direction, coordination, and standardization needed to operate effective information systems in the individual agencies. Further, and of a potentially critical nature, there is no central authority integrating individual information systems into a coherent management information system necessary to support decision making in the Executive Office of the President (EOP).*[11]

This is a very succinct statement of a fundamental problem that the nation must address if it is to improve foresight. It comes from a group that has hardly been identified as an advocate of foresight. If the spectrum of support can extend so far -- and if the debate can be removed from its present ideological context -- there may be hope.

On this note, I will leave the government's record of efforts to improve cross-sectoral coordination. At the policy level, the record shows halting progress over the years toward better coordination, with periodic reversals. No sustained and systematic effort has been made to mobilize and coordinate the working level. To the ardent eye of the foresight advocate, the system is archaic and anarchic.

Let us turn now to the second generalization made at the start of this chapter.

Second, the History of Efforts to Address Long-Term Resource, Environmental and Population Issues.

Governmental efforts to protect resources or the environment go at least as far back as efforts to control poaching in the King's Forest or ordinances governing urban zoning or waste disposal. This summary addresses the evolution of policies in the United States addressed consciously to the concepts of resources, environment and population change.

Resources. The traditional starting point is the creation under President Theodore Roosevelt and Gifford Pinchot of the National Conservation Commission and of the Forest Service. That was an effort to bring some concept of long-term management to the nation's mineral resources and public forests, a reaction to the ruthless turn-of-the-century exploitation of forest resources. Later, when the Dust Bowl dramatized the problem of soil loss, President Franklin D. Roosevelt created the Soil Conservation Service (SCS).

Concern has periodically arisen about minerals scarcity or the long-term prospects for resource availability. This concern has usually led to the creation of ad hoc commissions. Among these were President Truman's Materials Policy Commission (the "Paley Commission" of 1951), the National Academy of Science's Committee on Natural Resources in 1961, and the National Commission on Materials Policy created by an act of Congress in 1970.

The ongoing organizations such as SCS and the Forest Service continue to shape policies. It would be hard to identify in present policy any trace of those temporary study groups. This suggests a conclusion that will recur later in this book: to achieve any

lasting results, create ongoing institutions with policy responsibility in their subject areas.

The federal resource institutions are rather haphazard, reflecting historical accident, bureaucratic "turf" wars and, presumably the state of national awareness of different resource issues. Some organizations (e.g. the National Park Service, the Fish and Wildlife Service, the Marine Mammals Commission) exist primarily to protect aesthetic and non-economic values from economic depredation. Others (e.g. SCS) are conservation-oriented, but the conservation is intended to serve economic ends -- continued agricultural protectivity -- as well as secondary non-economic benefits such as the preservation of wildlife habitat. Still others (the Forest Service, the Bureau of Land Management, the National Marine Fisheries Service) are charged with the dual functions of protecting and facilitating the economic use of renewable resources over which the federal government has ownership or control. The weight given to each of these responsibilities changes with the national mood.

We tend to be less solicitous of "non-renewable" than of "renewable" resources, perhaps because the renewable resources consist generally of living things with which we can identify. The Geological Survey and the Bureau of Mines, for instance, are concerned with identifying and facilitating private exploitation of minerals, not with saving them. An exception perhaps is the newest entrant into the resource field: the Department of Energy. It combines research, production and management, regulatory, conservation (the Bureau of Conservation and Renewable Energy) and policy planning functions.

The resource responsibilities described above are scattered among the Departments of Agriculture, Commerce, Interior and Energy, plus one independent commission. There is no systematic coordination, and the only regular overview is provided in the Council on Environmental Quality (CEQ) *Annual Report*. That report is not geared to any specific decision process or machinery, and the report itself was two years behind schedule as this book goes to the publisher.

Environment. It is easy to forget how very recent the concepts of "the environment" and "environmentalists" are. The term itself, in its modern meaning, apparently came into use only in 1956.[12] Problems quickly generate their own

terminology, however, and the growing urban problems of the 1960s--"smog" being perhaps the most important early issue--generated a series of environmental laws:

* The Water Quality Act (1965);
* Endangered Species Preservation Act of 1966 (amended in 1969);
* Environmental Quality Improvement Act of 1970;
* National Environmental Policy Act of 1969;
* Clean Air Amendments of 1970;
* Federal Water Pollution Control Act Amendments of 1972;
* Federal Environmental Pesticide Control Act (1972, amending the Federal Insecticide, Fungicide and Rodenticide Act of 1947);
* Noise Control Act of 1972;
* Marine Mammal Protection Act of 1972;
* Endangered Species Act of 1973;
* Safe Drinking Water Act (1974);
* Toxic Substances Control Act of 1976;
* Resource Conservation and Recovery Act of 1976.

Responsibility for carrying out all these laws is somewhat less diffused than is true of resource policies, because of the central role of the Environmental Protection Agency (EPA).

The best single characterization of this wave of legislation is that, long overdue, it attempted to redress a whole series of specific environmental problems, sometimes by setting very strict linear goals. (The Federal Water Pollution Control Act Amendments of 1972 stipulated that " ... it is the national goal that the discharge of pollutants into the navigable waters be eliminated by 1985.")

For environmentalists, it was a heady period, but it is dangerous in environmentalism or anything else to pursue absolutes. Even among environmental goals, the pursuit of a prohibition on water pollution may simply shift that pollution to the atmosphere or to landfills. Financial resources are not unlimited, and society must learn how to get the most pollution control for its money.

Several of the environmental acts have been coming up for renewal, and each time the question is posed: Will the environmentalists "succeed" (i.e. be able to maintain the priority for environmental goals?) Will they fail (i.e. will the laws be gutted?) Or will the nation find a means to bring these environmental goals

into the decision process, to be weighed against other goals when any decision is contemplated that might affect the environment? So far, the tendency has been to renew the legislation substantially unchanged.

The reader should turn to other books for a detailed look at the Reagan administration's policy concerning environment and resources.[13] The early effort to push nationally held coal, petroleum and timber resources into the private domain for economic exploitation is perhaps the hallmark of the administration's conservation policy. On the environmental side, EPA went through a 44% decline in funding (in real dollars) from 1981-84 and a 29% decrease in personnel;[14] it has subsequently stabilized.

In a period that regularly brings us new bad tidings about toxic chemical dumps, the national Chemical Information System has been cut adrift by EPA, to be funded by private business if it will. For over a decade, this has been the integrated data base for physical and regulatory data about chemicals.[15] Examples such as this could be multiplied.

The energy forecasts in the Department of Energy have cut their time horizon from 2020 to five years. The rationale, as the erstwhile Deputy Secretary Danny Boggs gives it, is that long-term energy forecasts are notoriously inaccurate, anyway. To the foresight advocate, this misses the point. One does not expect a long-term forecast to be definitive. Rather, it may identify some potential issues that should be watched as subsequent projections are made every year. With the shorter time frame, the specialists are told not to look out beyond five years to identify those potential issues and begin to watch them.

Population. The government has persisted in a remarkable official blindness to population as an issue in the United States, given the fact that population is in the denominator of almost every equation dealing with human welfare, and that migration patterns and rates of population growth have fluctuated widely since World War II.

Only 25 years ago, President Eisenhower was able to say of efforts to introduce birth control information into developing countries receiving U.S. aid that he "... cannot imagine anything more emphatically a subject that is not a proper political

or governmental activity or function or responsibility."[16] (To his credit, he said after leaving office that he shouldn't have made the statement.)

Since then, the government has come to support efforts to control population growth in the less developed world, but only one President has dared to suggest that it might be desirable for the United States. In 1969, President Nixon said:

> *In 1917 the total number of Americans passed 100 million, after three full centuries of steady growth. In 1967--just half a century later--the 200 million mark was passed. If the present rate of growth continues, the third hundred million persons will be added in roughly a thirty-year period. This means that by the year 2000, or shortly thereafter, there will be more than 300 million Americans.*
>
> *The growth will produce serious challenges for our society. I believe that many of our present social problems may be related to the fact that we have had only fifty years in which to accommodate the second hundred million Americans. ...*
>
> *Where, for example, will the next hundred million Americans live? ...*
>
> *Other questions also confront us. How, for example, will we house the next hundred million Americans? ...*
>
> *How will we educate and employ such a large number of people? Will our transportation systems move them about as quickly and economically as necessary? How will we provide adequate health care when our population reaches 300 million? Will our political structures have to be reordered, too, when our society grows to such proportions? ...*
>
> *... we should establish as a national goal the provision of adequate family planning services within the next five years to all those who want them but cannot afford them.*[17]

President Nixon at the same time created the Commission on Population Growth and the American Future chaired by John D. Rockefeller III, who had been active in pressing for its creation. The Commission reported in 1972. Election years are not a good time to float controversial recommendations. The report concluded that the Commission could find no way in which further population growth would benefit the country. It also had recommendations on abortion which the White House saw as highly controversial, and the report was quietly shelved--including the broader recommendations on population.

Since then, the only Presidential reference to U.S. population growth has been an oblique one. President Carter, commissioning *The Global 2000 Report* in 1977, included population along with resources and environment among the global issues to be addressed.

The Reagan administration's view of population has become entangled in the abortion debate. The President himself has been guarded as to whether he himself considers population growth to be a problem, anywhere in the world. The administration position, as developed for the Mexico City International Conference on Population (August 1984) was a tortured compromise between warring factions within the administration. It ascribed third world countries' difficulties more directly to their failure to adopt private enterprise economic systems than to their population growth, and it opposed abortions and coercion.[18] In the face of Congressional opposition, the administration has abandoned an early proposal to end family planning assistance in its AID program; the AID population budget has instead been slowly whittled down since FY 1985.

On the social and economic implications of United States population growth, the administration has been silent.

What conclusion does one draw from this reticence? Presidents and their advisers, more sensitive to political winds than the professional concerned about population growth, are either themselves unconcerned about population issues, or they detect a great deal of continuing political resistance to government's concerning itself with Americans' decisions as to how many children they will have or where they will live.

Many poor countries, with serious and immediate population problems, have had to face the necessity of entering these contentious areas. It demands quite an adjustment for the United States to grow in less than a century from a frontier society to one in which we recognize that limits to population growth may apply here, too. The rapidity of our own national growth has precipitated the need for that profound change in thinking. One way to educate the government and the citizenry to the need for this change is systematically to examine how population growth affects efforts to solve the other problems with which we are dealing. Which leads us to ...

Third, the Development of Integrated Foresight Studies.

There has been very little effort by the Executive branch to think about the interaction of demographic, resource and environmental issues with each other, with technological trends, or with other economic and social issues.

When such efforts were undertaken, presidents usually asked a temporary group outside the government to do them. An example is the "Commission on National Goals" commissioned by President Eisenhower, which produced a widely-read report, *Goals for Americans*. Much later, President Carter asked the President of Columbia University to head the Commission for a National Future. Its report, published at the very end of the Carter administration, was simply lost in the Reagan transition.

Both of these reports were primarily goal-setting exercises, as was the Rockefeller Commission report of 1972. As such, they required a certain amount of systematic foresight to justify the goals they set forth; they were integrated studies, but far from foresight as it is envisaged in this book.

Perhaps the most significant effort to create an in-house cross-sectoral foresight operation following the demise of the National Resources Planning Board was the creation by President Nixon of the National Goals Research Staff in 1969. It was given the following task:

> *... forecasting future developments, and assessing the longer range consequences of present social*

> *trends; measuring the probable future impact of alternative courses of action, including measuring the degree to which change in one area would be likely to affect another; estimating the actual range of social choice--that is, what alternative sets of goals might be attainable, in light of the availability of resources and possible rates of progress; developing and monitoring social indicators that can reflect the present and future quality of American life, and the direction and rate of its change; summarizing, integrating and correlating the results of related research activities being carried on within the various Federal agencies, and by State and local governments and private organizations.*[19]

The history of this Staff is both poignant and instructive. Its mandate could be written today, and it would still be a very good one. It was created by the President, in the Executive Office of the President, precisely what some advocates of foresight are presently advocating. Yet the Staff died quietly after one unsung (but good) report, destroyed by political infighting, without ever having played a role in national decisions.

President Carter's 1977 Environmental Message called for

> *...the Council on Environmental Quality and the Department of State, working in cooperation with the Environmental Protection Agency, the National Science Foundation, the National Oceanic and Atmospheric Administration, and other appropriate agencies, to make a one-year study of the probable changes in the world's population, natural resources, and environment through the end of the century. The study will serve as the foundation of our longer-term planning.*[20]

The result was *The Global 2000 Report to the President*. It was the most comprehensive effort since the Rockefeller report to relate population, resource and environmental issues, and its scope was enlarged to cover the world on the reasonable assumption that U.S. interests may be affected by developments elsewhere.

Even though hampered by inadequate and inconsistent data, *Global 2000* did present a detailed and documented picture of the interrelationships between population, resources, and the environment. It was much less successful in relating these areas to other relevant questions. In the end (to simplify mercilessly), it had to content itself by simply extrapolating recent performance in most relevant areas: technological change rates; social development; economic growth; international trade; political stability, and even the weather.

What *Global 2000* established above all else is that integrated thinking about these relationships is just at its beginnings. *Global 2000*, unlike its predecessors, focused upon the weaknesses of the government's thinking processes on which the report itself was based. The awareness of the inadequacies of the government's foresight apparatus has not disappeared. The hope remains (and motivates this book) that out of *Global 2000* will come -- not just decisions about policy -- but improvements in the decision process itself.

President Carter, be it noted, called for *Global 2000* "to serve as the foundation" for future planning. He did not ask for policy recommendations. In this sense, *Global 2000* is as close as we have yet come to formal foresight: a systematic exercise to survey long-term trends and inform policy makers.

Since 1981, governmental interdisciplinary studies of population, resources and environment and their relationship to other goals have been confined to the work of the Global Issues Work Group, whose record will be examined in the next chapter.

Fourth, the Connection of Foresight to Policy.

The critical question, once an integrated analytical capability is in place, is "how do you bring it to bear on real world decisions?"

It would be hard to identify any hard governmental decisions taken as a result of *Global 2000* as it was of the Rockefeller and Paley reports. Follow-up recommendations were prepared, but they were not staffed out by the government.[21] They were offered as broad ideas rather than as specific proposals ready for the President's signature. The follow-up report was

completed just at the change of administration, and the Reagan administration studiously ignored it.

When ad hoc study groups disband, there is nobody left to carry on. The study group may itself generate legislation and enough public interest to push it through. Failing that, the results are likely to be lost on the wind, unless such studies are integrated into a regular process for offering policy choices to the administration.

I have said that the important issues of population, resources and environment have not been plugged systematically into Executive branch decision making.

There is one -- and only one -- major exception to that generalization.

The **National Environmental Policy Act (NEPA)** deserves special treatment because it created a process intended to close that gap. Under this law,

> *... all agencies of the Federal Government shall--*
>
> *(A) utilize a systematic, interdisciplinary approach which will insure the integrated use of the natural and social sciences and the environmental design arts in planning and in decisionmaking which may have an impact on man's environment;*
>
> *(B) identify and develop methods and procedures, in consultation with the Council on Environmental Quality established by title II of this Act, which will insure that presently unquantified environmental amenities and values may be given appropriate consideration in decisionmaking along with economic and technical considerations;*
>
> *(C) include in every recommendation or report on proposals for legislation and other major Federal actions significantly affecting the quality of the human environment, a detailed statement by the responsible official on--*
>
> *(i) the environmental impact of the proposed action,*

(ii) any adverse environmental effects which cannot be avoided should the proposal be implemented,

(iii) alternatives to the proposed action,

(iv) the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity, and

(v) any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented.

Prior to making any detailed statement, the responsible Federal official shall consult with and obtain the comments of any Federal agency which has jurisdiction by law or special expertise with respect to any environmental impact involved. Copies of such statement and the comments and views of the appropriate Federal, State and local agencies, which are authorized to develop and enforce environmental standards, shall be made available to the President, the Council on Environmental Quality and to the public as provided by section 552 of title 5, United States Code, and shall accompany the proposal through the existing agency review processes;

(D) study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources;

(E) recognize the worldwide and long-range character of environmental problems and, where consistent with the foreign policy of the United States, lend appropriate support to initiatives, resolutions, and programs designed to maximize international cooperation in anticipating and preventing a decline in the quality of mankind's world environment;

(F) make available to States, counties, municipalities, institutions, and individuals, advice and information useful in restoring, maintaining, and enhancing the quality of the environment;

(G) initiate and utilize ecological information in the planning and development of resource-oriented projects; and

(H) assist the Council on Environmental Quality established by title II of this Act.[22]

This is the origin of the Environmental Impact Statement (EIS).

The point here is that the Act did not tell government what it could or could not do. It was a **process** bill, despite the general (and still very powerful) preambular language as to the importance of preserving the environment for ourselves and future generations. It told the government it must **consider** the environmental consequences of proposed actions. It did not say what the government must do once it had considered these implications. It was, in effect, the single most relevant prototype for foresight legislation now being discussed.

The Act's greatest strength and its greatest weakness was a feature which seems to have been unintended by its Congressional sponsors. It opened the way to **judicial review.** Environmentalists could sue the government to force it to show that it had considered the environmental consequences adequately in an EIS. This feature also permitted opponents of an action, environmentalists or not, to slow up the action by throwing it into the courts. The judicial review feature has caused the bureaucracy much difficulty. This and future administrations would probably be wary of any proposed foresight legislation that might open the way for judicial review. The question posed for proponents of foresight legislation is how to find an equivalent forcing mechanism without the penalties.

The Act also created the Council on Environmental Quality (CEQ), which promptly began putting out a very good annual report on the environment. Some proponents of foresight legislation emphasize the importance of an office in the Executive Office of the President, making periodic assessments of world trends. They should look

at that annual report and ask themselves which aspect of NEPA, the EIS or the CEQ annual report series has been more effective in forcing the government to look at environmental issues. The answer, I think is self-evident. The **process** has been more important than the office or the report.

The Executive branch is (or was) diligent in turning out EISs to meet the requirements of NEPA for all sorts of concrete activities, such as highway construction. It has been much less careful to conduct overall analyses of major decisions such as President Carter's energy proposal or the Natural Gas Act, or President Reagan's far-reaching initiatives such as accelerated sell-off of coastal oil-drilling rights and Western timbering concessions. Perhaps this reflects the constituency; there may be more organizations ready to sue to force an EIS on a specific proposal than there are organizations with so broad a perspective as national resource or energy policy. The problem is that, while any single nibble may be environmentally unimportant, the effect of a series of nibbles may be disastrous. The encroachment upon the nation's wetlands is a good case in point.

The lesson here, presumably, is that an ongoing constituency is needed to see that any foresight mechanism is employed.

Neither CEQ nor the EIS procedure has brought environmental issues into the heart of the decision process. One by-product, however, of the EIS process is that every agency was required to designate an office responsible for preparation and comment on EISs. Although many of these were at a fairly low bureaucratic level, the list constitutes the sole available listing of governmental entities with environmental foresight responsibilities. The list changes regularly; it is maintained (after a fashion) by the Council on Environmental Quality, and is unclassified.

NEPA has been subsiding into disuse. Aside from the major decisions, most of which were never brought into the EIS process, routine environmental impact statements have been declining more or less steadily from about 2000 per year in the early 1970s to 549 in 1985.[23]

Anybody who seeks to improve national foresight, and to bring environmental issues into it, could well

begin with NEPA--as a model and perhaps as a vehicle. It is, after all, still the law of the land.

*****

In short, the federal government has yet to develop the machinery for systematic scanning of long-term trends and the lateral implications of contemplated actions. Its long-term analysis of population, resource and environment issues has been sporadic and -- despite the clear mandate in the National Environmental Policy Act -- it has not found a way to connect those issues with national decision making.

The trend, if anything, has been in the wrong direction in recent years. It would take imaginative new ideas to preserve the government's capacity to address these matters in the fact of intense budget-cutting, and there are few new ideas in evidence.

FOOTNOTES

1. U.S. Code, Title 31, Budget and Accounting Act of 1921, Sec. 11(a).

2. The quotation, and much of the historical matter in this section, is taken from Robert Cahn and Patricia L. Cahn, "Lessons from the Past," *Global 2000 Report to the President*, Vol. II, p.685 ff.

3. *Report of the Committee on Administrative Management in the Federal Government* (Washington: U.S. Government Printing Office, 1937. LC# JK 421 A45 1937.)

4. This description is pieced together from conversations with those involved. There is no formal public description of these arrangements. See, however, Peter T. Kilborn, "How the Big Six Steer the Economy," *New York Times*, November 17, 1985, Section 3.

5. "... the National Indicators System (NIS), which was born in early 1981, flourished during the summer, and was moribund by spring 1982. NIS was a program for systematically informing the President and senior officials of social, demographic, and economic trends in a policy-relevant format. The system was structured to conduct regular briefings in order to present an objective review of national conditions, drawing on the statistical resources of the Federal government. When NIS did work, it was able to provide high quality briefing materials that appeared to directly influence several policy decisions. But the shortfalls in the NIS system included: 1) the difficulty of regularly getting on to the President's calendar; 2) the failure to respond quickly enough to rapidly changing White House needs; 3) the failure to prepare secondary briefings to officials other than the President; 4) the failure to develop the cumulative computerized data base that was envisioned; 5) the lack of any kind of institutional or programmatic existence for the NIS system." Review of *The Natural History of National Indicators* by J. Timothy Sprehe (*Society*, 2-:1, xxx 1982, pp.26-28, reprinted in *Future Survey*, 5:2, 1983, p.9.)

   Beal himself was transferred to the NSC to plan for the management of crises. He died tragically young. Just before his death, he addressed the AAAS and said quite candidly that national security planning in this or earlier administrations is a "myth," and that without it, crisis management is very difficult. (*Science*, August 31, 1984, p.907.)

6. U.S. Government Printing Office, Subject Bibliography SB-114, November 5, 1986.

7. Carroll Publishing Company, 1058 Thomas Jefferson Street, N.W., Washington, D.C. 20007. Updated bimonthly; sold by subscription for $140 per year. The company publishes similar county, state, city and other directories.

8. Letter dated July 5, 1984, from Lindsey Grant to Marjorie Mecklenberg, Deputy Assistant Secretary for Population Affairs, U.S. Department of Health and Human Services; follow-up telephone calls July 18, August 22 and August 24.

9. Joseph W. Duncan, director of statistical policy for the OMB 1974-81, now corporate economist and chief statistician for Dun & Bradstreet, "The Economy Has

Left the Data Behind," *New York Times*, June 30, 1985, p. 2F.

10. *New York Times*, March 31, 1985, p. 1.

11. The President's Private Sector Committee on Cost Control, *Report to the President*, January 1984, Washington, GPO, Vol. I, p. III-20. See also Volume VII "Information Gap in the Federal Government."

12. Supplement to *Oxford English Dictionary*, Vol. 1, 1972.

13. See for instance Norman J. Vig and Michael E. Kraft, *Environmental Policy in the 1980s: Reagan's New Agenda* (Washington: Congressional Quarterly Inc., 1984). For a more general effort to describe the condition of major environmental indicators, see *State of the Environment: An Assessment at Mid-Decade* (The Conservation Foundation, 1717 Massachusetts Avenue, N.W., Washington, D. C. 20036; 1984).

14. *Natural Resources and the Environment: The Reagan Approach*, Paul R. Portney, ed. (Washington: The Urban Institute Press; 1984; p.68).

15. *Science*, August 3, 1984, p.483, and November 16, 1984, p.816. As of the date of writing, two firms were offering commercial access to the CIS data base. The author does not know what provision has been made for maintenance and up-dating. EPA maintains certain portions for its own purposes. Readers interested in this particular data base should address inquiries to the Chief, Systems Development Branch, Office of Information Resources Management, Environmental Protection Agency, Washington, D. C. 20460.

16. President Dwight Eisenhower's News Conference, Dec. 2, 1959, in *Public Papers of the Presidents of the United States*, (Washington: Office of the Federal Register, 1959), p.787.

17. U.S. President Richard M. Nixon, "Special Message to the Congress on Problems of Population Growth, July 18, 1969," in *Public Papers of the Presidents of the United States*, (Washington: Office of the Federal Register, 1969), p.521.

18. See *Policy Statement: International Conference on Population*, July 13, 1984, and the Plenary Statement presented by Ambassador James Buckley to the International Conference on Population, Mexico City,

August 8, 1984. Both are unclassified and should be available from the Office of the Coordinator of Population Affairs (OES/CP), Department of State, Washington, D. C. 20520.

19. U.S. National Goals Research Staff, *Toward Balanced Growth: Quantity with Quality*, (Washington: GPO, July 4, 1970).

20. U.S. President Jimmy Carter, "Environmental Message to the Congress, May 23, 1977," in *The Global 2000 Report to the President*, Vol. 1, Preface.

21. U.S. Council on Environmental Quality and Department of State, *Global Future: Time to Act*, (Washington: GPO, January 1981).

22. U.S. Code, Title 42, *National Environmental Policy Act (NEPA)*, Sec. 102.

23. The totals (including draft statements) are as follows:

Year	No. of EISs	Year	No. of EISs
1970-72	5,834	1979	1,273
1973	2,036	1980	966
1974	1,965	1981	1,033
1975	1,881	1982	808
1976	1,802	1983	677
1977	1,586	1984	577
1978	1,355	1985	549

The 1970-77 data are by personal communication from the Office of Federal Activities, EPA, March 2, 1983. The 1978-84 figures are from CEQ *Environmental Quality 1984*, Table A-69, p. 719. The 1985 figure is by personal communication with CEQ.

III.

Case Study:

the Global Issues Work Group

If "foresight" is as broad an idea as I have defined it, it is not confined to a single component of government. There was, however, a study group in the Reagan administration specifically tasked to address long-term global trends and their significance for the United States. That body was the Global Issues Work Group of the Cabinet Council on Natural Resources and the Environment, and it was the lineal descendant of Global 2000, *the Rockefeller Commission, the National Goals Research Staff, and the Paley Commission.*

A look at the functioning of the Work Group may illuminate the issues and problems faced in any effort to bring foresight effectively into decision making.

History of the Work Group

My belief is that the Global 2000 Report *is not an end in itself; it is the first step into the future.*

-- A. Alan Hill
Chairman, CEQ
Global 2000 Conference
February 26, 1982

In early 1981, the new Reagan administration found the "foresight issue" squarely on its doorstep. *Global 2000* had just been published and there were a number of legislative proposals aimed at improving the

government's long-range planning capability. Public discussion and media reviews of *Global 2000* still made good news, and articles and reports of studies supporting or debunking *Global 2000* regularly appeared in both scholarly and popular journals. Pointed questions were raised on the Administration's views on the report, on the recommendations contained in the companion paper, *Global Future: Time to Act*, and particularly on its position on the central issue of foresight.

During his June 1981 Senate confirmation hearing, Council on Environmental Quality (CEQ) Chairman-designate A. Alan Hill stated that a high priority for the Council would be coordination of White House efforts to address global environmental issues. He noted, also, that in order to help in the development of Administration policy, CEQ would be refining the *Global 2000* report with further analysis of the data and modeling.[1]

On September 22, 1981, Hill wrote a letter to the heads of those federal departments and separate agencies having major environmental and natural resource responsibilities. He referred to White House guidance and asked for designation of a senior agency official from each of them to participate in a Global Issues Work Group (GIWG) to "identify global environment and resource issues of national concern, and recommend appropriate government action." The letter also noted that *Global 2000* had stressed "the need to improve the U.S. national capability to gather information and to forecast future trends."[2]

The bureaucratic levels of those designated varied widely, from a Senior Policy Advisor to the President to an Assistant Office Director at AID, but most were at a policy level capable of speaking for their agencies with some authority. Initially, attendance was by principals only. However, after several meetings, agencies were often represented by both policy and senior staff participants. A mix of the two ultimately came to be the norm. Despite its title, the Work Group met infrequently -- only two times, for instance, in 1984.

In October 1981, Hill addressed the Environmental Quality Committee of the National Association of Manufacturers. Citing the Administration's commitment to reviewing issues raised in *Global 2000* and other reports, he identified improvement of the government's

forecasting skills as "an important first step," noting, "if our government's ability to forecast is not the best, how can we expect to plan effectively?"[3]

The initial meeting of the Global Issues Work Group was held on January 22, 1982. A CEQ Scope Memorandum prepared for this meeting suggested the proposed objectives and scope for the Work Group:

GLOBAL ISSUES WORK GROUP

January 22, 1982

Work Group Objectives

* *Improve the quality of the government's information base in the areas of global environment, resources and population.*

* *Improve the ability of the government to analyze such information, to forecast future trends, and to make policy recommendations.*

* *Provide the optimal basis for long-term policy decisions on the part of the President.*

Scope

* *Inventory and evaluate effectiveness of existing U.S. international activities (multilateral and bilateral) with regard to global issues, and make recommendations.*

* *Examine the current status, agency-by-agency, of information gathering and forecasting capabilities; examine capabilities government-wide.*

* *Update information on substantive issues covered in* Global 2000.

* *Report to the President.*

Although no formal work plan was adopted at the meeting, the suggestions for action contained in the Scope Memorandum formed the basis for many of the projects subsequently undertaken by the Group.

At the Global 2000 Conference in St. Louis, Missouri, in late February 1982, Chairman Hill delivered a speech in which he outlined many of the Reagan administration's positions and priorities regarding global environmental issues in general, and foresight capability in particular. While underscoring many of the Administration's differences with the *Global 2000* report, particularly that report's perceived reliance on outdated data and trends already in the process of change, Hill strongly endorsed *Global 2000's* call for improvements in the government's forecasting ability, stating, "We intend to do all possible to see that improvements are made. Specifically," he noted, "we must upgrade the sets of global data, improve the analytical and predictive models that are used in forecasting and analyses, and develop what I call 'linkages' among the models that deal with only small segments of global resources and environment." "Further," Hill added, "a system of making data available on a more timely basis needs to be implemented."[4]

In early spring 1982, the attention of the Work Group was focused on formulating the following set of Global Environmental Principles "to further the Administration's commitment and to guide its policies." Specifically, the "Principles" were intended for inclusion in the U.S. Plenary Address at the UN Session of a Special Character commemorating the 10th anniversary of the Stockholm Conference, the forum that had given birth to the United Nations Environment Program.

Global Environmental Principles

* *A healthy environment is fundamental to the well-being of mankind.*

* *Economic growth and social progress are necessary conditions for effective implementation of policies which will protect the global environment and promote wise use of the earth's natural resource base.*

* *Environmental policy should be based on the interests of present and future generations. The most successful policies are those which promote liberty and individual rights, as well as protection of the physical environment.*

* *Nations should pursue economic development in furtherance of the security and well-being of their citizens in a manner which is sensitive to environmental concerns. Due respect should be given to different approaches which various nations may adopt to integrate environmental considerations into development strategies based on their particular national values and priorities.*

* *Careful stewardship of the earth's natural resources can contribute significantly to sound economic development. Individual ownership of property, and free and well-developed markets in products and capital, are powerful incentives for resource conservation. These institutions best promote the use of renewable resources and the development of substitutes for renewable resources, ensuring continued resource availability and environmental quality.*

* *When environmental problems extend beyond the boundaries of any one nation, all affected nations should participate in investigating the nature of the problem, understanding its implications, and developing cost-effective responses.*

* *Governments, like individuals, should act so as to minimize environmental degradation. Decisions on environmental policies and programs should take into account the concerns of those closest to the problems and most directly affected.*

* *Increased scientific understanding of environmental problems, and improved methods of forecasting environmental conditions, are needed to address environmental issues in an effective and efficient manner. Ultimately, resolution of environmental problems which are global in nature will be determined by the quality and credibility of scientific and technical knowledge as well as by the degree of cooperation among nations, including the effective involvement of private sector institutions.*

These principles later formed the philosophical basis for the Work Group's draft "Perspective Paper" discussed later.

A second project (resulting from the Work Group's January 1982 Scope Memorandum) was the compilation of an **inventory of the nation's bilateral and multilateral agreements** relating to issues of population, resources and environment. This project was undertaken to provide an indication of the extent of federal government involvement in international matters and how information developed through these agreements could be made available to policy makers in a timely manner.[5] Although a draft inventory was quickly prepared and widely circulated, finalization was delayed until January 1984 as Work Group efforts shifted to other priorities. The inventory, entitled "U.S. Government Participation in International Treaties, Agreements, Organizations and Programs in the Fields of Environment, Natural Resources and Population," remains unpublished, but is available from CEQ or the Office of Food and Natural Resources of the Department of State.

The other aspect of that project -- to make recommendations to policy makers -- was never pursued.

As a third project, the Work Group undertook a survey of federal agencies to determine the extent of their activities in the population/resource/environment field and in the practice of foresight. The answers that came back from different agencies varied widely in depth and detail. Some of them apparently tended to substantiate conclusions reached in *Global 2000*, while others were at variance with it. Efforts were made within CEQ to analyze the results of the survey, but the task proved overwhelming, and no agreed conclusions were ever drawn from the survey.[6]

As a fourth concurrent project, CEQ sponsored a contract with the World Wildlife Fund (U.S.) to study the "Corporate Use of Information Regarding Natural Resources and Environmental Quality." This study was commissioned to explore Chairman Hill's often voiced contention that, in addition to the federal government, other entities collect, store and analyze information on population, resources and environment, and that a mechanism for better cooperation with them must be developed.[7]

The report of this project, released in May 1984, strongly confirmed Hill's contention, and showed a large and largely unsatisfied private sector need for timely access to accurate government information on the global environment and natural resources. It also revealed a strong private sector distrust of most

federal government forecasts. (The study is summarized at length in Chapter VI and Appendix E.)

The most ambitious and continually frustrating project undertaken by the Work Group was its central effort to develop a credible, consistent consensus Administration response to *Global 2000*.

Characterizing the tasks facing the Group after its second meeting as "formidable," Hill, in testimony before the House Committee on Foreign Affairs in April 1982, described the function of the GIWG as one of providing "the Administration, through the Cabinet Council process, with the collective thinking of senior officials able to take policy level responsibility to recommend appropriate Government action on global environmental issues of national concern."[8] On the subject of foresight, Hill stated that as the work of the group progressed it would "suggest mechanisms to improve the quality of the government's information base access and recommend improvements in the ability of the Government to forecast future trends, and provide an optimal basis for long-term policy decisions." As it has turned out, the difficulties the Group has experienced in obtaining the "collective thinking of senior officials" about global issues in general, and about the foresight process in particular, make the appropriateness of Hill's choice of the label "formidable" almost prophetic.

One element of this central Work Group project was a planned review of *Global 2000* itself. This review was mentioned by Chairman Hill in the April House hearings and again in July 1982 testimony before the Senate Environment and Public Works Committee. Although it appears that no formal review was undertaken, reference to *Global 2000* was made in a number of Administration speeches, and portions of the various drafts of the "Work Group Options Paper" circulated during 1983 were devoted to a description of some of the perceived strengths and weaknesses of *Global 2000*.

Meanwhile, Chairman Hill continued to remind listeners of his two-fold purpose to assess global trends and to improve the government's foresight machinery. Speaking to the National Chamber Litigation Center Forum in September 1982, Hill said the Reagan administration recognized *Global 2000* as "an important document that raises a number of tough questions." He also noted recognition of a number of "inadequacies

which detract from its usefulness as a basis for formulating policy." Singling out *Global 2000*'s identification of governmental inadequacy in doing accurate forecasts, Hill noted its finding that "assumptions used by computer modelers not only vary from agency to agency but often are inconsistent," and, referring to the mandate that established the GIWG, said that "a project to determine how the Federal Government's forecasting capabilities can be improved" had been undertaken at White House request.[9] This theme was echoed once more in 1982 in the Chairman's address at the EPA Region IV Environmental Review Conference in October.[10]

Work continued on the effort to identify and assess substantive global issues but in late 1982 it took a new direction. Throughout the fall and winter months of 1982 and into the spring of 1983, several drafts of an "Options Paper" were circulated among members of the GIWG. These internal working documents were intended to give the Cabinet Council a summary statement of Administration views on global issues and to suggest options for an Administration response to *Global 2000*. Chairman Hill apparently felt the need to get a mandate from the Cabinet Council.

A final version of the Options Paper was presented to the Cabinet Council on Natural Resources and the Environment on March 25, 1983. In keeping with normal Cabinet Council practice, no public release of the report was made.

That March 25th meeting was the only occasion on which the work of the Work Group was discussed by a policy-level group. (As Chairman Hill's letter of September 22, 1981, had made clear, the Work Group was not a policy group, having authority only to "recommend.") The Administration considers the deliberations of the Cabinet Councils, and the papers submitted to them, to be entitled to "executive privilege." Therefore, no complete first-hand record of the March 25 meeting is publicly available. Some sense of the directions which the Work Group was instructed to follow may be had from the following elements taken from the public record.

At the Global Tomorrow Coalition Conference on June 2, 1983, Hill reported the GIWG to be moving on two tracks: one, to "lead to an expanded statement of our approach to global issues in general" and the other, to be "devoted to a review of specific issues

and programs." "Further," he added, "we will continue examining the important area of forecasting. Our need for timely and accurate information is obvious. As this information becomes available, we can make better, more informed decisions." A new note of caution entered his remarks, however. "Government," he said, "must exercise great care in reacting to unverified trends and forecasts. It is very appropriate for government, business, academia and public interest organizations to compile and share reliable data on global environmental conditions. It is also vital to watch for warning signs and trends. But, if we permit the tools and models of modern technology to become regarded as infallible crystal balls, we face the danger of reducing the effectiveness of the most valuable tool of all: human ingenuity."[11]

One may deduce from Chairman Hill's remarks that the Cabinet Council had allowed him to continue his work but had warned him to proceed very cautiously, if he should continue his work on foresight. He has since spoken of the Cabinet Council's charge to produce a relatively brief Perspectives Paper outlining the Administration's philosophy concerning environmental issues, and he has underlined that this must be reached by "consensus."[12] Since "consensus" in government is equivalent to the lowest common denominator, Hill was saying in effect that the Cabinet Council had told him not to bring back anything controversial.

Following that March 25th meeting, there has been no further talk of a detailed rebuttal to *Global 2000*, and we must assume that the decision was taken to drop that idea.

A somewhat more detailed glimpse of the Work Group's instructions following the March 25th Cabinet Council meeting was given to the public on January 26, 1984, when Chairman Hill convened a meeting with several Washington-based environmental organizations under the "Sunshine Act." At Hill's request, the Work Group Staff Director again outlined a "two track" decision of the Cabinet Council and a "three part implementation plan" envisaged by CEQ and the Work Group.

The "two tracks" were to be "an expanded statement of our approach to global issues" in the form of a "Perspectives Paper." This Paper was to be based upon the 1982 "Global Environmental Principles." It would state the philosophical and policy underpinnings for

the second "track," which was to consist of individual "Issue Papers" reviewing "specific issues and programs."

The third element, added in the "implementation plan," was to be a description of the Administration's approach to the question of governmental foresight capability, or Foresight Paper.

In response to questions concerning any ultimate public dissemination of Work Group products, the Staff Director responded that the charge from the Cabinet Council called for a document "suitable for publication," but cautioned that the decision on release of any GIWG documents ultimately rested with the Cabinet Council.

The desirability of having a "perspectives" document completed in advance of, and as a tone setter for, the individual Issue Papers was broadly recognized. The governing factor, however, turned out to be timing -- a generally perceived need to have the project completed well in advance of the 1984 elections, to avoid charges of political motivation or manipulation. It was therefore agreed to proceed simultaneously on parallel tracks: the Perspectives Paper and the Issue Papers.

In early spring 1984, Chairman Hill suggested a modification in Work Group goals. Rather than continuing to press for simultaneous completion of all elements of the project, Hill, sensing an escalation in coordination and timing difficulties facing the Group, asked it to focus on completion of the Perspectives Paper and several representative Issue Papers. These, he suggested, stood a better chance of completion and could be presented to the Cabinet Council in early summer with a memorandum documenting project status, making recommendations for subsequent steps, and requesting approval or further guidance. Completion of the balance of the Issue Papers and the yet-to-be-formatted Foresight Paper would await the Cabinet Council decision. In this way, the Group's progress to date could become a matter of record, the appearance of a missed pre-elections deadline could be avoided, and breathing room obtained to allow work on the missing elements of the project to continue.

Faced with competing agency priorities, development of these documents progressed slowly. A semi-final draft Perspective Paper submitted for

"final" professional editing in April 1984 triggered suggestions for yet further major revision. By late summer 1984 it was apparent that no consensus was likely before the November elections.

Concurrently, some 26 candidate Issue Papers were drafted following a standardized format. By mid-May 1984, tentative agreement was reached within the GIWG to consolidate these Issue Papers under several topical headings. Several polished drafts were indeed produced, and the draft on genetic diversity was even subjected to some informal non-governmental peer review.

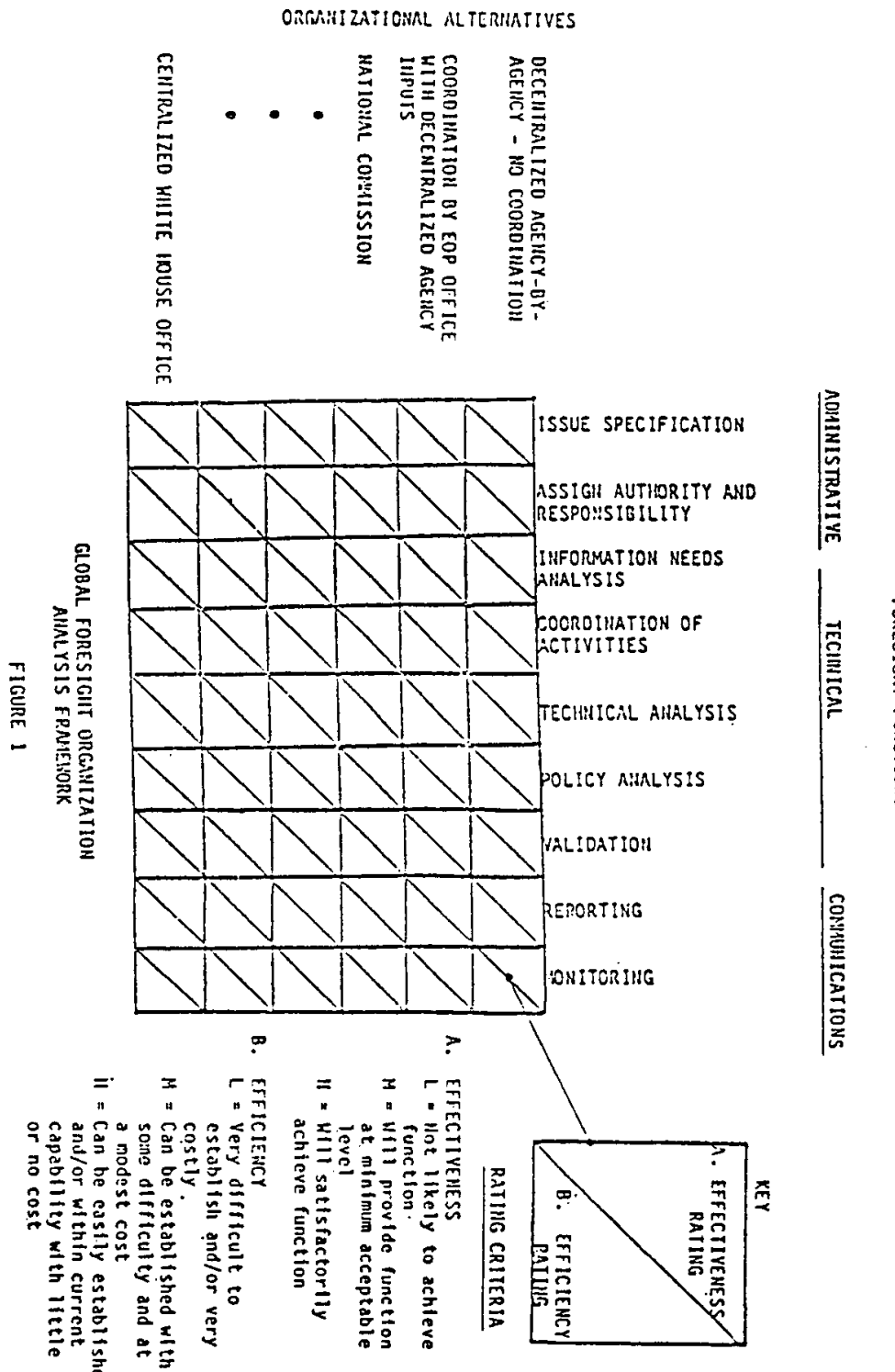
Drafting of other consolidated papers lagged as policy interest waned. No formally cleared final consolidated Issue Papers were ever completed.

The element of the global issues project which turned out to be the most difficult to handle, however, was preparation of the Foresight Paper. With both the Perspective Paper and the Issue Papers there was, despite a myriad of problems preventing completion, a certain sense of direction and conceptual expectation of a finished product. This was not the case with the proposed foresight capabilities document.

Whereas there was willingness on the part of one or more members to take the lead or to join in drafting other papers, the Foresight Paper remained largely without an active GIWG constituency. The notable exception was the National Science Foundation (NSF). Responding to Hill's request for assistance, the NSF Division of Policy Research and Analysis solicited private sector advice and developed a systematic proposal for a process to develop an improved foresight capability in the government. The heart of the process was a decision grid (shown here), intended to permit decision makers to decide what degree of centralization and coordination would be (a) effective and (b) cost-efficient at each stage of the foresight process as it was envisaged by NSF.[13]

While this author would prefer to see the foresight process more explicitly connected to policy making, the proposal is an interesting contribution to the process of selecting a decision making process. Although the NSF draft has not been formally considered, it could be of use if the Work Group -- or some future group -- returns to the subject.

Figure 1. NSC Foresight Proposal



Without agreed papers on either Perspective or Foresight, Chairman Hill did not feel that the nearly-completed Issue Papers alone were sufficient to make a presentation to the Cabinet Council. And that, as far as the Cabinet is concerned, is where matters stand with the Work Group.

At a more mundane level, CEQ and the Department of Energy responded to the businessmen's complaints (voiced in the "Corporate Use of Information..." study described above) about the difficulty of finding their way to government sources; they published a very useful *Sourcebook: Gaining access to US Government Information on the Environment and Natural Resources.* (This book is discussed, with other directories, in Appendix C.)

The Global Issues Work Group has lapsed into dormancy. It developed agreed papers on environmental policy for meetings of the Economic Commission for Europe (ECE) and the U.N. Environmental Program (UNEP) in 1985, but apparently it has met only once since then. When in 1987 the CEQ undertook to prepare the U.S. response to the "Brundtland Commission" report (Chapter VII), it convened an ad hoc interagency group for the purpose, rather than using the Global Issues Work Group.

The Perspective Paper, the Issue Papers, and the Foresight Paper are in limbo, and the current Work Group Staff Director sees no prospect for their revival. Perhaps the tasks will eventually be taken up in some other way, and the efforts of the Work Group will turn out to have been, not ends in themselves but, as Alan Hill once said of *Global 2000,* another "step into the future."

The Lessons to Be Learned

A dispiriting history. Alan Hill has repeatedly emphasized the need to improve both the process and the application of foresight, and there is no reason to doubt his sincerity. Yet the only visible products of four years' work have been

* a statement of principles, consisting of a few harmless generalizations laced with praise for the environmental benefits of capitalism (in effect, goal setting **without** foresight).

* a list of environmental treaties and agreements.

* a contractual set of interviews with business planners which, while interesting, was not directly related to the Work Group's mandate.

Only the first of these has been made public (through publication in *Environmental Quality 1982*), though the reader will find the results of the business survey in Chapter VI.

The full extent of the shortfall from early hopes is dramatized by looking again at the draft objectives of January 1982 in the light of what has transpired.

I would draw several conclusions from the history of the Global Issues Work Group.

1. An office in the White House is not enough. This has been the goal of many foresight proponents. Yet CEQ is in the Executive Office of the President, as was the National Goals Research Staff under President Nixon.

From the evidence, attitudes within the Administration have ranged from Hill's recognition of the need for better foresight to outright hostility among other officials, arising perhaps from confusion of foresight with a planned economy, from skepticism that the government can do **anything** right, and from the perception that warning of dangers fits ill with an Administration whose message is one of good cheer.

There has been an element of "getting even with" *Global 2000*. To Hill's credit, the author understands that he resisted a proposal by EPA Administrator Gorsuch to contract the rebuttal of *Global 2000* out to *Global 2000* detractors Herman Kahn and Julian Simon. Simon eventually published his rebuttal privately, with support from The Heritage Foundation, as *The Resourceful Earth.*

It seems likely that some of the people within the Administration who permitted the Work Group to go its way regarded the Group simply as a way of showing foresight advocates among Republicans that it is "doing something about it."

Faced with such a lack of consensus, it would take a powerful figure indeed to make much progress in coming to agreed descriptions of global issues, let

alone forcing those perceptions into the decision process.

2. An official trying to improve the foresight process needs a political power base. Hill came to the job from a small business in California. He had been an officer of the State Republican Party and had worked in the California government and for the Reagan campaign, but he has no significant power base of his own, nor apparently any access to the President. Himself a newcomer in the environmental field, he did not bring an established reputation. His natural constituency, the environmentalists, were themselves hardly a source of strength in an Administration that mistrusted them, and they in turn saw Hill as the representative of an unsympathetic Administration.

As Chairman of CEQ, Hill was a member of the Cabinet Council to which his Work Group reported. If the Cabinet Councils in fact operated collegially, he should have had the platform to bring the Group's findings into the policy process, and he had a method of forcing the Group to report to the Council, even if certain members took reservations. Whether he attempted to use that platform, and what happened if he did, are shrouded in the secrecy of the Cabinet Council procedures. One may suspect that he had few natural supporters on the Council. In such a situation, personal authority and access to the President would have been helpful.

3. Foresight does not function well in secrecy. Where there are issues as weighty as those identified in *Global 2000*, and in a democratic society when there are major differences over significance and methods of resolution, there should be a greater willingness to "inform the debate" and to engage freely in an open dialogue.

Our society will not be prepared to make difficult trade-offs until some consensus is reached as to their necessity. If the Work Group had published its drafts and sought comment by scientists and those knowledgeable, it would have succeeded at least in stirring and advancing the public debate that is necessary before tough issues are addressed. Preceding Administrations promoted that exchange. The rules imposed upon the Work Group cut it off.[14]

4. A foresight effort becomes irrelevant unless it is connected with the issues that policy makers are

addressing. There is no indication in the public record that the Cabinet Council ever considered any policy analyses by the Work Group, or that it ever asked the Work Group for comment on the implications of a policy under consideration, or that the Work Group felt itself empowered to offer such an analysis.

I have already argued that the CEQ Chairman, from his position on the Cabinet Council, in theory could have injected the Work Group into such debates, but he would have needed the support of at least some other departments to make such proposals stick.

With its very general mandate to consider global environmental issues and the improvement of foresight, the Work Group was in effect elevated above the real issues. The coordination of research and policy making in such major areas as atmospheric carbon dioxide and acid precipitation is vested in other groups, chaired by other agencies.

5. Success succeeds; failure fails. If the Work Group is seen to be making inputs into important policy decisions, the departments will move to make sure that their views are heard in the Work Group. If it is seen as powerless, they will begin to skip meetings or assign participation to underlings and they will not support the underlying staff work. This process has been discernible in the Work Group.

6. A parochial position is a bad starting point from which to chair an interdisciplinary foresight process. Alan Hill is seen as the spokesman for environmental issues in an administration that has not shown itself particularly sensitive to the environment. His mandate is too narrow to bring the issues together, and he does not have the mandate to explore issues that might be more sympathetically perceived -- he has, for instance, no authority over statistical policy although he has urged that it be improved.

Somehow, the terms of the debate must be shifted, and the potential sources of support systematically mobilized, and a clearer view formulated of what foresight is about, before efforts such as the Global Issues Work Group will meet much success.

FOOTNOTES

1. A. Alan Hill, June 23, 1981, statement before the Environment and Public Works Committee, U.S. Senate.

2. A. Alan Hill, September 22, 1981, letter to heads of federal agencies on formation of Interagency Global Issues Work Group. Invitations to participate were sent to all Cabinet departments except Labor, Transportation and Treasury, to EPA, NASA, NSF and the Federal Emergency Management Agency (FEMA), and to the Council of Economic Advisers (CEA), NSC, OMB, the Office of Policy Development (OPD) and the Office of Science and Technology Policy (OS&T) in the Executive Office of the President.

3. A. Alan Hill, October 22, 1981, "The President, CEQ, and the Environment," address before the Environmental Quality Committee, National Association of Manufacturers, Barton MA.

4. A. Alan Hill, February 26, 1982, "The Response of Government," address before the Global 2000 Conference, St. Louis MO.

5. *ibid.*

6. Information about GIWG activities has been gleaned from conversations with participants, from *Environmental Quality 1983* (14th Annual Report of the CEQ) and from two public briefings: a presentation by the Staff Director of GIWG to the Global Tomorrow Coalition, Washington, on October 12, 1983; and a meeting convened by Mr. Hill under the "Sunshine Act" on January 26, 1984 (49 Federal Register 2191 (1984)).

7. A. Alan Hill, February 26, 1982. *op.cit.*

8. 97th U.S. Congress, "Review of the Global Environment Ten Years After Stockholm"; hearings before the Subcommittee on Human Rights and International Organizations of the Committee on Foreign Affairs, House of Representatives, March 30, April 1 and 20, 1982; (Washington: GPO, 1982), pp. 87-88.

9. A. Alan Hill, September 22, 1982, Remarks before the National Chamber Litigation Center Forum.

10. A. Alan Hill, October 21, 1982, Remarks before the Sixth Annual Environmental Review Conference,

Environmental Protection Agency, Region IV, Atlanta GA.

11. A. Alan Hill, June 2, 1983, "Global Sustainability and United States Policy: The Administration View," Remarks before the Global Tomorrow Coalition Conference, Washington, DC.

12. Statement of A. Alan Hill, Chairman, CEQ, before the Subcommitee on Governmental Efficiency of the Committee on Government Affairs and the Committee on Environment and Public Works, U.S. Senate, April 30, 1985. This testimony, with an appended series of written questions and answers reflecting very sharp questioning by Senator Mathias, represents the fullest account on the public record of the CEQ evaluation of its own work and that of the Work Group in recent years. (In *Global Foresight Capability of the U.S. Government*, the record of the joint hearing. Washington: U.S. Government Printing Office, 1986.)

13. Draft study dated January 11, 1984. Reproduced by permission of the Council on Environmental Quality.

14. The process of closing down information sources is not confined to environmental issues. For a chronological survey of what the Administration has done 1981-84 to reduce the production of data and public access to them, see the American Library Association, "Less Access to Less Information By and About the U.S. Government," December 1984. (Unpublished, available from the Association at Box 54, 110 Maryland Avenue NE, Washington DC 20002.)

IV.

The Role of Congress

Finally, in 1939, after Roosevelt had succeeded in getting his executive reorganization plan through Congress and establishing an Executive Office of the President (without the planning agency, of which Congress unrelentingly disapproved), he reconstituted his planning group into the National Resources Planning Board and placed it in his Executive Office by Presidential order. Although this action was unpopular with Congress, Roosevelt used his personal influence to get about $1 million a year appropriated for the Board's activities.[1]

Congress has come a long way.

Congressional Initiatives

Congress in recent years has tended to be ahead of the Executive both in its development of techniques and institutions to broaden decision making and in its advocacy of environmental legislation.

The initiative for NEPA came from Congress, as did the Soil and Water Resources Conservation Act of 1977, creating a mechanism for periodic review of long-term soil and water conservation issues. Parallel legislation covers forests. It would take a separate study to make a fair assignment of credit for the spate of environmental legislation described in Chapter II, but it is probably fair to say that Congress reacted more swiftly than did the Executive to that wave of public concern about the environment, and that it can claim most of the credit for initiating and shaping the legislation.

In the General Accounting Office (GAO), the Congress has long had its own machinery for focusing

national attention on practices and issues that the Executive has not addressed. To that institution, it has added the Office of Technology Assessment (OTA) and the Congressional Research Service (CRS), which have done some of the most valuable work available in long-term foresight questions.

The OTA is of particular interest, since it was created with a mandate very close to "foresight" as the word is understood in this book. OTA defines its mission as

> *...to provide congressional committees with objective analyses of the emerging, difficult and often highly technical issues of the late 20th century. It explores complex issues involving science and technology, helping Congress to resolve uncertainties and conflicting claims, identifying alternative policy options, and providing foresight or early alert to new developments which could have important implications....*

OTA is supervised by a bipartisan House-Senate Congressional Board. The Board authorizes OTA studies at the request of Congressional committees, on its own initiative, or at the suggestion of the Director of OTA. Since its creation in 1972, OTA has conducted literally hundreds of studies and has won considerable praise for its work.[2]

From the standpoint of one looking for models applicable to the Executive branch, two reservations concerning the OTA structure come to mind. First, its mandate is limited to science and technology and their impacts. Second, it is invited into the policy process, not incorporated into it. In a sense, it is a high-powered wholly-owned think tank available to Congressional committees if they choose to use it. It does not have an ongoing mandate independently to identify and evaluate issues that may require Congressional action; it is not charged with summarizing all the identifiable policy implications of each bill at some stage of its way to the floor of Congress.

More informal structures have been created within the Congress to monitor foresight and environmental/ resource problems. The Congressional Clearinghouse on the Future is a principal source of information on foresight issues. The Clearinghouse has published a

survey of trends likely to shape the future,[3] and it produces a newsletter entitled "Emerging Issues," designed for its members' use, concerning activities in the foresight field.

The Environmental and Energy Study Conference is another informal group, created within Congress by a group of Congressmen interested in being kept abreast of present and potential environmental issues. It provides them with a weekly bulletin on legislative developments, briefing papers on environment/energy issues, and an annual briefing book.[4]

The House took the lead a decade ago in adding language to foreign assistance legislation requiring the Agency for International Development (AID) to consider the impact of its programs upon population growth and its effect upon economic progress. Later, the House created its own Select Committee on Population (the Scheuer Committee) to consider the impact of world population changes on U. S. national interests. The Committee conducted extensive hearings and published a report that should be re-read by Congress and the Executive today. (The reader may be beginning to sense how quickly even the best reports tend to disappear under the snowfall of newer reports in Washington.)

Congress took the lead in creating the Select Commission on Immigration and Refugee Policy (SCIRP) to inquire into the cross-sectoral impact of current immigration upon the country and to make recommendations for new legislation. (In defense of the Executive, be it said that there have been executive task forces on the subject in this Administration and the last one. These studies were, however, much less extensive than the Congressional one, did not seek outside comment, drew much less national attention to the issue, and were less influential in shaping subsequent legislative proposals.)

This list of explorations could be extended almost indefinitely. The House Subcommittee on Agriculture, Research and Environment under Congressman George Brown was long a particularly impressive sponsor of oversight hearings probing the directions of change in that key area. And so on.

On the subject of foresight itself, as a discipline, Congress has taken an important lead.

Several House and Senate committees and subcommittees, exercising their oversight function, have held hearings or promoted workshops on foresight issues. Most important for our purposes is the work of the House Committee on Energy and Commerce, which held hearings on foresight proposals in 1981 and sponsored a workshop in the spring of 1982.

The four volumes on foresight issues prepared by the CRS for the Committee on Energy and Commerce are the best source of information about foresight issues presently available.[5] The Committee itself, under Chairman Dingell, has been deeply involved in recent efforts to draft foresight legislation.

Over the past decade, a number of Senators and Congressmen have submitted foresight bills. Some of them have had multiple sponsorship, but none has gotten beyond the committee hearing stage. (See Chapter X.)

Between 1982 and 1985, several Congressional committees used the mechanism of oversight hearings to press the executive branch to improve its foresight processes. Particularly notable were the Senate Subcommittee on Governmental Efficiency and the District of Columbia, chaired by Senator Charles Mathias, the Senate Committee on Environment and Public Works, headed by Senator Robert Stafford, and the House Subcommittees on Human Rights and International Organizations and on Census and Population.

Among several legislators with a particular interest in foresight (Senators Hatfield, Heinz and Stafford, Representatives Dingell, Green, Gingrich, MacKay, Scheuer and Wise, to name a few of the most prominent), Senator Al Gore has emerged as something of a "Mr. Foresight" in Congress. He has sponsored legislation in both houses and serves as an officer of both the Clearinghouse on the Future and the Environmental and Energy Study Conference.

Congress has not yet found any certain way to bring foresight systematically into the decision making process, but the interested House committees may be the best allies in the government for private groups trying to achieve that goal.

Foresight and Actual Decisions on Legislation

The House of Representatives, particularly, has been the scene of most of the innovative thinking about foresight. (This in itself is somewhat surprising, since most of us were taught from childhood that the Senate, with its longer term of office, was intended to have the breathing space to do the long-range thinking.)

This innovation has included experiments to force inter-disciplinary thinking into the legislative process itself.

Over the years, the House has developed rules that require it to introduce foresight into its processes; the multiple referral of important bills to several interested committees; a requirement that each committee "shall on a continuing basis undertake futures research and forecasting" on matters within its jurisdiction; the requirement that inflationary impact and long-term cost estimates accompany each bill.

The Senate since 1977 has had a somewhat parallel requirement for evaluation of the "regulatory impact" (very broadly defined) of proposed legislation.[6]

The record apparently has been spotty in carrying out such broad mandates, but there is something here to build on.

Some of the Congressional special commissions have been as evanescent as most of the Executive branch commissions. Most of the Congressional machinery, however, has stayed in place. For that reason alone -- because it continues to exist -- it continues to offer the possibility of providing input into proposed legislation.

The Committee System: Lessons for the Executive

Beyond this catalogue of specifics, there may be something about the way that Congress itself is organized that can teach us some lessons about foresight.

Anybody who has seen the federal government in action for a sustained period may not be much impressed by Congress's ability to make sharp and elegant deci-

sions, but he cannot help but be impressed by its ability to keep a number of balls in the air.

On the other hand, in the Vietnam War period, we all watched President Johnson become "the Desk Officer for Vietnam." It is well enough for specialists to become immersed in their particular perspectives. It is dangerous when the leaders develop tunnel vision; and the Vietnam metaphor about "light at the end of the tunnel" was perhaps a better metaphor than Secretary Dean Rusk intended.

When the President and his immediate entourage are focused on one issue, it is hard even for a Cabinet officer to generate an initiative about another subject, no matter how valid the proposal. Even more important, that Cabinet officer's career may be in jeopardy if he tries to tell the President that what the President wants to do may endanger goals the Administration is pursuing in *his* area. (More on this in Chapter XI.)

Some way must be developed to keep the range of policy objectives and their interconnections before the leadership, even when it is under stress.

We have noted that the House of Representatives has taken useful initiatives on a number of environmental and foresight issues even while the Executive was stuck in various tunnels. It is worth speculating that the Committee system has played a role in this phenomenon.

Committee chairmen each have their own fief; they are barred from encroaching on each others' fiefs; and they measure their own success in terms of their ability to get legislation in their own areas through Congress. They may even need to do a bit of discreet horse-trading and log-rolling to pass that legislation, and the process may involve trimming their own proposals to avoid creating a problem for another committee chairman, or trading some votes.

Although the committee system has been more often damned than praised, be it noted that a) somebody of consequence is charged with watching every area of interest to Congress, b) there is a process for reconciling differences and bringing issues to a decision, and c) the system helps to keep Congress from becoming totally immersed for long periods in a single issue.

The horse-trading represents a mechanism for weighing differing or conflicting policy interests against each other. The system is inelegant, but it is a way of bringing lateral implications into the policy process, and it is self-administering. The committee chairmen see to that.

One could only wish that Congress had found the secret to bringing long-term national issues into the process with equal effectiveness.

The Congressional system would hardly work in the Executive. Indeed, the heart of good administration is the ability to weigh the pros and cons and then come to decisions, and Congress doesn't always do so well at that.

It would, however, be well worth implanting the characteristics cited above in the Executive process -- of assuring that the system is forced to look at every consequence of importance to the nation, that there is a process for reconciling differences and making decisions, and that the Executive is kept out of tunnels of its own making.

FOOTNOTES

1. "Lessons from the Past," *The Global 2000 Report to The President*, Vol. II, p. 688.

2. See the pamphlet "What OTA Is. What OTA Does. How OTA Works," Congress of the United States, Office of Technology Assessment, Washington, DC 20510; OTA-PC-104 (Revised), February 1985. Information concerning OTA publications may be had from OTA's Publishing Office, (202) 224-8996.

3. U.S. Congressional Clearinghouse on the Future and the Congressional Institute for the Future, *The Future Agenda, as Seen by the Committees and Subcommittees of the U.S. House of Representatives* (Washington: November 1982). The Clearinghouse consists of 96 members of Congress. It is co-chaired by Senators Al Gore and John Heinz and Representatives Tom Tauke and James

Scheuer; Staff Director Robert McCord; Room 555, House Annex 2, Washington DC 20515; (202) 226-3434.

4. Environmental and Energy Study Conference; Co-Chairmen Senator Al Gore and Representative Robert Wise; Staff Director John Dineen; Room 515, House Annex 2, Washington DC 20515; (202) 226-3300. The Weekly Bulletins are publicly available at $295 per annum through the Environmental and Energy Study Institute, 410 First Street SE, Suite 200, Washington DC 20003; (202) 863-1900.

5. The four volumes were prepared by CRS for the House Committee on Energy and Commerce, and are available from GPO. They are *The Strategic Future: Anticipating Tomorrow's Crises* (August 1981), *Strategic Issues: Historical Experience, Institutional Structures and Conceptual Framework* (July 1982), *Public Issue Early Warning Systems: Legislative and Institutional Alternatives* (October 1982) and *Congressional Foresight: History, Recent Experiences, and Implementation Strategies* (December 1982).

6. *Congressional Foresight: History, Recent Experiences, and Implementation Strategies*; see footnote 5 above, pp. 22-23.

V.

Lessons from State and Local Government

by Clement Bezold

The federal executive branch is so big that those of us who watch it may fall into the error of forgetting that there is a nation out there, beyond it. It is so big that its components become parochial, absorbed in their own immediate problems. When we press for better foresight, we may tend to define foresight simply as the process of requiring those officials to see the larger and longer picture.

There are only two elected officials in the federal executive. There are thousands of elected officers of state and local governments. The decisions they make will profoundly affect our future, and foresight is as relevant for them as it is at the federal level. They are experimenting with systematic foresight. Because they are closer to those who elect them, their experiments have emphasized -- as the federal proposals do not -- the importance of enlisting popular participation in selecting goals and choosing among alternative futures.

It behooves us to learn what these levels of government need from the federal government and what experience they can bring to bear on the process of federal foresight. Most important -- if the function of government is to serve the people -- their experience may provide some lessons as to how the federal foresight process can be brought into closer contact with the people.

How Widespread Is Systematic Foresight?

The 50 states are the laboratories of democracy. Add the thousands of local governments and you have far more opportunities for experimentation. And experiment with foresight is what state and local governments have done over the last two decades.

This chapter will review a variety of foresight efforts at the state and local level, particularly those that involve the public in the effort to explore the future and/or to set goals.

Foresight is a process for providing a longer and broader view to policy making. Its objective is to allow decision makers to make "wiser" decisions. The effort to instill such habits of thought faces some very difficult obstacles. Our current decision making systems fragment time into electoral cycles and fragment reality into specialized legislative committees or executive departments, without effective means of reassembling the pieces back into a whole and understanding their consequences. The public is seldom given a meaningful opportunity to press elected officials about the long-term implications of current decisions. Special interest groups such as corporate or environmental lobbies are able to do this for the area of greatest concern to them; but seldom for broad-scale interest. Thus, there are serious disincentives to foresight -- it is, in most state and local governments, an "unnatural act" with few rewards and sometimes swift punishment.

There is nevertheless a discernible increase in interest in foresight at the state and local level. Projects on foresight have been undertaken by associations of state and local officials, such as the League of the International City Managers Association,[1] the National Conference of State Legislatures,[2] the Council of State Policy and Planning Agencies (CSPA) of the National Governors Association,[3] and the Council of State Governments.[4] State and local governments, as well as local citizens' groups are increasingly developing organized efforts to provide more foresight.[5]

The growing interest in foresight on the part of governments themselves is reflected in a variety of forms. These can be training sessions for the legislature. For example, the Hawaii Legislature had the Institute for Alternative Futures and the National Conference of State Legislatures provide its members

with a two-day training workshop on foresight. The Hawaii State Association of Counties followed with a similar program for its members. The State of Minnesota had briefings prepared for its legislators, provided by the Commission on Minnesota's Future. The Oregon Commission on Futures Research did likewise. The Florida House created an Advisory Commission on the Future to explore foresight, while the Florida Senate trained their members at a "Sunshine 2000" orientation session. Likewise, governors' offices, executive agencies, and the organizations of state and local officials freqently add briefings on Foresight, Emerging Issues, or Long Term Trends to their training programs. The Council of State Policy and Planning Agencies is developing an innovative scanning network to link governors' offices. It will be discussed later in this chapter.

Some states have begun to use their budget process to look more consciously at long-term assumptions and impacts. For example, Florida explicitly identifies its assumptions for the next 10 years for the U.S. and the state as a whole. These 10-year forecasts, which drive all formula funding, are consciously reexamined twice each year.[6]

This growth in foresight conforms to what Alvin Toffler forecasts in *Future Shock* under the term "anticipatory democracy."[7] It continues in the direction I and several others described in 1978 in a book with that title: *Anticipatory Democracy.*[8] More recently, one of the ten trends shaping the U.S., identified by John Naisbitt in *Megatrends*, is a shift from short-term to long-term perspectives in the private sector and the public sector.[9]

What Are Some of the Dimensions of this Interest in Foresight

In 1979, I undertook to describe five characteristics of foresight at the state and local level. The first four of these characteristics are very similar to the definition of foresight given by Lindsey Grant in Chapter I of this book. The fifth is quite different, and is absent from most definitions of federal foresight. Here they are[10]:

1. **Anticipating emerging issues.** Problems such as the erosion of the tax base in our central cities could be spotted in advance but they

are not looked for. When they are identified, the "early warning" signals are not heeded by policy makers or the public. Foresight should identify what else should be on the agenda and provide an early exploration of the options for dealing with new problems or new opportunities.

2. **Identifying unanticipated consequences, particularly side effects..** It is often said that the major consequences of government actions are not the intended consequences of policies and programs, but their unintended consequences. Foresight must include better analysis and processes so that the full range of consequences can be identified in advance.

3. **Getting a sense of the "big picture" or major directions.** How do individual policy choices add up and how do they interact with the city or state "environment"? Foresight must provide processes that simultaneously allow the cross-impact among policy areas and the moving target of the future to be related, particularly so that decision makers are able to consciously steer the community toward their "preferred futures." In doing this, the "big pictures" of the state's future must be related to policy and budget priorities (revenues, expenditures and deficit levels).

4. **Supporting oversight and evaluation.** The assumptions on which policies are based often change long before those changes are recognized. For example, local governments continued building schools after the baby boom was grown and in some cases are getting rid of schools that are now empty, but will be needed again in the early 1990s. Foresight must be able to suggest the variables to monitor, not only to judge the success of the programs, but also the current and future level of need or demand.

These four characteristics could fit into most definitions of federal foresight. The fifth characteristic is the one ignored at the federal level:

5. **Involving the public.** Where problems are not identified early, say the energy crisis before 1973 or state and local infrastructure

> rebuilding throughout the U.S. in the early 1980s, opportunities for healthier development for communities are lost because individual citizens have no sense of how the choices relate to their hopes, fears or preferences in a systematic or long-term manner. Foresight must ultimately share the lessons about the problems and opportunities of the future with the public, and give them a meaningful voice.

What this fifth point suggests is that **goal-setting** (whether through the formal choice of goals or by informing popular choices made in other settings) occupies a place at the state and local level that is often not thought of at the federal level. We have set very few national goals through federal legislation. The few exceptions such as the Full Employment Act have generally not been perceived as "foresight," nor have they been developed on the basis of systematic participation sought from large numbers of the public.

If we accept these five characteristics of foresight, then the success of the foresight effort must be judged by its success in several tiers of the foresight process:

* Considering the future: Has the program consciously addressed the threats and opportunities facing the city or state over the next 10 to 25 years?

* Visioning: Has the process inspired large numbers of people to create a vision for the community?

* Goal-setting: Have credible alternative sets of goals been considered and a consensus set of goals been chosen by the public?

* Have the goals been formulated into policies and programs that will allow them to be achieved?

* Normal policy making: Is day-to-day policy making, particularly proposed laws and budgets, wiser because the individual decisions are seen in a larger context?

It is against these criteria of success that I will consider some of the state and local foresight work presently underway.

Goals and Futures Programs

Many of these foresight efforts come together in goals and futures programs. There are a wide variety of efforts, undertaken by more than 40 states and scores of local governments to develop foresight, and to involve the public in that process.

These projects have been reviewed in my anthology, *Anticipatory Democracy* and in *Institute for Alternative Futures* periodic reviews; in a major comparison by Keon Chi for the Council of State Governments in a report entitled *State Futures Commissions;* in a study by Yale Professor Christopher Artertan on *Teledemocracy;* and in a recent review of local programs by Professor Janice Perlman and her graduate students at Berkeley.[11] Some of these groups act as repositories, research archives, or networkers for those studying these programs or designing them -- the Institute for Alternative Futures and the Council of State Governments.

In addition to the reports already cited, each project normally provides a variety of reports, and periodically articles appear on specific projects in magazines such as *The Futurist* or the *Bulletin of the World Future Society.*[12]

Form, Functions and Financing

These programs take a variety of forms. They may be created by legislation or by a governor's executive order. They may be an independent organization, or the project may simply be an effort run out of an existing organization or agency. The financing varies widely from very small amounts and primarily volunteer labor to very large budgets for staff, travel and public outreach. Appendix D identifies several of these state, local and regional programs.

Moving from Goals to Futures

The programs in Appendix D represent social invention, social experimentation with more conscious choice of the future. While there is often a tendency for projects to "reinvent the wheel" there is a progression among those programs and several key lessons from them. The progression is a movement from

programs focused primarily on goals to those focused primarily on the future.

The early programs, such as Goals for Dallas, focused primarily on getting the community to support a set of goals. Little research was done on the future. At times, such as the Dallas case, major events were missed. Goals for Dallas did not consider the impact of an energy crisis. In recommending the great expansion of the Dallas-Fort Worth Airport they helped set in concrete incorrect assumptions about the future (in this case energy prices).

The next type of program realized that information on the future should be gathered and presumed that the local or state government could provide it. The "goals with forecasts" programs typically used the forecasts from their government agencies, often providing an important service, namely, pulling the assumptions of various agencies together in one place. Typically, these governmental assumptions about the future are "extrapolated forecasts." They assume that the last ten or so years is the appropriate guide for the next ten. This information in programs such as the Commission on Minnesota's Future provided useful briefings for the legislature. Goals were set in the context of the extrapolated forecast.

The third type of program realized that the future included many more possibilities than simply an extrapolation of past experience. These "goals with futures program" developed multiple pictures of the future to help in understanding the range of challenges and opportunities facing the community. Programs such as Alternatives for Washington, or the Commission on Hawaii's Future used alternative futures or scenarios as a tool to press their thinking further into the future. Goals were set on the basis of a richer set of threats and opportunities.

The fourth type has only begun to evolve, in programs such as the Lehigh Valley Futures Forum. These programs are "futures without goals." They are similar to the "goals with futures" programs in that they use the most sophisticated approaches to learning about the future. Yet these programs give themselves a slightly different task. They see goals as really being set by individuals and organizations in various settings other than the project. The task of the project is to inform that goal-setting, rather than to develop the goals.

Whether or not goal-setting is seen as a component of foresight, the two processes must be intimately related.

Lessons from These Programs

There are a host of major lessons from these programs. Some of the major ones include.

1. The major benefit of the programs comes from learning that takes place among participants, learning about the future. This includes the assumptions made by state and local governments and other major groups, as well as a broader consideration of the threats and opportunities facing the community's future. Decisions will be made, not by the futures project, but by its participants back in the city hall, county council, state legislature, local corporation, etc. The learning about the future from the project must affect those decision makers as they do their day-to-day work.

2. "Who owns" the effort's final report is a guide to the impact of the program. The larger the number of people in the community who feel they have had an opportunity to think about the future and to state their preferences and that these are reflected in the final report, the greater will be the impact of the program.

3. Broad openness at the early stages of the project is critical. As noted above, some projects have failed to identify real threats to the community in their assumptions about new needs (e.g. airports too large) or they have failed to be imaginative in identifying options.

The Emerging Ideal Model

The emerging "ideal program" is one that shapes a systematic process and enlists a high degree of participation. In regard to participation, the "ideal program" creates a community dialogue on the threats and opportunities facing the community, employing a variety of options, including the use of local print

and broadcast media to allow the entire community to be polled about the future, parallel scientific random sample surveys, speakers' bureaus, exercises for local community groups and high school civics classes, briefings for the legislature or council and key executive branch officials, briefings for the local business community.

In terms of process, the "ideal program" does some variant of each of these steps:

1. **Identify the major forces** which have shaped the community (or the policy areas under consideration), as well as the current assumptions about the future. This might be called the base case forecast, the extrapolated future or the "official future" for the area. This identifies the model of historical change for the community, allowing participants to consider whether the same factors will be the ones shaping the future, and to decide whether the current assumptions reflect the historical forces.

2. An **"environmental scanning"** exercise that asks what are the major trends which will affect the community. These may be social, technological, economic, environmental/ecological, political, or other factors, at the local, national or global level. As a general rule, these trends should imply more change for the community than occurred over the past 20 years, i.e. change is likely to be more rapid in the years ahead, change impelled by technology, demographics, and values.

Identifying these trends can be an involved and difficult process. Several groups have been identified earlier in this book (Introduction and Chapter IV) that are attempting to identify such trends on an ongoing basis for the private sector or for Congress. They may be of some benefit to local and state "environmental scanning" efforts.

Moreover, the Council of State Policy and Planning Agencies (CSPA) has now created a State Scanning Network designed explicitly for the use of state governments. The Network is organized much like the United Way's Environmental Scanning Committee. Each of the participating states (ten now, with more planned) assigns staff members to review selected journals and research reports. Their reviews go to a National Scanning Board drawn from a broad range of business, academic and public backgrounds. The Scanning Board

selects topics for a bimonthly *Report to the Governors* containing tightly drafted one-page summaries of the trends and their implications. (Topics highlighted recently included State Entry into International Financial Markets; International Wage Rates; Blurring of Sectors; AIDS; Intergenerational Equity; University Labs; Federal Deficits; and Health Testing Technologies.) As topics are identified, CSPA undertakes to identify or create data bases on important ones, to be linked by a computerized information exchange network. For topics of major importance, the Scanning Network encourages the creation of working groups under state leadership, which can lead to Assemblies or Round Tables on the topics and the ways to address them.[13]

The *Reports* started in early 1985. If it develops as hoped, this State Scanning Network seems likely to develop into the most broadly based program of continuing, systematic trend identification that the country has yet had -- and it involves real decision makers.

The Council of State Governments has picked up this idea from the CSPA, and in 1987 it launched a parallel though less ambitious scanning process for legislators and key executives.

3. The **"preferred future"** or the "vision." Having considered the future in some detail, the group should ask itself what is "the best that could be" for the community; goals that would inspire them and their neighbors. It is particularly critical to be imaginative at this point.

Tri County Tomorrow, in the Peoria area of Illinois, is a particularly good example here. Faced with declining employment by Caterpillar, the area's largest manufacturer, and with a hard hit farm economy, "TCT" formed a "creative futures group." This group developed five plausible scenarios and then drafted their preferred scenario. This yielded one of the most imaginative and far-sighted sets of recommendations yet developed by a local futures effort.

4. The **choice among "options" and of "priorities."** The group must identify the key strategic choices which may shape the community toward its preferred future, aware of the various threats and opportunities facing it and the factors that have shaped the community up to this point. These choices

should be made clear, along with the implications of those choices.

For most states and communities, the budget process is the central place where priorities are set. Ideally, the sets of choices which make up the budget are translated into the pursuit of the preferred future, and participants throughout the community take part in expressing their preferences.

The options and priorities steps are among the most complex and time-consuming in terms of analysis (each of the steps requires a fair amount of effort). Yet without them the goal statements become little more than unexamined wish lists (a failing of several existing programs).

These four process steps, in conjunction with broad participation, give the community an effective way to define a preferred future and to seek it.

What State and Local Foresight Can Use from the Federal Government

State and local foresight can benefit greatly from enhanced foresight at the federal level. The assistance could take several forms. One would be federal summaries in more visible and accessible forms of forecasts for those things the feds normally do (e.g. economic forecasts, forestry resource forecasts, housing forecasts, population and demographic forecasts.)

These are national forecasts but they often include state or regional components as well. Regularized summaries of these could be helpful. Likewise, local governments would appreciate federal efforts to create new data sets which include more fine-grain details on the states. For example, the National Planning Association forecasts 39 economic and demographic variables to the year 2000 for each of the counties in the U.S. Federal sponsorship of efforts to provide a common framework for the states to use such forecasts would be helpful.

One way to encourage this would be through the 1985 foresight legislation sponsored by Senator Albert Gore, Jr., and Representatives Newt Gingrich and Buddy MacKay -- the Critical Trends Assessment Act (see Chapter X). This would set up an office in the White

House to develop, among other things, periodic reports on alternative futures for the U.S. The Joint Economic Committee would develop alternative futures for Congress. Together, if done right and in sufficient local detail, these reports could greatly aid in generating greater sophistication about trends and scenarios that are relevant to state and local foresight efforts.

Some of this information is now provided by private groups, and that is likely to continue. The federal government might well buy and make public forecasts from these sources, or if private providers are unable or unwilling to provide forecasts which ultimately become public domain, then the federal government can develop its own forecasts, as it does in a variety of areas, such as forestry and health care. (The federal forecasts for health care expenditures are a major source of information for the private sector, particularly financial analysts.)

A major aid to state and local foresight would be the creation and nurturing of the public discussion of the future in imaginative and creative ways.

Lessons for Federal Foresight from State and Local Foresight

This chapter suggests that the dictum that the states are the laboratories of democracy holds true for anticipatory democracy as well.

Perhaps the most important thing the federal government could learn is enthusiasm for the idea. State and local governments have shown much more interest than has Washington in tying policy decisions to systematic procedures for exploring alternative futures and choosing among them. The National Governors' Association has urged that the idea be applied at the global level:

> *... the security of the United States is tied to stewardship of the world's resources. Such stewardship means viewing the whole earth as an integral system and ensuring the long-term protection of the planet's agricultural, economic, and life support systems. This requires that all nations develop foresight capability and recognize*

the international implications of their decisions...

-- from resolution "Managing Global Resources," adopted at NGA August 1986 Conference

Beyond that example, and in addition to the general lessons as to how the foresight process is best organized, there are some underlying lessons for federal foresight.

1. Foresight efforts must be repeated. A static single forecast is less valuable than a process that forces the federal government or its agencies to reexamine and repeat their forecasts (as the Gore, Gingrich, MacKay legislation proposes).

2. There is a need for forecasts of the context -- for whole sets of patterns in society. Foresight efforts must be able to explore forecasts of futurists such as Alvin Toffler who envision significant change in society.

3. While the logistics are more massive, federal foresight efforts must develop ways to involve the entire population in learning about the threats and opportunities facing the nation and giving individuals the opportunity to state their preferences. Only through this broad participation and support will it become easier for elected officials to act like statesmen.

The Future of Foresight

It is relevant to ask how the future will shape the prospects for foresight. We are at the early stages of the "information era." The information-handling capacities of communities and households by the year 2000 will be staggering. One may hope that much of the work in the four steps outlined above for the ideal program will be an ongoing process, and that local citizens will have access to it.

But information alone will not overcome political inertia. The future of foresight will be shaped most effectively by citizens pressing all levels of government for a more meaningful choice in shaping the

future. There are indications that normal forms of political participation, particularly voting, are declining in their use or have plateaued at a dismally low level. Among citizens, the data on attitudes and participation from pollsters such as Daniel Yankelovich suggest that people in fact would take more responsibility if it were given to them in effective ways.

Let me offer a personal view of the directions in which we are headed.

Foresight in the year 2000 will be different from foresight in the mid-1980s. The information revolution will have made analytical hardware and software widely available, and (whether public domain or proprietary) relatively inexpensive. These will have led to the development of choice games used by planners and developers at the local level as well as by citizen groups and high school civics classes. National and global forecasts and scenarios will be commonly available and widely used.

Much of this is already available. Why is it more likely to be used fifteen years hence? Primarily because of several major societal trends which reinforce foresight efforts. As noted above, one of John Naisbitt's ten "megatrends" is the movement from short- to long-term decision making. Foresight is becoming more common.

Another is at the level of values. Daniel Yankelovich and others have identified shifts in individual values toward greater community, sharing and responsibility, coupled with a search for personal growth. Part of foresight is a greater concern for the interaction of various decisions, for the side effects of actions. In the past, politicians have argued that the self-centeredness of their constituents has kept them from taking a more sensitive, responsible, foresighted approach to policy. While aspects of this will never go away, the relative balance of values is changing so that constituents will be more likely to ask for foresight from their politicians in the years ahead.

By the year 2010, a generation from now, society will have seen great advances in foresight mechanisms. The time test will be whether it has used them to be wiser and more imaginative in steering our communities (at all levels) into the future.

FOOTNOTES

1. International City Managers Association - 1984 Telecon - National Teleconference on the Future of Cities.

2. Bart Weller, *Foresight Activities in State Legislatures*, The National Conference of State Legislatures, 1978; NCSL also provides futures information on specific topics as part of its ongoing work, see for example Chapter IX - "Future Challenges," in *Hospital Cost Containment: A Legislator's Guide*, 1985, NCSL, 1125 17th Street, Denver CO 80202.

3. Council of State Policy and Planning Agencies (CSPA) of the National Governors Association publishes extensively, on general techniques, see Susan Walters and Pat Choate, *Thinking Strategically, A Primer for Political Leaders*, 1984, John B. Olsen and Douglas C. Eadie, *The Game Plan, Governance with Foresight*, and on specific issues, such as infrastructure, see Roger J. Vaughan and Robert Pollard, *Rebuilding America, Vols. 1 & 2*, CSPA, 400 North Capitol Street NW, Suite 291, Washington DC 20001.

4. Council of State Governments, *State Futures Commissions: A Survey of Long Range Planning Experience*, by Keon Chi, 1983. Available from Council of State Governments, PO Box 11910, Lexington KY 49578.

5. Clement Bezold, *Anticipatory Democracy*, New York: Random House, Inc., 1979. Clement Bezold, et al., "A Survey of Selected Goals and Futures Projects," 1982, Institute for Alternative Futures, 1405 King Street, Alexandria VA 22314. See also *State Futures Commissions*, above.

6. Information on the ongoing Florida 10 Year Revenue Forecasting project is available from James Zengale, Joint Legislative Committee, Florida Legislature, Tallahassee FL.

7. Alvin Toffler, *Future Shock*, New York: Bantam Books, 1971.

8. *Anticipatory Democracy* and "A Survey of Selected Goals and Futures Projects," above.

9. John Naisbitt, *Megatrends*, New York: Warner Books, 1982.

10. *Local Government Foresight: A Handbook*, Institute for Alternative Futures, 1979; *State Legislature Foresight: A Handbook*, Institute for Alternative Futures, 1979.

11. *Anticipatory Democracy*, IAF Reports and Keon Chi, *op cit*, Christopher Arterton, et al. *Telecommunications Technologies and Political Participation*, Roosevelt Center, Washington DC, December 1984; Janice Perlman, "Public Private Partnerships: Views from Around the Country," forthcoming.

12. In *The Futurist*, see for instance Judith Ellison, "Anticipatory Democracy in Action: Colorado's Front Range Project," *The Futurist*, December 1981, pp. 10-14.

13. The ten states presently participating are Colorado, Florida, Minnesota, Missouri, Nebraska, New Jersey, North Dakota, Oklahoma, Pennsylvania and Rhode Island. The National Science Foundation supported the work leading to the Network, and it is supported by private foundations as well as the states. It seeks additional foundation support and it plans to invite private subscribers to the reports and databases. For further information, contact Ms. Lauren Cook, Coordinator, State Scanning Network, CSPA, 400 North Capitol Street NW, Suite 291, Washington DC 20001 (202) 624-5386.

VI.

Advice from Business

Business has its own foresight processes, which it generally prefers to call strategic planning. Since in the United States most economic activity is in private hands, society has an interest in the quality of that planning process comparable to its stake in governmental foresight. On it depends the productivity and competitiveness of the national economy. Business, in turn, needs governmental data and has an interest in improving that data.

Businesses, as much as government, face the need to understand and deal with change. The strategic planning function of business has grown enormously in sophistication. Despite recurrent criticism that American business does not seem to have much to show for its strategic planning, businessmen can point to a number of ways in which planning is simply essential to their operation.

Private business is a major user of government-generated data and (much less enthusiastically) of government forecasts.

It is not the purpose of this book to make a detailed examination of the planning process in business. It may be well, however, to be aware of that process, to understand what business needs of government, and to explore what government might learn from business in developing its own foresight machinery. Through this inquiry, we may gain another perspective as to the role that governmental data collection and forecasting processes serve in this society.

There is a good starting point for such an inquiry. It is the report of a survey conducted for the Council on Environmental Quality (CEQ) by the World

Wildlife Fund, acting in behalf of The Year 2000 Committee. The report, completed in May 1984, is entitled "Corporate Use of Information Regarding Natural Resources and Environmental Quality." It has not been formally published or widely distributed, which is unfortunate, since it represents the most serious and systematic effort yet by the government to learn from corporate America what business believes it needs from government in the fields of data gathering and forecasting. If governmental leaders should read it, they would learn that the improvement of environmental data is important to important groups other than environmentalists. That warning takes on added significance in the light of the current contraction of federal data gathering (Chapter II).

A description of the methodology of the study is at Appendix E of this book. The questions were confined to the areas of demography, resources and the environment (which it described in shorthand as "resource information"). Nevertheless, they can serve as surrogate for other fields.

The reader should be forewarned that the survey was exploratory and descriptive rather than methodologically rigorous. The planning activities described below are simply examples (given by the executives) of the kind of planning activity that goes on in business. The firms were selected for interview, not at random but because they were thought to be engaged in systematic planning, and the sample is thus weighted toward big business. The recommendations that flowed from the survey were developed through interviews and group meetings with executives, then distilled by the interviewers into a preliminary draft, which was checked with those interviewed (the response rate at this stage was 58 per cent) and revised into a final report.

This process provides an insight into the views of a group of leading businessmen about their own planning process and the usefulness of governmental data. It does not purport to be a statistically valid sample of planning in American business or of business's views of U.S. governmental data.

With that said, the study remains a unique contribution to a government-business dialogue that has been all too infrequent. Let us see what they learned.

Corporate Uses of Resource Information

The survey identified eleven categories of decision making that draw heavily upon resource information.

1. **Strategic direction.** Decisions involving the strategic direction of a corporation are so important that they must be made by its senior management or board of directors. Such decisions set broad objectives and direction for the corporation. Strategic direction decisions frequently require the use of resource information on a wide array of topics.

Examples of such strategic decisions would be an oil company's decision to move out of retail gasoline sales in order to focus on the extraction and refining segments of its business, a railroad company's decision to become a natural resource company by developing the resource potential of its land holdings, or a chemical company's decision to acquire an oil company.

2. **Market research.** Market research contributes vital information to basic decisions made by corporations: which new markets to develop, which existing products to emphasize in which markets, how to sell those products, in what kind of packaging and at what price. Although many types of resource information are used in market research, demographic data are likely to be the most important determinant of the size, the geographic distribution and the potential changes in a market.

Demographic forecasts, including age distribution, can be crucial to decisions about new product development. For example, a market researcher at Frito-Lay noted that his business hopes to grow at 4% per year, whereas the population is projected to grow at only 1% per year to the year 2000. Segmenting the population by age, he sees that the 25-54 year-old age group will grow 3% to 4% per year until 1995.

Hence, Frito-Lay's products must be attractive to this particular age group until 1995, at which time new products will have to be tailored to a relatively older population.

3. **Resource acquisition.** Resource acquisition commitments, such as purchasing mineral rights, are typically major investments involving long periods of time. Natural resource companies must decide whether

to increase their resource base, when to do so, where, and at what price to make the investment. Resource supply, demand, and price movements must be projected and evaluated in light of the companies' potential investment.

4. **Production capacity.** Capacity, plant siting, and plant design typically are interrelated decisions because each decision can influence the cost and regulatory considerations of the others. Decisions to expand or reduce production capacity are influenced by the market for the product and its cost of production. The cost of producing steel, for example, can be influenced by natural resource information such as the world availability of iron ore. Furthermore, the cost of production, current and projected, can be strongly influenced by information on the availability and cost of fuels powering the production process.

5. **Plant siting.** Plant siting decisions must consider the environment surrounding the plant location in two ways: the environment must accommodate the functional needs of a plant (e.g., water availability for paper products mills); and plant facilities must be designed to minimize negative impacts on the surrounding environment, such as pollution of the air and water around a steel mill. Corporations depend on many different kinds of resource information in making plant siting decisions, including a great deal of environmental quality information.

6. **Plant design.** Resource information influences such varied aspects of plant design as power source, operating procedures, material selection, and physical dimensions and characteristics of a plant.

Planners may need to make projections regarding the availability and cost of different fuel sources many years into the future, since they expect a boiler to last 40 years or more.

In addition to energy information, they need data and projections on the quality and quantity of water in the surrounding area, as an input to plant design. They require a wide range of atmospheric data. For example, they need to know how much rainfall to expect in order to construct an appropriate sewer system. To design the smokestacks, they need to know wind velocities to determine height; and they choose which direction to place the buildings by evaluating the prevailing winds. To determine the output capability

of the air-conditioning systems, they need to know the number of sunshine days, the temperatures, and humidity levels.

7. **Environmental compliance.** Many corporate executives are involved in activities which subject them to regulation under the Clean Air Act, the Clean Water Act, and the Resource Conservation and Recovery Act.

That corporations are subject to regulation in these areas necessitates their use of environmental quality information in two major ways: (1) for debating the standards set in regulations, and (2) for complying with them.

8. **Production and materials purchasing.** Production and materials purchasing decisions may be short or long-term decisions. They may be based on day-to-day operations and/or market activity, or they may be based on up to 25-year market forecasts. Any of these decisions can have a significant impact on a company's profit.

At Weyerhaeuser, production decisions are extremely complicated, involving planting and harvest decisions which can be as much as 50 years apart. Weyerhaeuser projects the supply, demand, and price of pulpwood and saw timber to determine how much of each species of tree to plant.

Since population trends strongly influence housing markets, Weyerhaeuser scrutinizes demographic information in an effort to estimate the demand for saw timber. To assess the supply of timber in the marketplace, analysts gather forest inventory statistics from many sources. Weyerhaeuser monitors these vital supply and demand statistics on an ongoing basis throughout the production process--planting, forest management, and harvest. This information provides input to decisions regarding how quickly to cut and what types of trees to harvest first.

Some of the most important decisions in the production process pertain to materials purchasing. The price at which a material is purchased can have a major impact on a company's profit margin. To compete, a company producing packaged food, machine tools, or even live cattle needs to be as sophisticated as its competitors in deciding when, where, and what quantity of materials to buy.

A specialist at Frito-Lay described a materials purchasing decision in which weather data was critical to his analysis. Frito-Lay is a large buyer of cottonseed oil, which it uses to fry its snack foods. A Frito-Lay buyer told the survey team that West Texas, where much cotton is grown, had recently suffered hail, high winds, and torrential rains. Much of the cotton crop had not yet been harvested, and the bad weather was delaying harvesting further. The later the harvest and the worse the weather, the smaller the total crop would be. The buyer believed that, based on weather information available to him, combined with historical yield and demand data, cottonseed oil prices would jump. He responded by purchasing a sizable quantity of oil in the cash market for future delivery, choosing the current known price over the potential for a higher price in the future.

9. **Research and development.** Every major company is involved in research of some sort. Resource information influences the guidelines for research. For example, the outlook for transportation fuels will determine the choice of areas for research by the manufacturers of transport equipment.

10. **Bank lending.** Financial service companies make many decisions which require the use of resource information. For a bank to make wise lending decisions--whether a seasonal loan to a small farmer or project financing of a large mining operation--the banker must understand the risks and opportunities his client faces. He must be able to evaluate the decisions his clients are making in all the areas above.

11. **Investment recommendations.** Brokers and others who influence the allocation of this other source of capital share the bankers' need for data on which to base their judgments.

The survey did not deal with the processes whereby the resource information was fed into decision making. We will touch upon this at the close of the chapter. Meanwhile, let us learn what the executives thought of the resource information they were getting from the federal government.

Corporate Evaluation of the Government's Resource Information

The corporate officers interviewed were generally satisfied with the data available to them. Operating conditions are changing, however, and corporate information needs are evolving faster than the nation's decentralized information network can respond. As the corporate users see it, these are the most pressing needs for improvement in federal government resource information:

* Information as to where the data are available.

* Better governmental projections.

* Resource information on other countries to match the growing corporate awareness of the opportunities and dangers of a worldwide trading system.

* Better environmental data to inform regulatory standards and to facilitate compliance with those standards.

* The more timely release of data.

As the checklist suggests, the executives were dissatisfied with the government's data analysis and interpretation (as contrasted with the straight data collection). The federal government's analysis is considered far less credible than analysis from private sources. Many corporate analysts deem it to be useless if not detrimental. Specifically, they charge that government analysts either do not have or do not apply the expertise required to develop credible natural resource forecasts. A common complaint is that government analysts simply project historical trends (which might be highly accurate) out into the future, rather than basing forecasts on probable economic cycles, technological developments, materials substitution, energy-source substitution, and other effects of the forces of supply and demand.

Even though many analysts at large corporations do not rely on government forecasts, they still worry about the quality of the forecasts for the following reasons. First, they think that widely conflicting public and private views on natural resource trends contribute to uncertainty in the business environment, hampering decision making, and producing inefficiency

in the marketplace. Second, they show concern for the plight of smaller companies, with fewer financial resources, which are forced to rely on flawed government forecasts and pay the price of poorly founded decisions. Third, they are concerned that the poor quality of government forecasts has a negative influence on government policy, which in turn affects the operating environment of all corporations. (The argument for shared national perceptions about trends thus turns up from an unexpected quarter.)

For all of these reasons, corporate representatives see a need for improved government natural resource forecasts.

Recommendations for Improvement

The drafters of the study distilled six recommendations from the interviews and questionnaire, and then solicited comment from the executives. Through this process, it can be said that the following recommendations reflect the information needs identified as most pressing by corporate interviewees.

Recommendation 1.

The creation of an index of government resource information. The federal government or a private sector organization should create an index of all unclassified and non-proprietary federal government resource information.

* Following the completion of a study or report, government agencies should be required to send references to the indexing organization within a designated period of time.

* Each reference should be indexed by subject area as well as by publishing agency or department.

* Each reference should include an abstract and description of the data covered.

* The index should be updated on a regular basis.

* The index should be made available to the public.

(Note: 87 per cent of the corporate respondents expressed unqualified agreement with this recommendation.)

Recommendation 2.

The establishment of a clearinghouse for international natural resource information. The federal government or a private sector organization should establish a clearinghouse for international natural resource information.

* The clearinghouse should gather already collected information on natural resources in foreign countries.

* The sources for the information should be the U.S. federal government, the private sector where feasible, foreign governments, and international organizations.

* If the federal government were to undertake this task, the responsibility should be placed in an agency which is already set up to collect, index, and disseminate information; the agency should have extensive experience in U.S. and foreign statistics, such as the Bureau of the Census.

* The data should be standardized whenever possible so that it is comparable from one country to another.

* The information should be indexed.

* The information should be available to the public.

(Note: 69 per cent of the respondents expressed unqualified agreement.)

Recommendation 3.

The collection of more and better data regarding environmental quality. The federal government should collect more and better data regarding environmental quality.

* The federal government should develop monitoring strategies to ensure that needed information is being collected, and should improve its monitoring practices and analytical procedures to better ensure data quality.

* Within each agency, there should be a high-level office responsible for coordinating monitoring policy and procedures among the program offices and for ensuring that the monitoring function receives high-priority attention in budget appropriations.

(Note: Only 58 per cent of the respondents expressed unqualified agreement.)

Recommendation 4.

An improvement in the credibility of government natural resource forecasts. The government should improve the credibility of its forecasting in the area of natural resources.

* More private-sector expertise should be incorporated in natural resource forecasts.

* Documentation of all data assumptions and methodologies should accompany forecasts.

(Note: Only 57 per cent of the respondents expressed unqualified agreement, the lowest proportion for any recommendation, and 10 per cent disagreed.)

Recommendation 5.

An improvement in the timeliness of government resource information. The government should make its resource information more timely by releasing it in electronic form as soon as it is ready for publication.

* As soon as resource information has been prepared for publication, it should be released to the general public and to private information companies which could make the information available electronically.

(Note: 88 per cent of the respondents expressed unqualified agreement; none disagreed.)

Recommendation 6.

A strengthening of federal statistical policy management. The government should strengthen the ongoing management of federal statistical policy and programs.

* A senior policy official within the Executive Office of the President (e.g., an Assistant Director of the Office of Management and Budget for Statistical Policy) should lead an interagency working group on U.S. statistical policy management for the purpose of reviewing existing policy and recommending action for current and future information needs.

* Statistical policy management should be assigned to an individual in each agency which is responsible for the collection and publication of information.

* The management of statistical policy should be given high priority in the agencies.

(Note: 69 percent of the respondents expressed unqualified agreement.)

The current system of data collection and dissemination is, to a large degree, decentralized. Given this fact, a high-priority task should be to evaluate the information system as a whole. In a rapidly changing environment, there is a particular need for continual review of the relevance of the information being collected and published. This review can and should be done within each individual agency, but to cross-check the efforts of many agencies, a coordinated review is also necessary. Only a coordinated effort can satisfy corporate information users' desires for information that is consistent or standardized from one agency to another.

A senior policy official should be responsible for coordinating an Interagency Working Group to review the statistical policies of the agencies. The working group should serve as a forum for discussion and analysis of U.S. statistical policy as a whole. The policies of the agencies should be examined with regard to the needs of the general public as well as corporate users. The designated official should consult with the working group concerning potential changes in policy.

The study does not recommend that control over the specific actions of the agencies (e.g., collection, dissemination, and analysis of information) be centralized. It recommends that the implementation of statistical policies developed both by the agencies and by the Interagency Working Group be carried out in the agencies. Individual agency representatives will be

aware of the structure and current policies of their agency and should be in the best position to carry out policies.

So that is what business executives want of the federal government: an index of resource information and a clearinghouse for worldwide data sources; better data, better organized; timely release of data; the coordination of federal statistical policy, but not centralization.

The proposals in Chapter XII would give substance to most of these recommendations.

"Strategic Planning" in Business and "Foresight" in Government

A considerable body of literature has developed concerning corporate planning. Various writers have undertaken to apply the business experience in suggesting ways to improve foresight at the state and local level. Indeed, two very useful reports on business systems were published by the Council of State Policy and Planning Agencies for the benefit of local and state planners. They are *The Game Plan: Governance with Foresight* and *Thinking Strategically: A Primer for Public Leaders*, cited in Chapter V.

The strategic planning machinery varies greatly from one business to another. Perhaps the most useful lesson for the federal government is that business does plan. Most businesses, at least among the larger ones, seem to find some form of systematic planning a necessary element in managing their companies. To a private sector-oriented federal administration, this should provide some reassurance that "planning" is not simply the dream of some statist intellectuals. It is a necessary component of management. If large businesses find some systematic structure necessary, it is perhaps even more necessary to a federal government that far outstrips in scale and complexity anything in the business world.

Descriptions of business planning repeatedly emphasize two other characteristics that should be of interest to proponents of government foresight. Where it is successful, strategic planning

* involves the top executives, and

* is connected with real decisions such as deciding on the budget.

These are decidedly **not** the characteristics of most of the proposals that have been made for federal government foresight. See Chapter X below.

Beyond a few generalizations such as these, the analogy should probably not be carried too far. Business and government, particularly national government, are very different organisms. In business, a Chief Executive Officer (CEO) can in fact set goals and make them stick--until the business starts losing money.

Government, on the other hand, represents (in varying degrees of effectiveness) all the elements of society, with their very different priorities and goals. The central function of democratic government is to reconcile those goals as best it can and assign priorities to their pursuit.

This process may be explicit or implicit. Frequently, the course of action actually chosen is a compromise without an explicit rationale, because it is easier to agree on the actual steps (e.g. the shape of the budget) than upon a rationale for them. Messy, perhaps, but democracy evolved after long centuries in which kings marched off in pursuit of their own objectives and the people were dragged helplessly along. If there is a deep resistance in this country to the idea of national planning, it is perhaps justified by these tribal memories. Few Americans would agree that any substantial part of the democratic reconcilation process could or should be handed over to some bureaucratic planning body.

Nevertheless, decisions must sometimes be made, and they are easier to make if there is some sort of consensus behind them. In Chapter V, we saw a transmutation of the goal-setting function. Some states and local governments consider "alternative futures" and attempt through public debate to agree on goals. This process can be a means of mobilizing public opinion in support of necessary choices. In this transmuted form, goal-setting may have a place in federal government foresight--but not simply by buying business's strategic planning techniques "off the shelf."[1]

There is another way in which the focus of foresight shifts between business and government. The federal government, because of its scale and the multiplicity of objectives it pursues, needs a foresight process that opens up the channels of internal communication and that seeks to identify the lateral implications of proposed actions. Business does not have comparable requirements. It may--because of the recent proliferation of damage suits--want its planners to scan for potential direct damage that a new product or process may inflict on others (e.g. an unreliable automobile accelerator; the leakage of poisonous gases from a chemical plant). However, it does not need to consider the air pollution it generates unless required by law, which shifts the foresight function to government. It can ignore more distant implications such as the impact of a pricing policy upon the social distribution of wealth, or of a plant-siting decision on local tax revenues and demographic change.

Government does not have that freedom.

In a sense, strategic planning in business resembles the policy options papers that have long been a feature of the National Security Council system. In both processes, broad goals are hypothesized, alternate strategies toward those goals are evaluated, and the potential threats to the pursuit of the goals are itemized. This process may be enough for business's needs; it is not enough to constitute governmental foresight.

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There is much more to be learned from business's experience. For example: do technically sophisticated planning operations yield perceptibly better results than a seat-of-the-pants approach? In what respects?

For the present, however, this exploratory reconnaissance may offer some feeling as to what business needs from the government's information system and what government can learn from business.

FOOTNOTES

1. For a vivid description of the differences between decision-making in a large firm and in the U.S. government, see W. Michael Blumenthal, "Candid Reflections of a Businessman in Washington," *Fortune*, January 27, 1979. Mr. Blumenthal moved from CEO of the Bendix Corporation to Secretary of the Treasury under President Carter.

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VII.

The World Outside:

International Connections

The world beyond our borders impinges on us in a multitude of ways, whether it be the weather or migratory pressures or acid rain or changing world demand for food or the threat of war.

It is not enough simply to take account of these interactions by making our foresight worldwide in scope. That is the first conceptual step. Beyond that, we must cooperate with others to obtain the data needed to understand what is happening. We may develop a shared perspective of the issues to be addressed if we address the foresight process together. Finally, as a nation, we cannot effectively correct some of the problems we identify unless we deal with them jointly with other countries.

This chapter will undertake, not to catalogue the broad range of international activities relevant to foresight, but rather to show how international data collection and international regulatory agreements relate to foresight, to identify some of the major foresight projects underway elsewhere in the world, and to suggest that our cooperation with those efforts advances the ultimate objective of foresight, which is to solve the problems it identifies.

The Building Blocks: Collective Scientific Inquiry and Data Collection

Let us begin with the weather. Weather forecasting is not foresight; it is prediction. It becomes a part of foresight only when a ship captain or an orange grower, a restaurateur or a government use that forecast to influence their behavior. The

forecast then becomes a central tool of that particular foresight process.

The example of weather is chosen advisedly. Even a nation of continental size, such as the United States, needs and obtains data from other nations to assist in making its forecasts. The development of the art, the improvement of modeling to make longer and better forecasts possible, depends even more upon international cooperation to learn more about global atmospheric patterns and the interconnected oceanic processes.

The process of international scientific cooperation is well established. The United States is party to hundreds of international agreements for cooperation in the gathering of scientific data and participation in joint scientific inquiry. If non-governmental scientific exchanges were added, the list would probably increase an order of magnitude. Nobody knows just how many there are. [1]

These cooperative efforts have expanded from simple data exchanges to awesomely complex cooperative, multidisciplinary projects. There has been an International Geophysical Year, a World Climate Program and an International Biological Program, among dozens of others. The most ambitious of all is one on the drawing boards: the IGBP, or "Global Change" or "International Geosphere-Biosphere Program," a study of the earth and its environs as an integrated whole." The proposal springs from the widening recognition that "Humans are beginning to perturb the climate and the biosphere on a planetary scale, and yet there are enormous gaps in our knowledge of the system; governments have been faced with making expensive and controversial policy decisions on the basis of scientific guesswork." [2]

For anybody but a troglodyte, that quotation alone should be ample demonstration of the significance of these building blocks to our national interests and to our foresight efforts.

The Use of Knowledge: International Regulatory Agreements

There is another sort of international agreement very different in purpose. Rather than facilitating the pursuit of knowledge, these agreements provide for

regulation and management of problems already perceived.

Such agreements -- e.g. a treaty to define a boundary -- are as old as international relations. They are much newer in our area of population, resources and environment. The first modern multilateral treaty to protect a resource was probably the North Pacific fur seal convention among the U.S., Russia, Canada and Japan, first signed in 1911. It has functioned effectively since then, and probably saved those fur seals from extinction. The US/Canada Convention for the Protection of Migratory Birds was initiated in 1916.

The United States is a party to thousands of bilateral and multilateral treaties and conventions. (See Footnote 1.) Most of these probably involve some regulatory or management function.

Not all such cooperation necessarily takes the form of formal treaties. There are ways to harmonize policies and to establish common guidelines where formal agreements would be difficult or impossible. For examples from the area of environment, let us look at the Organization for Economic Cooperation and Development (OECD), the nearest thing to a "club" of developed non-Communist countries.

The OECD Council, in response to recommendations from its Environment Committee, has agreed to a series of Decisions or Recommendations on environmental policy, ranging from broad declarations of principle to specific procedures regarding such diverse issues as PCBs, mercury emissions, oxides and particulates, and the management of conflicts between economic and environmental policies.[3] And so on. Some of these agreed principles have potentially important applications beyond the environment. The "polluter pays principle," for instance, is a useful rule of thumb for resolving debates as to whether some countries gain an unfair trade advantage by refusing to force their export industries to absorb the cost of pollution control.

On toxic chemicals, the OECD has been engaged in a classic case of what would now be considered foresight. A decade ago, several countries were passing legislation to control toxic substances. Some countries, led by the United States, saw that individual country laws, based upon different technical

standards and terminology, could create chaos in international trade in chemicals. That trade already amounted to over $50 billion each year, which gave it considerable economic and political importance. Since even the names of chemicals vary from country to country, and since testing standards were different, Customs officials presumably would begin to ban the importation of chemicals until they could establish whether they met national toxic chemicals laws. In that situation, business would be pitted against environmentalists as to whether to enforce the law.

The obvious solution was to establish common terminology and a process to permit one state to accept the standards determined by laboratories in other countries. With these in place, the shipper would know in advance whether the import was permissible.

The OECD created a special group to get this harmonization under way. In the ensuing decade, a set of agreed principles and procedures has been hammered out, and a major trade/environmental conflict avoided.

Processes such as this represent, albeit at a rather primitive level, the creation of means to fit national decisions into the reality of economic interdependence--in this case, trade.

Each of these agreements represents a decision to limit one's own freedom of action in some degree, in order to gain a greater good. The justification for some agreements is self-evident. The International Postal Union (IPU) is one such example. Another example is the international convention on radio frequencies. Without it, there would be pandemonium in the radio and television frequencies.

Other agreements involve more difficult trade-offs. The International Convention on International Trade in Endangered Species of Flora and Fauna involved a decision by each of the 87 participants that the preservation of endangered species was worth the necessary regulatory bother and expense and, in the case of exporters, the loss of employment and export earnings.

The really agonizing trade-offs are yet to come. Most present agreements in the resource/environment area are peripheral to the economy or are full of loopholes. If the accumulating evidence about acid precipitation and/or carbon dioxide should require

worldwide action to reverse the present build-ups, the trade-offs for each nation would involve the production and use of energy, which lie at the very heart of the their economies. Those choices will be epochally important and difficult.

That is the justification for scientific inquiry such as the IGBP. The better the science, the better able the political leaders will be to judge the choices. If the scientists' information percolates to the body politic, the better prepared the world will be to accept the necessity for action.

And, in a very real way, this is a justification for internationalizing the foresight process. To deal with some problems, we must enlist the participation of other nations. If those nations themselves have come with us to some consensus as to the character and importance of the problem, there is the basis for an agreement. Without that consensus, there is none. I remember a relevant example from the OECD in the mid-seventies. The early scientific work identifying the problem of chlorofluorocarbons in the stratosphere was done in the United States. The US suggested to the OECD Environment Committee that releases of chlorofluorocarbons into the atmosphere should be reduced. The initial reaction of the other countries was decidedly chilly. An international exchange of information among scientists was arranged through the Committee, and within a year the Committee was prepared to recommend national regulation of the emissions.

If nations are not prepared to cooperate in addressing a problem until they see the problem in compatible terms, there is a very strong case for an examination of the evidence together, internationally. Since the trade-offs to be studied are almost always intersectoral -- they require a sacrifice in one part of the economy to preserve or achieve a benefit in another part -- that process of examination is foresight.

Toward Consensus: the Foresight Process Worldwide

"Foresight" as a term of art seems to be an American invention, but the process is hardly confined to America.

Most people still tend to think of foresight in terms of mathematical models projected to some future year.

There have really been only a few attempts at integrated worldwide mathematical models. The following list is probably exhaustive:

* Forrester/Meadows (WORLD 2 and WORLD 3; the basis for the Club of Rome's *Limits to Growth*);

* Mesarovic/Pestel (World Integrated Model, or WIM; developed also for the Club of Rome);

* Bariloche (Argentina);

* MOIRA (Netherlands);

* SARUM (United Kingdom);

* Fugi (Japan);

* UN Global Model (Leontief/Carter).

In addition, the World Bank model is at the border of being "global" in that it covers the world, though it is largely focused on trade, international aid, and investment. There are a number of more specialized worldwide models, particularly on one phase or another of agriculture.

Lest the reader remember *Limits to Growth* and equate environmentalists with models, be it noted that most of the seven models are focused on economic rather than environmental forecasts.

It is also noteworthy that all of those models were first run between 1972 and 1977, and there are no global successors presently on the horizon. Some of the seven are still being run or developed. A successor of WIM is installed at the US Department of Defense, but this author is unaware of any documented instance in which these models' results have been brought directly into a national policy decision, anywhere.

The International Institute for Applied Systems Analysis (IIASA) at Laxenburg, Austria, is the spiritual home for most of the world's mathematical global modelers, including those from the Soviet bloc.

It has an ongoing program of modeling and meetings about modeling, and it is the best source of information concerning the state of global modeling. The United States played a major role in its formation, but our government in 1981 withdrew financial support. The American Academy of Arts and Sciences presently leads a private consortium that serves as the US member of IIASA. As of this writing, there was a faint prospect that our government would resume support.[4]

It would appear that the burst of mathematical models represented the first effort to exploit the new powers of computers for long-term, intersectoral analysis. The uses and abuses of mathematical modeling will be discussed in the next chapter. For reasons that will become clear in that chapter, problems arise when one attempts to relate rigorous mathematical models to the real world. These weaknesses probably led to the next development: a series of "World in XXXX" studies including *Global 2000*, some of which used mathematical models, but all of which chose an adjectival and descriptive (and mathematically less rigorous) approach to the problem of projecting trends into the future.

Global 2000 did something that none of the others have done: it judged its own results against a mathematical model. Using WIM, it ran its data in two ways. First, it cut the feed-back loops from one sector to another that are built into WIM. This was done to approximate the forecasting practices of the agencies on which *Global 2000* was built, without systematic feedback from one department to another. Then it ran the data with the feedback loops, and the projections came out more sharply constrained than they had in the first projection.

Put in layman's terms, this suggests two things: the mathematical models can teach us something; and in this case WIM reminded us that the failure to calculate feedback -- the failure to consider the impact of one sector upon another -- produces results different from those when the feedbacks are considered. In a sense, this is simply a rephrasing of the argument for foresight -- except that foresight does not demand that the linkages be strict or even mathematical.

There have been several other non-mathematical, prescriptive world models. In Europe, the "Brandt Commission report"[5] focused upon worldwide North-South

relations and the plight of the less developed countries.

Some of the international organizations' periodic reports are in fact global projections, though they usually tend to focus upon a particular sector or issue. One of the finest recent examples was the World Bank's 1984 annual report, which addressed the social and economic implications of third world population growth. [6]

An ambitious early effort to project world trends and how to deal with them was *Interfutures: Facing the Future*, published by the OECD in 1979. That study was proposed by Japan. It deals with energy, resource, economic and social trends and touches occasionally upon environmental questions. It concludes with nine pages of recommendations. Among them are

* broadened international exchange of views and knowledge, to begin to build toward a "social consensus."

* increased attention to climate research and soil conservation.

* emphasis upon coal and nuclear power to buffer the transition away from oil.

* intensified efforts to reduce business cycles and cyclical unemployment in the industrial countries.

* better data and information for government and industry.

* more efficient management of public expenditure, and reducing governmental interference in the operation of markets.

* increased aid to the third world, emphasizing agricultural and food aid to the poorest countries.

* and finally, managing the increasing interdependence of the world. This "management" would include international participation in interdisciplinary "prospective analysis on a world scale" -- another name for "World in XXXX" reports -- "so that from this investigation of the future the various governments may derive a

common awareness of the long-term issues that face them."

In simpler terms, somebody has been here before, warning us that shared approaches to shared problems require shared perceptions of what the problem is -- and that a way toward that "social consensus" is joint participation in such projects as the *Interfutures* study itself.

The language of the *Interfutures* project ranges from cautious to Delphic, as befits the product of an international bureaucracy. (The treatment of third world population growth, for instance, is so delicate as to be meaningless.) Nevertheless, it is noteworthy that the Secretary General of OECD found it prudent to publish the study on his own responsibility rather than to seek formal clearance from all nineteen participating countries.

Another major international study has just been completed, with the encouragement of the United Nations General Assembly. It is the World Commission on Environment and Development, or the "Brundtland Commission" (after its Chairwoman, the Prime Minister of Norway). The General Assembly appointed her and the Vice Chairman, who then recruited a distinguished Commission membership selected with an eye to geographic and rich-nation/poor-nation balance. All serve in their private capacities.

As it turns out, the Brundtland Commission report -- *Our Common Future* -- is more a call to action than a forecast. Its keynote is "sustainable development," which it defines as "an approach to progress which meets the needs of the present without compromising the ability of future generations to meet their own needs." The authors claim that they are not pessimistic, that sustainable development is achievable. They have not undertaken a systematic argument to justify such optimism, and the catalogue of ongoing ecological horror stories that they have put together would lead the reader to conclude that the optimism is an expression of faith rather than the result of calculation.

The report describes the Commission's objectives as "sustainability, equity, social justice and security." It makes many very specific proposals. Among them are compulsory arbitration of international environmental disputes; increased aid from industrial

to developing countries; reducing the developing countries' debt burden; commodity agreements to improve and stabilize developing nations' export earnings; increased attention to ecological factors in bilateral and multilateral aid programs; strengthened "negotiating capacity" of developing countries vis-a-vis transnational corporations; adherence by all nations (this means the United States, primarily) to the Law of the Sea Treaty; the use of revenues from Antarctica, the oceans, space and international trade to finance international aid programs; the redirection of national budgets from military to developmental and environmental purposes; a greater role for non-governmental organizations; an international "space regime"; and many more.

The Commission made recommendations about foresight, without using that term. It observed that ecological impacts are inseparable from decisions made about other things: economic development, energy policy, and so on. In the past, governments have tried to handle the environmental impacts--in Mrs. Brundtland's vivid phrase -- by "bolting [environmental policy] onto the exhaust pipe." The Commission called for changes in decision processes so that "the ecological dimensions of policy be considered at the same time as the economic, trade, energy, agricultural and other dimensions." It argued that "such a reorientation on a continuing basis is simply beyond the reach of present decision making structures and institutional arrangements, both national and international."

This is a succinct statement of the argument for foresight. The Commission (unlike this book) did not try to spell out the specific changes in processes to achieve the goal--which is probably a wise forbearance when one is proposing changes in hundreds or thousands of institutions, worldwide.

The Commission recognized the threats caused by third world population growth, but was cautious in proposing remedies. It said that "urgent steps are needed to limit extreme rates of population growth," but it went no further than to advocate family planning to give women the freedom of choice, and it argued that the social and economic conditions must be created to encourage women to want only an appropriate number of children. Thus, on this fundamental issue, it was unwilling to go beyond the generalizations

already expressed at the governmental population conferences at Bucharest (1974) and Mexico City (1984).

The Commission has completed its report but does not want to see it fade away. During 1987, they are holding conferences around the world to publicize it. They hope for consideration by the U.N. General Assembly in the autumn, leading to regional conferences, a worldwide conference, a Universal Declaration on Environmental Protection and Sustainable Development, and finally a "Convention establishing the rights and responsibilities of governments in this field."[7]

An ambitious agenda. Not surprisingly, reservations are being heard from the governments the Commission seeks to reform. The United States government has taken a polite but cool view of the report. CEQ issued a statement pointing out its disagreement with some of the recommendations and opposing the proposal for the U.N. program and Conference. The government dealt with the Commission at the sub-Cabinet level (the Director of CEQ) during its visit to Washington to publicize the report.

The developing world seems to share with local governments the tendency to see foresight as a goal-setting process. Of the mathematical models listed above, only the Argentine Bariloche model started with an image of what the future should be, and then ran the model to show how it might be achieved. The answer was, in part, "by getting more from the rich countries." Similarly, the principal third world excursion into futurology, the New International Economic Order, starts with a comparable goal and comes to about the same conclusion. Not all foresight efforts are necessarily identical with our national interest as we are likely to see it.

Several individual countries have undertaken long-term studies of their future. Among them are "Poland 2000," "China 2000," "Mexico 2010," "Iceland 2000" and "Korea 2000." The names suggest that the United States' *Global 2000* has generated a widening ripple of interest. (A summary listing of global foresight studies, prepared by the Global Studies Center, is at Appendix F.)[8]

There have been several private studies, regional or worldwide, attempting to identify key coming economic, social, resource or environmental issues. To

go back no more than a decade, *The Unfinished Agenda* focused on population, resource and environment issues and the ways that society makes decisions in those areas. The report was produced by an Environmental Agenda Task Force chaired by Gerald Barney.[9]

In Europe, the European Cultural Foundation published *Europe 2000*,[10] an effort to draw together some twenty studies on education, industry, urbanization and agriculture. The study is generally discursive and non-quantitative in tone and, despite the purpose proclaimed, is largely concerned with social and political attitudes and perceptions.

More recently, the World Resources Institute in Washington conducted an international study entitled *The Global Possible*. First, they commissioned scholars to make projections of resource and development issues. Then they convened an International Conference on the Global Possible. They published the Conference conclusions in a brief volume called "Statement and Action Agenda." The detailed papers were published by the Yale University Press.[11] This informal process, a variant of the "Delphi" approach to futurism, is about as far as one can get from the mathematical models of the 1970s.

These are perhaps the best-known multidisciplinary efforts to identify world trends and their implications for policy.

We should not leave this section with the impression that foresight is found only in these monumental studies. It has been argued in earlier chapters that an essential part of foresight is the mundane process of bringing different disciplines and specialists into communication. The United Nations is far ahead of the U.S. (see Chapter II). The *Directory of UN Information Systems* contains a volume on "Information Systems and Data Bases" with very practical information, such as which data are available on computer tapes and the telephone numbers of those in charge. Another volume consists of "Information Systems in Countries," and there is a "Register of UN Serial Publications." These publications are periodically updated. Congressional Information Services, Inc. covers many of the same sources in its "IIS" directory.[12]

On the specific issues of the environment, the United Nations Environment Program (UNEP) has long had

a mandate for organizing international monitoring (GEMS -- the Global Environmental Monitoring System), and it has fostered regional groupings to address specific pollution problems, such as the Mediterranean and the Caribbean.

In 1985, UNEP created GRID, the Global Resource Information Database. With the help of donated computers and software (much of it from the United States), it will integrate resource and environmental information from a variety of sources, including satellite coverage. It is so organized to permit the information seeker to start with a specific place, bring up a base map and overlay it with different categories of information, such as soil types, soil moisture and water resources, vegetation and crop cover, animal populations, human settlements, and so on.[13]

The businessmen in Chapter VI wanted integrated international resource information. Here it is. The next problem, in the era of the "information explosion," is to bring the data and the potential users together.

UNEP has now drawn business into the dialogue. Jointly with the International Chamber of Commerce, in 1984, it sponsored an international business conference concerning the role of industry in environmental management, a heartening indicator that industry has come to recognize that it has responsibilities in the area.[14] The United States' Business Round Table was a key player in bringing the conference about. One result was the creation of the business-oriented International Environmental Bureau, quartered in Geneva and Chaired by the CEO of the USX Corporation (formerly U.S. Steel).

Enough. In the end, this profusion of studies and reports must begin to sound like the gabbling of geese, even to friendly ears. It would take a brave futurist to claim that he has read all of all these studies. Only the most literate politician is likely to have read **any** of them. What purpose do they serve?

Foresight, Sovereignty and a Shared Planet

Perhaps this is the way the human tribe progresses. Like a flock of geese deciding where to land, the gabbling apparently helps to develop a

consensus. Directly or indirectly, these holistic studies serve to educate all of us to the ideas of multiple causation and inter-sectoral connections, and they may be developing a shared sense of the issues ahead for all of us. They may be the precondition for finding ways to deal collectively with the issues that foresight foresees, when those issues are too large to be managed by a single country.

A recurrent theme in *Interfutures* is the recognition that the world is economically and environmentally interdependent, that a retreat behind national walls would be impossible for some and extremely disruptive for any country.

Absolute sovereignty is a dangerous anachronism in an interdependent world. If the United States believed it necessary to compromise Grenada's independence of action because of a perceived strategic threat from the USSR, how much more may a low-lying country like Holland, behind its dikes, feel the urgency of persuading the rest of the world to cooperate in an effort to halt the increase of worldwide atmospheric carbon dioxide, if the alternative is a rising sea level?

As a nation we are hardly ready to sacrifice our sovereignty at the political level. A look around the world at governments that would like to share sovereignty with us suggests that our reluctance has its reasons. However, we have already allowed some of that sovereignty to be nibbled away in practical matters, as the fatness of the volume of *Treaties in Force* suggests. If cooperation with others in the pursuit of better foresight generates as its own by-product a broadening set of shared perceptions of the global problems that nations should face together, then the joint pursuit of foresight may be integral to the greater effort to learn how to reconcile a system of sovereign states with the fact of a shared planet.

FOOTNOTES

1. A considerable degree of imprecision is inescapable in any effort to quantify the web of agreements linking the United States with the rest of the world, simply because their number is so vast, and the government has not attempted to codify them or describe them in terms of function: "scientific inquiry"; "regulatory"; "statements of principle"; etc. The standard reference is *A List of Treaties and Other International Agreements of the United States in Force on January 1, 1984.* (Department of State Publication 9351, US GPO.) Listing only the names and dates of the agreements, it runs to 327 pages, and it is limited to formal intergovernmental agreements, not including agency-to-agency agreements.

   The unpublished survey "U.S. Government Participation in International Treaties, Agreements, Organizations and Programs in the Fields of Environment, Natural Resources and Population, January 1984" (see Chapter III), is one of the few efforts at a full compilation, and it is confined to the three topic areas in its title. It notes (p.ii) that in those areas "We are a party to 26 major international conventions and treaties; cooperate with 73 foreign nations through some 265 separate bilateral treaties and agreements (some of a general government-to-government nature and most of a subject matter-specific, agency-to-agency, variety); and participate in over 70 specific programs carried out by some 40 international and regional organizations, commissions and councils." It does not attempt to distinguish between agreements providing for scientific inquiry and those involving regulatory activities.

2. *Science*, Vol. 226, 5 October 1984, p. 33; see also *Science*, 5 January 1985, 5 September 1986, 3 October 1986, and 7 November 1986 for reports on the progress of the proposal. Quoted by permission of the publisher. Copyright 1984 by the American Association for the Advancement of Science (AAAS). The description of this proposal is available from the foreign secretary of the National Academy of Sciences, entitled "IABP: A Study of Global Change," May 15, 1984, reporting the results of the ICSU Conference in Ottawa, Canada, September 1984.

3. "Recommendations" are advisory; the OECD regards "Decisions" as binding, though their force in U.S. law is murky. The Decisions and Recommendations through 1976 are available in "OECD and the Environment," Paris: OECD, 1976.

4. The description of mathematical world models in this chapter was drawn largely from *Groping in the Dark: the First Decade of Global Modelling*, by Donella Meadows, John Richardson and Bernhart Bruckmann (New York: John Wiley & Sons, 1982), which was published as the proceedings of the Sixth Conference of IIASA. Five of the seven models were also analyzed in detail in *Global 2000*, Volume Two, Part III. *Global 2000* is probably unique in that it also contains an exhaustive critique of its own models. The American Academy of Arts and Sciences is at Norton's Woods, 136 Irving Street, Cambridge MA 02138, (617) 492-8800. The IIASA contact is Mr. Alan MacDonald. In 1986, with Congressional blessings, NSF, the Department of Energy and EPA proposed to support small IIASA studies in demography, environmental studies, acid rain and systems theory. The funding as of this writing has been held up by the National Security Council.

5. Independent Commission on International Development Issues, *North-South: A Program for Survival* (English version by MIT Press, Cambridge MA, 1980).

6. The World Bank, *World Development Report 1984* (New York: Oxford University Press, July 1984).

7. The initial mandate for the Brundtland Commission was spelled out in *World Commission on Environment and Development: Mandate, Key Issues, Strategy and Workplan* (Geneva, 22 October 1984). The completed report was published as *Our Common Future: Report of the World Commission on Environment and Development* (London and New York: Oxford University Press, 1987). The "Tokyo Declaration" by the Commission, plus an executive summary, unofficial chapter summaries, and proposals for follow-up activities, are contained in an information packet dated 27 April 1987, assembled by the WECD Secretariat at Palais Wilson, 52, Rue des Paquis, CH-1201 Geneva, Switzerland, Tel. (022) 32 71 17. The "United States Views" were issued on the same date and are available from the Council on Environmental Quality, 722 Jackson Place NW, Washington DC 20006.

Mrs. Brundtland's personal statement of the significance of the Commission's work is available in her article "The World Commission on Environment and Development," World Resources Institute *Journal '86* (Washington: World Resources Institute 1986).

The American member of the Commission is William Ruckelshaus, former Administrator of EPA.

8. The Global Studies Center is the nearest thing to a clearinghouse for information about global futures studies. It publishes a newsletter, *Global Perspective Quarterly*. It has published an analysis of five global models: J. M. Robertson and G.O. Barney, *The Global Future: An Analysis and Synthesis of Five Recent Global Studies*, 24 July 1985, available from Global Studies Center, Inc., 1611 N. Kent Street, Suite 600, Arlington VA 22209. Tel. (202) 841-0048. Dr. Barney was Executive Director of **Global 2000.**

   There is undoubtedly much systematic futures work being done in a number of governments that has not been catalogued. A useful short look at foresight machinery in England, France and Sweden is contained in a report entitled "Foresight in Three European Nations," 15 February 1983, by John M. Clough, Jr., staff member of the US House Committee on Energy and Commerce, unpublished.

9. Gerald O. Barney, Ed. (New York: Thomas Y. Crowell, 1977).

10. Peter Hall, Ed. (London: Gerald Duckworth & Co., 1977).

11. *The Global Possible: Resources, Development and the New Century*, (New Haven: Yale University Press 1985). The Conference conclusions were published under an alternative title: *The Global Possible: Practical Proposals from 75 Leaders from Science, Business, Government and Citizens' Groups*.

12. Published by the UN Inter-Organization Board for Information Systems, Palais des Nations, Geneva. A somewhat less voluminous survey is available commercially: "IIS: Index to International Statistics: A Guide to the Statistical Publications of International Intergovernmental Organizations," Congressional Information Services Inc., 4520 East-West Highway, Bethesda MD 20814; (301) 654-1550; 1986. Abstracts and index covering 1127 sources.

13. John Fanshawe, *Global Resource Information Database (GRID)*, Nairobi: United Nations Environmental Program, 1985.

14. "World Industry Conference on Environmental Management, Nov. 14-16, 1984: Outcome and Reactions," UNEP Industry & The Environment paper ISSN 0378-9993 Special Issue No. 5, 1984 (Nairobi: UNEP 1984).

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VIII.

A Skeptic's Guide to Computer Models

by John D. Sterman

But Mousie, thou art no thy lane,
In proving foresight may be vain;
The best-laid schemes o' mice an' men
Gang aft a-gley,
An' lea'e us nought but grief an' pain,
For promis'd joy!

Robert Burns, "To a Mouse"

This chapter has a narrowly focused purpose. It is not about the uses of computers in foresight; it is a guide to the strengths and weaknesses of computerized mathematical models. Computers have other potential uses in foresight that do not necessarily involve computer modeling, such as electronic data bases for the storage, retrieval and communication of data. For these uses, I would refer the reader to other sources.[1]

There have been misunderstandings on all sides as to the role computer modeling should play in foresight, at which level and what stage models should be brought into the process. Those decisions will depend upon the way the foresight process itself is structured, and there are other studies addressing those relationships. This chapter is intended to give the non-modeler a sense of the terminology and concepts of different models, to help him or her to decide what models' capabilities are and how they may be useful.[2]

The Inevitability of Using Models

Computer modeling of social and economic systems is only about three decades old. Yet in that time, computer models have been used to analyze everything from inventory management in corporations, to the optimal distribution of fire stations in New York City, to the performance of national economies, to the interplay of global population, resources, food and pollution. Computer models have been front page news as in the case of *Limits to Growth*,[3] have been the subject of numerous congressional hearings, and have influenced the fate of legislation. Computer modeling has become an important industry, generating hundreds of millions of dollars of revenues annually.

As computers have become faster, cheaper, and more widely available, models have become commonplace in forecasting and public policy analysis, especially in economics, energy and resources, demographics and other crucial areas. As computers continue to proliferate, more and more policy debates will involve the results of models. Though we are not all going to be model builders, we are all becoming the consumers of models, whether we know it or like it. The ability to understand and evaluate computer models is fast becoming a prerequisite for the policy maker, legislator, lobbyist, and citizen alike.

Each of us will be faced with the results of models and will have to make judgments about their relevance and validity. How can such decisions be made in an intelligent and informed manner? Can modeling be made accessible to the ordinary person or will it remain the special magic of a technical priesthood?

This chapter offers tentative answers to those questions. It first highlights the characteristics and capabilities of computer models such as are used in foresight. (Models of physical systems such as the models NASA uses to test the space shuttle are not discussed.) The advantages and disadvantages, uses and misuses of formal models will be presented. What are the fundamental assumptions of the major modeling activities? What are the crucial questions a model user or model consumer should ask when evaluating the appropriateness and validity of a model?

Mental and Computer Models

Fortunately, everyone is already familiar with models. People use models every day -- mental models. Our decisions and actions are based not on the true state of affairs, but on mental images of the state of the world, how the parts of the system are related, and how our actions will influence the system.

Mental models have some powerful advantages. The mental model is flexible. It can take a wide range of information into account, not just numerical data. It can be adapted to new situations and modified as new information becomes available. The great systems of philosophy, politics, and literature are, in a sense, mental models. But mental models are not easily examined by others. Their assumptions are hard to pin down in debate or discussion. Interpretations differ. Ambiguities and contradictions can go unresolved.

Of more concern is the fact that people are not very good at interpreting the assumptions of their own mental models. Psychologists have shown that people can take only a few factors into account in making decisions.[4] People often make errors in deducing the consequences of their assumptions. Research on the behavior of people in organizations (e.g. families, businesses, the government) shows that decisions are not made by rational consideration of objectives, options, and consequences. Rather decisions are often made by rote, using standard operating procedures that evolve out of tradition and which adjust only slowly to changing conditions.[5] These decision making rules often make sense given the role of the decision makers in the organization, the information available to them, and the limited time available to make decisions. The problem is that individual perspectives may be parochial, information incomplete, dated, or biased, and the time available to weigh alternatives insufficient. Decisions are strongly influenced by organizational context, authority relations, peer pressure, cultural perspective, and selfish motives. As a result many decisions turn out to be incorrect because the complicated puzzle of choosing the best course of action is too difficult. Psychologists and organizational observers have identified dozens of different biases that creep into human decision making as a result of cognitive limitations and organizational pressures.[6] Hamlet exclaims "What a piece of work is a man, how noble in reason, how infinite in faculties...!" But it seems that people, like Hamlet

himself, are simply not capable of making rational decisions without error and without being swayed by societal and emotional pressures.

Enter the computer model.

Computer models offer an improvement over mental models because

* they are explicit, and their assumptions are open to all for review.

* they infallibly compute the logical consequences of the modeler's assumptions.

* they are comprehensive, and able to interrelate many factors simultaneously.

These are powerful advantages. However, in practice, many models are

* so complex and poorly documented that no one can examine their assumptions. They become black boxes.

* so complex the user has no confidence the assumptions are consistent or correct.

* unable to deal with relationships and factors which are difficult to quantify, or for which numerical data do not exist, or which are outside the expertise of the specialists who built the model.

In part because of these problems, computer models have often been misused. Models have often been used to lend authority to an argument, to justify decisions already taken, or to provide a scapegoat when a forecast turns out wrong.

How can a policymaker know what kind of model is appropriate for the problem at hand? How can a prospective model user decide whether a model is appropriate for the purpose at hand, whether its results are valid or useful? How can one guard against the misuses of models? No single or comprehensive answer can be given, but some useful guidelines can be given.

The Importance of Purpose

A model must have a clear purpose. The purpose should be to solve a particular problem. A clear purpose is the single most important ingredient for a successful modeling study. **Beware the analyst who proposes to model an entire social or economic system rather than a problem.** What is the difference? For example, a model designed to understand how to stabilize the business cycle is a model of a problem. A model designed to understand how the economy can make a smooth transition from oil to alternative energy sources is a model of a problem. A model that claims to be a comprehensive representation of the economy is a model of a system. Why does it matter? All models are simplifications of the real system. A truly comprehensive model would be as complex as the real system and just as inscrutable.

The art of modelbuilding is knowing what to leave out. In this context, the purpose of a model is a logical knife. It provides a criterion for deciding what to cut out, leaving only the essential features necessary to fulfill the purpose. In the example above, the comprehensive model of the economy will likely be enormous. In order to answer all questions, it will include many factors irrelevant to the business cycle such as long-term population growth or resource depletion. And it will include factors irrelevant to understanding the energy transition such as short-term changes in unemployment and interest rates. Because of its size, it will be next to impossible to examine the assumptions. The model builders, not to mention the intended consumers of its output, are unlikely to understand its behavior, thus its validity will be largely a matter of faith.

A model designed just to examine the business cycle or energy transition, on the other hand, can be much smaller. It can be limited to those factors thought to be important in understanding business cycles or energy. Its validity for its purpose can be assessed by asking how its assumptions relate to the most important theories of the business cycle or resource economics. Of course, a model with a clear purpose can still be incorrect, large, and difficult to understand. But a clear purpose allows model users to ask the questions that can reveal the utility of a model for solving the problem at hand.

Two Kinds of Models

There are many types of models and they can be classified in many ways. Models can be static or dynamic, mathematical or physical, stochastic or deterministic. One of the most useful classifications, however, is to divide models into those that **optimize** versus those that **simulate.** The distinction between optimization and simulation models is particularly important since these types of models are suited for fundamentally different purposes.

Optimization models. The Oxford English Dictionary defines "optimize" as "to make the best or most of; to develop to the utmost." The output of an optimization model is a statement of the best way in which to accomplish some goal. For example, a nutritionist would like to know how to design meals that fulfill certain dietary requirements but cost as little as possible. A salesperson must visit a certain number of cities and would like to know how to make the trip as short as possible, taking into account the available transportion between cities. Instead of trial and error, an optimization model may be used to determine the best way.

An optimization model typically consists of three parts. The **objective function** specifies the goal or objective. For the nutritionist, the objective function is to minimize the cost of the meals. For the salesperson, it is to minimize the travel time or total mileage of the trip. The **decision variables** restrict the choices of the decision variables to those that are possible or acceptable. In the diet problem, the constraints would specify that consumption of each nutrient must exceed the minimum daily requirement. The constraints might also specify that you don't want potatoes more than three times a week. The constraints in the salesperson's problem would specify that each city must be visited at least once, and would restrict the selection of routes to the available connections (e.g. if there were no direct flights from Boston to Cincinnati, the constraints would require you to pass through Cleveland or Pittsburgh or wherever on the way).

Thus an optimization model takes as input the goals to be met, the choices to be made, and the constraints to be satisfied. It yields as **output** the best decision that can be made given the assumptions of the model. Because optimization models tell you what

to do in order to make the best of the situation, they are normative or prescriptive models. The purpose of an optimization model is not to tell you what will happen in a certain situation, but what ought to be done to optimize the objective.

Limitations of optimization. There are a variety of limitations and problems with optimation models which a potential user must bear in mind.

Whose objectives? One obvious difficulty is the problem of specifying the objective function. It is clear that the dietician wants to minimize the cost of food, but what is the objective function of the mayor of New York City? How is the optimal population of the world to be defined? How can intangibles like the quality of life be measured and incorporated in an objective function? How should conflicting goals and the differing agendas of special interest groups be balanced? The objective function embodies the values and preferences held to be desirable. Whose values and preferences should be used?

Because optimization is prescriptive, it always involves subjective value judgments. Users of optimization models should always scrutinize the objective function and constraints to examine the values they embody, both explicitly and by omission. For example, a water quality model may find the cheapest way to place sewage treatment plants along a river so as to meet water quality standards. The model user should ask how the model takes into account the impacts on fishing, recreation, wild species, and the development potential in the affected areas. Unless explicitly incorporated in the model, these considerations are implicitly held to be of no value.

Though difficult, the problem of choosing an objective function is not insurmountable. Intangibles like quality of life can often be quantified, at least roughly, by for example breaking them into measurable components. Quality of life in a city might be represented as depending on unemployment, housing adequacy, the crime rate, air quality, etc. A variety of techniques have been developed to help extract preferences from interviews and other impressionistic data. The attempt to make values explicit may itself have enormous value for the clients of a modeling project, and is a worthwhile exercise in any study.

Linearity: A more important problem relates to the verisimilitude of optimization models. Because a typical optimization problem is very complex, involving hundreds or thousands of variables and constraints, the mathematical problem of finding the optimum is extremely difficult. To render the optimization problem tractable, a number of simplifications are commonly introduced. One common simplification is to assume all the relationships in the system are linear. In fact the most popular optimization technique, linear programming, requires the objective function and all the constraints to be linear.

Linearity is convenient mathemetically but almost always unrealistic. For example, a model of a firm's inventory distribution policies may contain a relationship between inventory and shipments. If the inventory of goods in a warehouse is 10% below normal, shipments may be reduced by, say, 2% because certain items will be out of stock. If the model required the relationship to be linear, then a 20% shortfall would reduce shipments by 4%, a 30% shortfall by 6%, and so on. But obviously, when the warehouse is empty (a 100% shortfall of inventory), no shipments are possible, while the linear relationship indicates shipments would be 80% of normal, an absurdity.

This may seem like a trivial example, but consider the sorry fate of the passenger pigeon, *ectopistes migratorius*. Before the colonization of North America, passenger pigeons were extremely abundant. Huge flocks of the migrating birds would darken the skies for days. They often caused extensive damage to crops and were hunted both as a pest and for food. For years, hunting had little impact on the population. The prolific birds reproduced fast enough to offset most losses to hunters. But the fertility of the pigeons depended nonlinearly on their population density. In large flocks they could reproduce at high rates. But in small flocks fertility dropped precipitously. As hunting gradually reduced the population, fertility fell, accelerating the decline in population. Lower population levels further lowered the birth rate, in a vicious cycle. By 1914, the passenger pigeon was extinct.

There are some techniques available to solve certain nonlinear optimization problems, and research is continuing. But in general, the nonlinearities that can be handled are limited, and the vast majority of optimization models assume the world is linear.

Lack of feedback: Complex systems are highly interconnected. There is a high degree of feedback between sectors. For example, a water quality model may assume the sewage load to be treated is fixed, and compute the optimum size of treatment plants to be built. But if the water quality improves as a result of treatment, the attractiveness of the river for development will increase, raising the sewage load. The results of the plant siting decisions feed back through the physical, economic, and social environment to alter the conditions that the policy was suited for.

A model that ignores feedback effects is said to have a narrow boundary. Such models tend to rely on exogenous variables. There are two basic kinds of variables in a model; **endogenous** and **exogenous** variables. Endogenous variables are those that are calculated by the model. They are the variables explained by the structure of the model, the variables for which the modeler has an explicit theory. Exogenous variables influence other variables in the model but are not calculated by the model. They are given simply by a set of numerical values over time. The values of exogenous variables may come from other models but are most likely the product of an unexaminable mental model.

Ignoring feedback can result in policies that are diluted, delayed, or defeated by the system, or which generate unanticipated side effects.[23] An illustration is provided by the construction, in the 1950s and 60s, of interstate highway networks and freeways to alleviate congestion around major cities. In Boston, for example, it used to take a half an hour to drive from the neighborhood of Dorchester to the downtown area, a journey of only a few miles. With the construction of a limited access highway network, travel time dropped substantially. But by reducing congestion, outlying communities were opened up. The population in the suburbs soared. Today the rush hour journey from Dorchester to downtown often takes half an hour or more. The center city has become more congested and polluted. Its population has declined. Many businesses moved to the suburbs or were squeezed out by shopping malls. In the suburbs, farmland was paved over or turned into housing developments. The point is not to condemn these changes but to illustrate how a policy aimed at reducing highway congestion generated a wide range of side effects and was

eventually undone by feedback effects which were largely unanticipated.

In theory, feedback can be incorporated in optimization models. But in practice, the resulting complexity and nonlinearity usually renders the optimization problem insoluble. As a result, many optimization models ignore most of the feedback effects. Model users should identify the degree to which important feedbacks are incorporated in the model and how excluded effects might alter the assumptions of the model and thus invalidate the results.

Lack of dynamics: Many optimization models are static. They determine the optimal solution for a particular moment in time without regard for how the optimal state is reached or for the future evolution of the system. For example, the U.S. Forest Service once constructed a linear programming model to optimize the use of government lands. The model was enormous, with thousands of decision variables and tens of thousands of constraints. It required the full use of a large computer for hours or even days at a time to find the solution. Typographical errors in the model's huge database required months of debugging. Despite the effort required, the model produced the "optimal" use of forest resources for a single moment in time. It did not take into account how harvesting a particular area would affect its future ecological development. It did not consider how land use needs or lumber prices might change in the future. It did not consider how long it would take for new trees to grow to maturity in the harvested areas, or the economic and recreational effects during this time. The model provided the optimal decisions for a single year even though those decisions would influence the development of forest resources for decades.

Not all optimization models are static. The MARKAL model, for example, is a large linear programming model designed to determine the optimal choice of energy technologies. Developed at the Brookhaven National Laboratory, the model produces as output the least-cost mix of coal, oil, gas, etc. in five-year intervals well into the next century. It requires exogenous inputs of future fuel prices, construction and operating costs for unconventional energy technologies, and energy demands. The model is dynamic in the sense that it provides a "snapshot" of the optimal state of the system at five-year intervals. But it does not explain how the system moves from one

optimal state to another. For example, it does not incorporate construction delays for energy production facilities, delays which are often much longer than five years. The model assumes that people, seeing what the optimal mix is for, say, the year 2010, would begin construction far enough in advance to have the required plants ready on time.

Delays are pervasive. It takes time to acquire capital plant and equipment, to clean up a waste dump, to acquire information. Delays are a major source of instability in complex systems. Delays in carrying out or perceiving the effects of decisions may cause overreaction or prevent timely intervention. Acid rain provides a typical example. Many scientists feel it will take years to determine the extent to which incipient damage to the forests of New England, the Appalachians, and Bavaria are caused by acid rain or by natural forces. Until scientific and then political consensus emerges, legislative action is not likely to be strong. Implementation of pollution control programs, once passed, will take years. The lifetimes of existing power plants and other pollution sources is measured in decades. Settlement patterns and lifestyles dependent on the automobile change over even longer periods. By the time sulfur and nitrogen oxide emissions are reduced sufficiently, it may be too late.

Delays are crucial in determining the dynamic behavior of systems. But as with nonlinearity, it is difficult to incorporate delays in optimization models. When possible, delays are usually assumed to be of fixed length. The results of such models are of questionable value. Users of these optimization models may find, like the city tourist on the back roads of Maine, that "you can't get there from here."

When to use optimization. Despite the limitations discussed above, optimization techniques can be extremely useful. But they must be used for the proper problems. Optimization models can substantially improve the quality of decisions in many areas, including computer design, airline scheduling, the location of factories, and the operation of oil refineries. Whenever the problem to be solved is one of choosing the best from among a well-defined set of alternatives, optimization should be considered. If the meaning of "best" is also well defined, and if the system to be optimized is relatively static and free of feedback, optimization may well be the best technique to use. Unfortunately, these latter conditions are

rarely true for the social, economic, and ecological systems that are frequently of concern in foresight.

Beware, however, the optimization model which purports to forecast actual behavior. The output of an optimization model is a statement of the best way to accomplish a goal. To interpret the results as a forecast of likely actual behavior or the likely future behavior of the system is to assume that people in the real system will in fact make the optimal choices. It is one thing to say "to maximize profits the following decisions should be made" and quite another to say "people will succeed in maximizing profits, and therefore the following decisions will be made." The former is a prescriptive statement of what to do; the latter a descriptive statement of what will happen. The optimization model will only be valid for the latter purpose if people in fact optimize. It may seem reasonable to expect that people behave optimally -- after all, it would be irrational to take second best when you could have the best. But the evidence on this score is conclusive; real people do not behave like optimization models. As discussed above, real people make decisions with simple and incomplete mental models, models that are often systematically incorrect, or that reflect goals and motives that are not captured in an optimization framework. Real people do not have the perfect information, foresight, and computational powers required to solve for the optimum solution. As Herbert Simon puts it,

> *The capacity of the human mind for formulating and solving complex problems is very small compared with the size of the problem whose solution is required for objective rational behavior in the real world or even for a reasonable approximation to such objective rationality.*[6]

Optimization models augment the capacity of the human mind to solve the problem of finding the objectively rational course of action. Nevertheless, even optimization models must make simplifying assumptions so as to be tractable -- even with a computer the best we can hope for is a reasonable approximation to objectively rational behavior. But to model how people actually behave rather than how they ought to behave requires a different set of modeling techniques.

Simulation Models

The latin verb *simulare* means to imitate or mimic. The purpose of a simulation model is to mimic the real system so that its behavior can be anticipated or changed. A simulation model is a laboratory replica of the real system. By creating a representation of the system in the laboratory, experiments can be performed which are either impossible, unethical, or prohibitively expensive in the real world.

Simulations of physical systems are commonplace, ranging from simulations of weather patterns and the depletion of oil reservoirs to wind tunnel tests of aircraft designs. Similarly, economists and social scientists have used simulation to understand how cities evolve and respond to urban renewal policies. how energy prices affect the economy, how corporations grow, how population growth interacts with food supply, resources, and the environment. There are many different simulation techniques, including stochastic modeling, input-output models, system dynamics, discrete simulation, and role-playing games. Despite the differences, all simulation techniques rely on a common approach to modeling.

A simulation model has two main components. It must include a representation of the physical world relevant to the problem under study. For example, to understand why America's large cities have continued to decay despite massive amounts of aid and numerous renewal programs, a model would need to include a representation of the physical components of the city: the size and quality of the housing stock, commercial structures, and other infrastructures; the size, skill mix, income, and other attributes of the population; the flows of people, money, etc. into and out of the city; and other factors which characterize the physical and institutional setting. The degree of detail needed depends on the specific problem to be addressed with the model. A model designed to understand why urban renewal programs have generally not worked in a variety of cities requires only an aggregate representation of the features common to such cities.[7] But a model designed to improve the location and deployment of firefighting resources in New York City had to include a detailed representation of the streets and traffic patterns.[8]

In addition to the physical structure of the system, a simulation model must portray the behavior of

the actors in the system. Behavior in this context means the way in which people respond to different situations. The behavioral assumption of a simulation model describes the way in which people make decisions. The decision rules are the input. The pattern of decisions is the output of the model. For example, in a pioneering simulation study of corporate behavior, Cyert and March found that department stores used a very simple decision rule to determine the floor price of goods.[9] The rule was basically to mark up the wholesale cost of the items by a fixed percentage. When excess inventory piled up on the shelves, a sale was held and the markup was gradually reduced until the goods were sold. If the sales goals were exceeded, prices were boosted. Prices were also adjusted towards those of competitors. The normal markup was determined by tradition -- it adjusted very slowly towards the actual markup on the goods sold. Cyert and March found that when these rules for pricing were tested with actual store data, the model reproduced the pricing decisions of the floor managers quite well.

Thus the inputs to a simulation model are assumptions about the physical structure of the system and the procedure people use to make decisions. The state of the system determines the nature and quality of the information available to decision makers. The model plays the role of the decision makers, using the available information to mimic their decisions. The decisions made then feed back and alter the state of the system, giving rise to new information and new decisions.

Simulation models are "what if" tools. They are descriptive models. The purpose of a simulation model is not to tell a policymaker what should be done, but what would happen in a given situation. Often such "what if" information is more important than knowledge of the optimal decision. For example, during the 1978 debate over natural gas deregulation, President Carter's original proposal was modified dozens of times before a final compromise was passed. During the congressional debate, the Department of Energy used a simulation model to evaluate each version of the bill.[10] The model did not indicate what ought to be done to maximize the economic benefits of natural gas to the nation. Congress had its own ideas on that score. But by providing an assessment of how each proposal would affect gas prices, supplies, and demands, the model generated useful ammunition for the administration in lobbying for its proposals.

Limitations of simulation. Like any model, a simulation model is only as good as its assumptions. Naturally, a good simulation model should have an adequate representation of the the physical system it represents. In general, simulation models are quite flexible and can portray the physical environment with detail and accuracy sufficient for their purposes. Unlike optimization, simulation models can easily incorporate feedback effects, nonlinearity, and dynamics. The structure of simulation models is not rigidly determined by mathematical limitations as those of optimization models often are. Indeed, one of the main uses of simulation is to identify how nonlinearities, physical delays, and the limited information available to decision makers interact to produce the troubling dynamics that have persistently resisted solution.

Accuracy of the decision rules. A potential trouble spot is the accuracy of the decision rules portrayed in simulation models. Simulation models must represent human decision making as it is, even if it is not optimal. The decision making heuristics and strategies people use, including their limitations and errors, must be modeled. Only if a model mimics the response of decision makers to changing circumstances will it respond to policy interventions in the same way the real actors would. In principle there is no limitation on the accuracy of the decision rules portrayed in models. In practice, discovering those rules is often difficult. Decision making rules cannot be determined from aggregate statistical data, but must be investigated first hand. Primary data on the behavior of the actors can be acquired through observation of decision making in the field, that is, in the boardroom, on the factory floor, along the salesperson's route, in the household. The modeler must discover what information is available to each actor, examine its timeliness and accuracy, and infer how that information is processed to yield a decision. The skills of the anthropologist and ethnographer are often needed. Fortunately, psychologists, behavioral scientists, sociologists, and other social scientists have developed an extensive body of primary data which describes how decision making is done. The best simulation modeling draws on a wide variety of disciplines as well as first hand observation of the system to elicit the decision rules of the people in the system.

Soft variables. Because simulation models must portray decision making as it is, they must often include variables which are difficult to quantify. It is frequently necessary to represent intangibles such as product quality, optimism, reputation, expectations, desires, and so on. Again, there is no limitation in principle to the inclusion of such soft variables, and many simulation models do. Unfortunately, some modelers limit the factors they include to those variables that are measurable, and often measurable by numerical data. This practice is sometimes defended as more scientific than "making up" the values of parameters and relationships for which no numerical data are available. Without numerical data, how can statistical tests be performed? How can parameter values be estimated?

The overwhelming majority of all data are descriptive and qualitative. And the majority of these data have never been written down. Yet they are crucial for understanding and modeling complex systems. Imagine trying to operate a school, factory, or economy solely on the basis of the available numerical information. Without the descriptive knowledge of operating procedures, political subtleties, organizational structure, and so on, the result would be chaos. To leave out of a model a relationship known to be important but for which no numerical data are available is just as much an unscientific value judgment as using judgment to estimate the relationship. Ignoring the relationship implies it has a value of zero -- probably the only value known to be wrong![11]

Model boundary. A great strength of simulation models is the ability to capture the important feedback relationships that shape the behavior of the system and govern its response to policies. In practice, however, many models ignore factors outside the expertise of the modelbuilders or the mandate of the sponsoring organization.

The consequences of omitting feedback are often serious. For example, many energy models assume the economy is unaffected by the price of energy. The PIES model (Project Independence Evaluation System), used in the 1970s by the Federal Energy Administration, and later by the Department of Energy, provides a typical example. The PIES model assumed that economic growth, the costs of unconventional fuels, interest rates, inflation and world oil prices were all unaffected by

domestic energy prices, production, or policies. A full embargo of imported oil or doubling of oil price would have no impact on the economy, according to the model. Yet the FEA described the model's purpose the following way:

> *[Energy] strategies are evaluated in terms of their impact on:*
>
> * *Development of alternative energy sources;*
> * *Vulnerability to import disruptions;*
> * *Economic growth, inflation, and unemployment;*
> * *Environmental effects; and*
> * *Regional and social impacts*[12]

By treating the economy exogenously, the PIES model was inherently contradictory. The model showed that the investment needs of the energy sector would rise substantially as depletion raised the development costs of new sources of oil and as synthetic fuels were developed. But at the same time, the model assumed that the higher investment needs of the energy sector could be satisfied without reducing investment or consumption in the rest of the economy and without raising interest rates or inflation. In effect, the model let the economy have its pie and eat it too. In part because it ignored the feedbacks between the energy sector and the rest of the economy, the PIES model consistently proved to be overoptimistic. In 1974 the PIES model projected that by 1985 the U.S. would be well on the way to energy independence. Energy imports would be only 3.3 million barrels per day, production of the shale oil would be 250,000 barrels per day, all at an oil price of about $22 per barrel (1984 dollars) and with vigorous economic growth. In reality oil imports are about 5.5 million barrels per day. A shale oil industry remains a dream. All this despite huge reductions in oil demand caused by oil prices that have exceeded $30 per barrel and the most serious recession since the Great Depression (see the appendix in Stobaugh and Yergin 1979 for a good discussion of the limitations of the PIES and other energy models).

Narrow model boundaries are not limited to energy analysis. The *Global 2000 Report* showed that most of the models used by government agencies rely significantly on exogenous variables. Population models assumed food production was exogenous. Agriculture models assumed that energy prices and other input prices were exogenous. Energy models assumed

that economic growth and environmental conditions were exogenous. Economic models assumed that population and energy prices were exogenous. And so on. Because important intersectoral feedbacks were ignored, the models produced inconsistent results.

A broad model boundary that includes important feedback effects is more important in a model than a great amount of detail in the specification of individual components. It is worth noting that the PIES model provided breakdowns of energy supply, demand, and price for dozens of fuels, each for different regions of the country. Yet its projections for 1985 aren't even close. One can legitimately ask what purpose was served by the effort devoted to forecasting the price of jet fuel or naphtha in the Pacific Northwest when the basic assumptions were so palpably inadequate and the main results so woefully erroneous. (In fairness, the PIES model is not unique in the magnitude of its errors. Nearly all energy models, of all types, have consistently been wrong about energy production, consumption, and prices. The evidence shows clearly that energy forecasts actually lag behind the available information, reflecting the past rather than anticipating the future.[13])

Econometrics

Strictly speaking, econometrics is a simulation technique. But it deserves separate discussion for two reasons. First, econometrics evolved out of economics and statistics, while most other simulation techniques emerged from engineering or operations research. The difference in pedigree leads to large differences in purpose and practice. Second, econometrics is one of the most widely used formal modeling techniques. Pioneered by Nobel Prize-winning economists Jan Tinbergen and Lawrence Klein, econometrics is taught in nearly all business and economics programs, and ready-to-use statistical routines for econometric modeling are now available for many personal computers. Econometric forecasts are regularly reported in the nation's media.

Econometrics is literally the measurement of economic relations, and originally involved statistical analysis of economic data. As commonly practiced today, econometric modeling consists of three stages. These are **specification, estimation, and forecasting.** In the first step, the structure of the model is specified. Structure means the set of relations

between variables, both those that characterize the physical setting and those that describe behavior. For example, an econometric model will typically contain accounting relations that specify how GNP is determined by consumption, investment, government activity, and international trade. It also will include behavioral equations that describe how these quantities are determined. The Phillips curve is an example of such a behavioral relation. If the model contains a Phillips curve, one of the equations will specify that the rate of inflation depends on the amount of unemployment. Presumably the modeler expects that high unemployment reduces inflation and vice-versa. An econometric model will typically consist of a set of such equations, with many inter-relationships between the variables. For example, another equation may relate unemployment to the demand for goods, the wage level, worker productivity, etc. Still other equations may explain these in terms of other factors. A large econometric model may have hundreds or even thousands of equations.

Not surprisingly, econometrics draws on economic theory to guide the specification of models. The validity of the models thus often depends on the validity of the underlying economic theory. Though there are many flavors of economic theory, a small number of basic assumptions about human behavior are common to most (especially modern neoclassical theory and the "rational expectations" school). These include:

Optimization. People (economic agents, in the jargon) are assumed to be concerned with just one thing: maximizing their profits. Consumers are assumed to maximize the "utility" they derive from their resources. Decisions about how much to produce, what goods to purchase, whether to save or borrow, are the result of optimization by individual decision makers. "Non-economic" considerations (defined as any behavior which diverges from profit or utility maximization) are ignored or treated as local aberrations and special cases.

Perfect information. To optimize, economic agents need accurate information about the world. The information needed goes beyond the current state of affairs. Also needed is complete knowledge of the available options and their consequences. For example, to determine the optimal mix of labor, machines, energy, and other inputs to the production process, a

firm must know not only the wages of workers and the prices of machines and other inputs, but also how much could be produced with different combinations of people and machines, even if those combinations have never been tried. Such knowledge is assumed to be freely and accurately known in most economic models. Many go further, assuming people know not only the current situation, but future prices, technologies, and possibilities as well, including the ability to perfectly anticipate the consequences of their own actions and those of competitors.

Equilibrium. The pioneers of mathematical economics were primarily concerned with the net result of optimization by individuals and firms. The net result defines the equilibrium of the money or economy. The crucial questions of theory involved the nature of the equilibrium state for different situations. Given people's preferences and the technological possibilities for producing goods, at what prices will commodities be traded, and in what quantities? What will wages be? What will profits be? How will a tax or monopoly power influence the equilibrium? These questions proved difficult enough without tackling the more difficult problem of dynamics. Indeed, dynamic theory, including the recurrent fluctuations of the business cycle, of the growth and decline of industries and nations, of inflation, remained primarily descriptive and qualitative long after equilibrium theory was completely mathematized. Consequently, dynamic behavior in economics tends to be seen as a transition from one equilibrium to another. The transition is usually assumed to be stable.

The rich heritage of static theory in economics left a legacy of equilibrium for econometrics. Many econometric models assume markets are in equilibrium at all times. When adjustment dynamics are modeled, variables are usually assumed to adjust in a smooth and stable manner towards the optimal, equilibrium value. The lags are nearly always fixed in length. For example, most macroeconometric models assume the capital stocks of firms in the economy adjust to the optimal, profit maximizing level with a fixed lag of several years. The lag is the same whether the industries that supply investment goods have the capacity to meet the demand or not. Yet clearly, when the supplying industries have excess capacity, orders can be filled rapidly. When capacity is strained, customers must wait in line for delivery. Analysis shows that there are significant differences between

a model that assumes a fixed investment lag regardless of the physical capability of the economy to fill the demand and one that explicitly models the determinants of the investment delay. In general, models that explicitly portray delays and their determinants will yield different results from models that simply assume smooth adjustments from one optimal state to another.

Economists acknowledge the idealization and abstraction of their assumptions about human behavior, information, and equilibrium, but point to the helpful results that have been derived from them. However, a growing number of prominent economists argue that these assumptions are not only abstract but false. In his Presidential address to the Royal Economics Society, E. H. Phelps-Brown said

> *The trouble here is not that the behaviour of these economic chessmen has been simplified, for simplification seems to be part of all understanding. The trouble is that the behaviour posited is not known to be what obtains in the actual economy.*[14]

Nicholas Kaldor of Cambridge University is even more blunt.

> *...in my view, the prevailing theory of value -- what I called, in a shorthand way, "equilibrium economics" -- is barren and irrelevant as an apparatus of thought....*[15]

As mentioned earlier, a vast body of empirical research in psychology and organizational studies has shown that people do not optimize or act as if they optimize, that they don't have the mental capabilities to optimize their decisions, that even if they had the computational powers necessary they lack the information needed to optimize. Instead, they try to satisfy a variety of personal and organizational goals, use standard operating procedures to routinize decision making, and ignore much of the available information to reduce the complexity of the problems they face. Herbert Simon, in his acceptance speech for the 1978 Nobel Prize in economics, concludes

> *There can no longer be any doubt that the micro assumptions of the theory -- the assumptions of perfect rationality -- are contrary to fact. It is not a question of approximation; they do not even remotely describe the processes that human*

beings use for making decisions in complex situations.[16]

The second stage in econometric modeling is statistical estimation of the parameters of the model. The parameters determine the precise strengths of the relationships specified in the model structure. In the case of the Phillips curve, for example, having assumed in advance that unemployment affects inflation, the modeler would then use the past data on inflation and unemployment to estimate precisely how strong that relationship has been. Sophisticated statistical routines are used to estimate the parameters of the model. In essence, these routines, known generally as regression, are simply fancy curve-fitting techniques. They use the historical data to find the parameter values that best match the data itself, for example, matching the inflation rate in terms of the unemployment rate.

The use of statistical procedures to derive the parameters of the model is the hallmark of econometrics, and distinguishes it from other forms of simulation. All modeling methods must specify the structure of the system and estimate parameters. But the focus in econometrics on statistical parameter estimation to the exlusion of other techniques imposes a strong discipline on the modelbuilding. It gives econometricians an insatiable appetite for numerical data, for without numerical data the statistical procedures used to estimate the models are useless. It is no accident that the rise of econometrics went hand in hand with the quantification of economic life. For example, the development of the national income and product accounts by Simon Kuznets in the 1930s was a major advance in the codification of economic data, for the first time permitting consistent measures of economic activity at the national level. To this day all major macroeconometric models rely on the national accounts data, and indeed, macroeconomic theory itself has adapted to the national accounts framework.

It is obvious that policy evaluation and foresight depend on an accurate knowledge of the state of the world and of its history. Econometrics has been a valuable stimulus to the development of much-needed data gathering and measurement by government and private companies alike. But at the same time, the relentless focus on numerical data blinds econometric modelers to less tangible but no less important factors. Econometric models portray the behavior of

people. But aggregate statistical data measure only the result of the decisions made, not how or why those decisions were made. Statistical data do not reveal the nature and quality of the information people used to make decisions, and therefore models based on such data cannot be used to indicate how changes in that information would alter future decisions.

Reliance on statistical procedures to estimate the parameters forces econometricians to exclude from their models variables for which no numerical data exist such as soft variables and unobservable concepts like desires, goals, perceptions, and so on. Potentially observable quantities that haven't been measured must also be ignored or handled with proxy variables for which data do exist. For example, the literacy of a population may be proxied by education expenditures per capita, though the connection between the two may be tenuous.

Another problem is the failure of econometric techniques to distinguish between causal relationships and correlations. Simulation models must portray the causal relationships in the system if they are to mimic its behavior, especially in new situations or in response to new policies. But the statistical techniques used to estimate parameters in econometric models only reveal the degree of past correlation between the variables. Statistical techniques can never tell the modeler whether a relationship is causal. The problem in using correlations is that the correlations may change or shift as the system evolves. Consider the Phillips curve as an example. The Phillips curve stopped working sometime in the early 1970s. Inflation rose at the same time unemployment got worse. Many economists argued that structural change had occurred. By structural change they meant that the underlying causal structure of the system had changed. In fact, the Phillips curve was never a structural relationship at all -- it never represented the causal forces that determine inflation or wage increases. Rather, the Phillips curve was nothing more than a way of restating the past behavior of the system. In the past, the curve said, low unemployment had tended to occur at the same time inflation was high, and vice-versa. Naturally, when the inflation of the 1970s took prices to levels unprecedented in the industrial era, the historical correlation broke down. The behavior of the system had changed. But the underlying structure of causal relationships need not have changed. As inflation worsened, causal

relationships that had been present all along but which were unimportant in an era of low inflation suddenly became active determinants of behavior. Because econometric models rely on historical correlations, an appeal to "structural change" usually means the inadequate structure of the model was altered because it failed to anticipate the behavior of the system.

A related problem caused by the reliance on statistical estimation arises from the limited range of historical data usually available. Aggregate statistical data do not provide a guide to behavior outside the historical range of experience or under a different set of policies or incentives. Historical relationships are assumed to remain valid in the future. Consequently, many econometric models are not robust -- changes in policies or conditions that carry the system outside the range of historical data often cause the models to break down. To illustrate, in 1979 the DRI model was used to test policies to eliminate oil imports. The model assumed that the response of oil demand to the price of oil was rather weak -- a ten percent increase in oil price caused a reduction of oil demand of only two percent, even in the long run. To reduce oil consumption by 50 percent (enough to cut imports to zero at the time), the model indicated that oil had to rise to $800 per barrel. Yet at that price, the annual oil bill for the remaining 50% would have exceeded the total GNP for that year.[17] Today, with the benefit of hindsight, economists agree that oil demand is much more responsive to price than was earlier believed. But considering the behavior of the model in extreme conditions could have revealed the inconsistency of the original assumptions much earlier.

The validation of econometric models is also strongly influenced by the reliance on numerical data. Because the micro-level data that describe how decisions are made are commonly ignored in econometrics, the criterion for the goodness of an equation or model becomes the degree to which it fits the data. (The model's predictive accuracy is also a criterion, but this is never known in advance -- at best one knows how well a model predicted in the past.) The statistical routines used to estimate parameters indicate the degree of fit between the estimated and actual variables, and tell the modeler if the relationship between the variables is statistically significant. When a relationship fails to be significant, the modeler may try another specification

for the equation, hoping for a better statistical fit. Without recourse to the descriptive, micro-level data, the resulting equations may be ad hoc and bear only slight resemblance to either economic theory or actual behavior. Alternatively, the discrepancy between the model and data may be explained by faulty data, exogenous influences, or other factors. The Phillips curve again provides an example. When the Phillips curve broke down, numerous revisions of the equations used to predict inflation were made, with limited success. Some analysts pointed to the oil price shock, Russian what deal, or other one-of-a-kind events as the explanation for the change. Still others argued that there had been structural change which caused the Phillips curve to shift out to higher levels of unemployment for any given inflation rate. Others argued that the Phillips "curve" was really a vertical line -- that in the long run, the rate of inflation was solely dependent on monetary policy and had no relationship to unemployment at all.

Econometrics texts teach that the statistical significance of an equation is an indicator of the correctness of the relationship.[18] But this is a mistaken view. Statistical significance does not mean a relationship is a correct or true characterization of the way the world works, but simply indicates how well the equation fits the observed data. A statistically significant relationship indicates the variables in the equation are highly correlated -- and that the apparent correlation is not likely to have been the result of mere chance. But it does not indicate that the relationship is causally correct or even that it is causal at all. While the criterion of statistical significance as a yardstick for judging models seems plausible, failure to find a statistically significant relationship may simply indicate that there aren't enough data, or that the data don't contain enough information to allow the statistical procedures to discriminate between competing hypotheses. Or there may be statistical limitations. The regression procedures used to estimate parameters only yield unbiased estimates under certain conditions. These conditions are known as maintained hypotheses because they are assumptions which must be made in order to use the statistical technique. The maintained hypotheses can never be verified, even in principle, but must be taken as a matter of faith. In the most common regression technique, ordinary least squares, the maintained hypotheses include the assumptions that the variables

are all measured perfectly, that the model being estimated corresponds perfectly to the real world, and that the random errors in the variables from one time period to another are completely independent.

Validation in the sense of establishing the truth of a model is not possible. All models are simplifications of reality and therefore literally false. The question is whether a model is useful; whether one should place confidence in its results; whether it provides a better guide to reality than other available models, including mental models. Validation is not a one-time activity which vaccinates a model against error. The process of building confidence in a model is continuous. Beware of models which present statistical tests and claim these tests "validate" the model. Many tests are required. Statistics may or may not be relevant.

The restrictive assumptions and mixed results of econometrics have generated serious criticism from within the economics profession. Phelps-Brown notes that because controlled experiments are generally impossible in economics, "running regressions between time series is only likely to deceive."[19] Lester Thurow notes that econometrics has failed as a method for testing theories and is now used primarily as "a showcase for exhibiting theories." But as a device for advocacy, econometrics imposes few constraints on the prejudices of the modeler. Thurow concludes

> *By simple random search, the analyst looks for the set of...variables and functional forms that give the "best" equations. In this context the "best" equation is going to depend heavily upon the prior beliefs of the analyst. If the analyst believes that interest rates do not affect the velocity of money, he finds a "best" equation that validates his particular prior belief. If the analyst believes that interest rates do affect the velocity of money, he finds a "best" equation that validates this prior belief.*[20]

But the harshest assessment of all comes from Nobel laureate Wassily Leontief:

> *Year after year economic theorists continue to produce scores of mathematical models and to explore in great detail their formal properties; and the econometricians fit algebraic functions of all possible shapes to essentially the same sets*

> *of data without being able to advance, in any perceptible way, a systematic understanding of the structure and the operations of a real economic system.*[21]

But surely such theoretical problems matter little if the econometric models provide accurate predictions. Unfortunately, econometrics fails on this score as well. The predictive power of econometric models, even over the short term (one to four years) is poor and virtually indistinguishable from that of other forecasting methods. There are several reasons for the failure to predict accurately.

To forecast, the modeler must provide estimates of the future values of the exogenous variables, that is, those variables which influence the other variables in the model but which are not in turn influenced by the model. An econometric model may have dozens of exogenous variables. Each must be forecast before the model can be used to predict. The source of the forecasts for these variables may be other models, but is usually the intuition and judgment of the modeler. Ensuring consistency, much less correct forecasts for the exogenous variables, is difficult.

Often the forecasts produced by the models don't square with the modeler's intuition. Many modelers, including those at the "big three" econometric forecasting firms, Data Resources, Inc., Chase Econometrics, and Wharton Econometric Forecasting Associates, routinely adjust their forecasts whenever they feel the model output is wrong. This fudging, or "add-factoring," as they call it, is extensive: the late Otto Eckstein of Data Resources admitted that their forecasts were "60% model and 40% judgment" (*Wall Street Journal*, 17 February 1983). "There is no way of telling where the Wharton model leaves off and [model developer] Larry Klein takes over" according to another economist (*Business Week*, 30 March 1981). Worse, the adjustments are often colored by the personalities of the modelers:

> *Mr. Eckstein concedes that sometimes his forecasts reflect an optimistic view. Data Resources ..."is the most influential forecasting firm in the country," he declares. "If it were in the hands of a doom-and-gloomer, it would be bad for the country."* (Wall Street Journal, *17 February 1983)*

Add-factoring has been attacked by other economists as unscientific. The mental models used to add-factor, though they are the mental models of seasoned experts, are subject to the same cognitive limitations other people face. And whether good or bad, the assumptions behind add-factoring are unexaminable.

In a shocking experiment, the Joint Economic Committee of Congress (through the politically neutral General Accounting Office) asked the three leading econometric forecasting firms (DRI, Chase, and Wharton) to make a series of simulations with their models. One set of forecasts was "managed" or add-factored by the forecasters at each firm. The other set consisted of pure forecasts, made by the GAO, to examine the untainted results of the models. The models were run under different assumptions about monetary policy. As an illustration of the inconsistencies revealed by the experiment, consider the following. When the money supply was assumed to be fixed, the DRI model forecast that after ten years, the interest rate would be 34 percent, a result totally contrary to both economic theory and historical experience. The forecast was then add-factored down to a more reasonable seven percent. The other models fared little better, revealing both the inability of the pure models to yield meaningful results and the extensive ad hoc adjustments made by the forecasters to render the results palatable.[22]

The failures of econometric models have not gone unnoticed. A representative sampling of recent articles in the business press on economics and forecasting includes the following headlines:

"1980: The year the forecasters really blew it"
(*Business Week*, 14 July 1980);

"Where the big econometric models go wrong"
(*Business Week*, 30 March 1981);

"More or less oil will go up or down or maybe it won't: Energy experts are gun-shy after forecasts haven't turned out well"
(*Wall Street Journal*, 5 May 1982);

"Where have all the answers gone? Economists seem bankrupt just when their ideas are needed most"
(*Time*, 17 January 1983);

"Economists, too, find themselves in disarray" (*US News & World Report*, 7 February 1983);

"Forecasters overhaul models of economy in wake of 1982 errors" (*Wall Street Journal*, 17 February 1983);

"Economists missing the mark: more tools, bigger errors" *The New York Times*, 12 December 1984).

The result of these failures has been to erode the credibility of all computer models no matter what their purpose, not just econometric models designed for prediction. This is unfortunate, for foresight does not depend on the ability to predict the future. In fact, there is substantial agreement among modelers of global problems that exact, point prediction of the future is neither possible nor necessary.

> *...at present we are far from being above to predict social-system behavior, except perhaps for carefully selected systems in the very short term. Effort spent on attempts at precise prediction is almost surely wasted, and results that purport to be such predictions are certainly misleading. On the other hand, much can be learned from models in the form of broad, qualitative conditional understanding -- and this kind of understanding is useful (and typically the only basis) for policy formulation.... If your doctor tells you that you will have a heart attack if you do not stop smoking, this advice is helpful, even if it does not tell you exactly when a heart attack will occur or how bad it will be.*[23]

When to use econometrics. Econometric models do not seem to be well suited to the types of problems of concern in the foresight process. The prime purpose of econometric models is short-term prediction of the exact future state of the economy. Most of the attributes of econometrics have evolved in response to this need, including the reliance on regression techniques to pick the "best" parameters from the available numerical data, the extensive reliance on exogenous variables, and add-factoring. Though in practice, econometric models do not predict very well, they are about as good as anything else for that purpose.

Though econometric models purport to simulate human behavior, they in fact rely on unrealistic assumptions about the motivations of real people and the information available to make decisions. Though they must represent the physical world, they commonly ignore dynamic processes, disequilibrium, and the physical basis for delays between actions and results. Though they may incorporate hundreds of variables, they ignore soft variables and unmeasured quantities. Foresight is most often concerned with longer time horizons than are common in econometrics. The feedback relationships between environmental, social, and demographic factors are usually as important as economic influences. Often the numerical data needed to model these effects are not available. The need to consider the long term means the system is likely to leave the historical region of behavior, making historical correlations an unreliable basis for analysis.

Systems Dynamics

Systems dynamics as a type of simulation modeling has become so well known, particularly because of its use in global projections, that it would perhaps be in order to sketch out its characteristics in a few words, by way of contrast with the econometric models discussed above.

Systems dynamics is a widely used simulation technique that emphasizes the feedback loop structures of highly complex systems. Systems dynamics models are typically highly nonlinear, emphasizing disequilibrium, delays, and bounded rationality in decision making. Systems dynamics was created by J. W. Forrester (1961) and has been used to study a wide variety of systems. It has been heavily criticized and analyzed elsewhere.[8]

Checklist for the Model Consumer

The preceding discussion has focused on the limitations of various modeling approaches in order to provide potential model consumers with a sense of what to look out for when choosing a model. Despite the limitations of the various modeling techniques, there is no doubt that computer models can be and have been extremely useful foresight tools. Well built models offer significant advantages over the often faulty mental models currently in use.

To further assist the model consumer, the following checklist presents key questions a model user should ask to help evaluate the appropriateness of a model for a particular purpose.

* What is the purpose of the study? What problem does the model address?

* What is the boundary of the model? What factors are endogenous? Exogenous? Excluded? Are soft variables included? Are feedback effects properly taken into account? Does the model capture possible side effects, both harmful and beneficial?

* What is the time horizon relevant to the problem? Does the model include as endogenous components factors that may change significantly over the time horizon?

* Are people assumed to act rationally and to optimize their performance? Does the model take non-economic behavior into account (organizational realities, non-economic motives, political factors, cognitive limitations)?

* Does the model assume people have perfect information about the future and about the way the system works, or does it take into account the limitations, delays, and errors in acquiring information that plague decision makers in the real world?

* Are appropriate time delays, constraints, and possible bottlenecks taken into account?

* Is the model robust in the face of extreme variations in input assumptions?

* Are the policy recommendations derived from the model sensitive to plausible variations in its assumptions?

* Are the results of the model reproducible? Or are they adjusted ("add-factored") by the model builder?

* Is the model documented, and is the documentation publicly available?

* Is the model being operated by its designers and builders or by third parties?

* How much does a set of "runs" cost? Does the budget permit adequate sensitivity testing?

* How long does it take to revise and update the model to reflect new information and new understandings of the system? Can the model operator revise it in a timely fashion?

Conclusions

The arguments above have crucial implications for the design of governmental foresight capabilities. Foresight requires the intelligent use of different models designed for specific purposes, not a single, comprehensive model of the world. Foresight is not a well-intentioned way to back into an Orwellian world of centralized control. To repeat a dictum offered above, "Beware the analyst who proposes to model an entire social or economic system rather than a problem" It is simply not possible to build a single, integrated model of the world, into which mathematical inputs can be inserted and out of which will flow a coherent and useful understanding of world trends. To be used responsibly, models must be subjected to review and debate. To foster that process, a cross-disciplinary approach is needed. Models designed by experts in different fields and for different purposes must be compared, contrasted, and criticized. The governmental foresight process should foster such review.

The history of global modeling provides a good example of such a process. The initial global modeling efforts, published in *World Dynamics* (Forrester 1971) and *The Limits to Growth* provoked a storm of controversy. A number of critiques appeared, and soon after, other global models were developed. Over ten years, the International Institute for Applied Systems Analysis (IIASA), near Vienna, conducted a program of analysis and critical review designed to bring the modelers together. Six major symposia were held. Eight major global models were examined and discussed. The models had different purposes, used a range of modeling techniques, and were built by persons with widely varying backgrounds. There remain large areas of methodological and substantive disagreement. Yet despite the enormous differences in perspective,

consensus has emerged on a number of crucial issues. These include:

1. The physical and technical resources exist to satisfy the basic needs of all the world's people into the foreseeable future.

2. Population and material growth cannot continue forever on a finite planet.

3. Continuing "business as usual" policies in the next decades will **not** result in a desirable future, or even the satisfaction of basic human needs.

4. Technical solutions alone are not sufficient to satisfy basic needs or create a desirable future. (Paraphrased from *Groping in the Dark*. See footnote 4, Chapter VII.)

The IIASA program on global modeling represents the most comprehensive effort to date to use computer models as a way to bootstrap human understanding. It has created agreement on crucial issues where none existed. It has guided research and sped progress. It offers a model for the effective conduct of governmental foresight.

The primary function of modelbuilding should be educational rather than predictive. No one should make decisions on the basis of a computer model whose results are simply presented, take 'em or leave 'em.

Towards that end, the role of modeling should be redefined as a **process** rather than as a technology for producing an answer. The common mode of computer-based analysis, in which a study is commissioned by a client who then waits for the final report, largely ignorant of the methods, assumptions, and biases that go into the conclusions, virtually guarantees failure. Such a procedure places the policymaker in the role of a supplicant before the oracle, awaiting the prophecy. Like King Croesus before the Oracle at Delphi, there is a nearly overwhelming temptation for policymakers to interpret such pronouncements in accordance with their preconceptions, or easier still, to simply ignore unfavorable results.

Worse, the model-as-oracle attitude so prevalent today rightfully alarms many who see blind acceptance (or rejection) of models as an abdication to the

computer of the responsibility for judgments that should be human.[24] Models should not be used as a substitute for critical thought, but as a tool for improving judgment and intuition.

But for all the pitfalls of formal modelbuilding, it must be remembered that the alternative is continued reliance on the mental models that have failed to resolve the pressing problems with which foresight is concerned. While far from perfect, the computer model is often superior to the alternative mental models currently in use.

Indeed much of the value of formal models derives from the difference between the results of the formal model and those of the mental model. By exploring the reasons for the differences between the results of the mental and formal models, both can be improved. Improving the mental models upon which decisions are ultimately based is the proper goal of computer modeling. The success of such a dialectic, however, depends on the ability to understand the assumptions of the computer model. If systematic foresight is to contribute to the national policy, it must foster that dialectic and stimulate education, aided by the computer, but ultimately relying on informed human judgment, not computer printouts.

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FOOTNOTES

1. See, for instance, Martha E. Williams, "Electronic Databases," *Science*, 26 April 1985, pp. 445-456.

2. (a) The World Growth Policy Group, a group sponsored by organizations and individuals in the Research Triangle, NC, has held a series of seminars addressing these relationships. The seminars are reported in monographs issued as Occasional Papers by the Center for International Studies, Duke University, 2122 Campus Drive, Durham NC 27706. The papers are edited by Gerald R. Stairs. See especially *Global Modeling and Discontinuous Change* (1984) and *Foresight Planning: Realities and Resiliency at the Policy Interface* (1986).

   (b) *A Guide to Models in Government Planning and Operations*, Environmental Protection Agency (Office of Research and Development), Washington, August 1974. Chapters 1 and 2 on decision models and policy making are particularly valuable concerning the modeler/decision maker relationship.

   (c) I refer the reader to the following works for fuller discussions of the strengths and weaknesses of computer models:
   J. S. Armstrong, *Long Range Forecasting from Crystal Ball to Computer*. New York: John Wiley & Sons, 1985.

   W. Ascher and W. Overholt, *Strategic Planning and Forecasting: Political Risk and Economic Opportunity*. New York: John Wiley & Sons, 1983.

   W. Ascher, *Forecasting: An Appraisal for Policy Makers and Planners*. Baltimore: Johns Hopkins University Press, 1978.

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Part Three

What More Is Needed?

There is an old country proverb: "If it ain't broke, don't fix it." As it presently functions, the United States Government's system very evidently falls short of what the foresight proponent would suggest. But can one point to ways in which the system, as it now functions, fails to deal adequately with the problems it faces? And are there practical ways to improve it?

I will attempt to show that the system is indeed "broke" -- that the narrowness of our present decision processes has gotten the country into serious trouble already and threatens to get it into more trouble if the processes are not broadened to address lateral and long term implications of current and proposed policies.

Following that, I will undertake to describe and evaluate current proposals for change, to identify the obstacles to change with which any proponent of change must wrestle, and finally to propose a foresight machinery that would meet the requirements that have been described.

IX.

Why More Foresight?

If your only tool is a hammer, every problem is a nail.

Let me revert in this chapter to the dichotomy between single track thinking and foresight. The former assumes that problems have identifiable causes--usually single causes--that issues can be treated in isolation, and that objectives, to be achieved, must be pursued singlemindedly. As a guide to action, it offers clarity and simplicity at the expense of subtlety.

Foresight is the effort to give substance and formal structure to the ecologists' insight that "everything is connected."

Single track thinking is as American as apple pie. It can achieve remarkable things such as moon landings. Foresight, on the other hand, would remind us of multiple causations and multiple consequences. The single track or linear thinker may underestimate a problem because he fails to understand all its roots. Moreover, government must pursue an extraordinarily complex set of goals, and the single-minded pursuit of one may imperil the pursuit of others. Finally, and perhaps most important, the linear thinker looks within the armory of his own expertise for the solutions to his problems. Just as the roots of the problem may lie outside his range of experience, so may the best solutions.

War is the ultimate example of linear thinking. It is hardly novel to observe that wars have regularly failed to achieve the purposes intended by those who started them, and instead have set consequences in motion that the initiators did not foresee and would not have wanted.

Individuals who come to power usually have strong wills and strong commitments to their agendas, which predispose them to linear thinking. For President Johnson, the issue became the Vietnam War to the detriment of his earlier program, the Great Society. For President Reagan, it is less government and lower taxes, a program he has yet to reconcile with his view of defense requirements or with other politicians' views of the importance of social programs. The price for achieving his goal, so far, has been a trillion dollars of new deficit and the conversion of the United States from the world's largest international creditor to its principal debtor, and one wonders whether anybody is sketching out to him the potential implications if foreigners should stop underwriting the annual U.S. budgetary deficit.

The long term is put aside, and the consultative process is abbreviated, in direct proportion to the urgency of immediate decisions that must be made.

The process, almost by definition, means that the long view is excluded precisely when it is most dangerous to exclude it. Urgency is generally generated by crisis, and crisis results from increasing difficulties in doing something one wants to do. The tendency to try to jam something through is most intense at just the time when policymakers should be backing off for a broader view of the issue and its context. Anybody who watched or participated in the decision process on Vietnam will understand this generalization.

The Chinese conqueror at the start of this book had reached the top by a linear process of subordinating everything else to the conquest of China, but he recognized that thenceforth he would do well to temper his administration with the best advice he could get -- and his dynasty lasted for over 400 years. Other kings have not always been so wise, and there are adages about what happens to messengers who tell rulers things they do not want to hear. This is a sobering thought for a foresight advocate, but let us proceed.

The Costs of Demographic Illiteracy

I will leave it to others to undertake a survey of errors into which the United States has been led by the narrowness of its decision processes.[1] For the present purposes let me take one issue -- demography,

the most slighted of the great variables that shape our lives -- and suggest how it is connected with several other great issues and how we are paying for our inattention to it.

I will move in rough order from world to domestic issues, from the past to the present, and I will try to show the connections among them. The descriptions will necessarily be brief to avoid writing a book within this book.

The third world. Let me start with that first example from Chapter I: the assault on third world mortality rates without considering the demographic consequences. The United States, because of its dominant post-World War II position, was a leader in that decision -- or rather in that decision void -- but others went along gladly. It seems eminently reasonable to want people to be healthier and children to live to maturity. Since it was a public health problem, it was approached from the standpoint of the public health officer, and there was no foresight machinery to enlist the demographers who might have asked "What if fertility doesn't fall...?"

The consequences are not just still with us; they are still at their beginnings. The explosion of population eroded the prospects for **development.** I will leave the reader with the World Bank's 1984 Annual Report to learn the statistics on the inverse correlation between population growth and per capita income in the third world.[2] For one small, vivid example, however, let me cite the Sahel.

Food production per capita in Africa has been decreasing for years. For over a decade there have been increasingly serious famine stories out of Africa, culminating in 1984-1985 in the most serious situation yet.

The current official U.S. view, expressed at Mexico City (see footnotes at Chapter II) is that, if poor countries suffer, it is because they practice statism rather than embracing private enterprise and enjoying the efficiencies. It would be hard to argue against productivity, or to urge that Africa has maximized its opportunities. But for a wandering herdsman, the issue is not statism vs. private enterprise; it is children to feed. One study in 1983 concluded that, before the Sahelian drought of the early 1970s, there were 4.5 livestock units per person.

The count dropped to 2.8 just after the drought. Total herd size has returned to the 1970 level, but there are now only 3.5 units per person, because population has been increasing 2.5 per cent per year.[3] Less milk for each child.

When agricultural populations grow -- if they don't have the technology and the capital to change their practices -- they accommodate their expanded numbers by over-grazing the land. Or they expand acreage. Onto typhoon-vulnerable coastal sandbars; into fragile semi-desert; onto hillsides. Slash-and-burn farmers shorten their cycle, and the tropical forests cannot recuperate.

It is a vicious circle, because at this point they do not have the money or the margin above starvation to experiment with better technologies.

Population growth is thus central to the problem of **desertification**, and here is another vicious spiral: population growth generates a problem that reduces the resources to support the population growth.

The U. N. Conference on Desertification of 1977 was spurred by the Sahel drought. The United States was a major participant. The Conference came up with a "plan of action" including many technical recommendations but nothing about population.

Similar engines drive the problem of **tropical deforestation**, and it has somewhat similar results. The problem is compound: third world governments encourage the exploitation of tropical hardwood forests to earn foreign exchange; peasants in search of land follow the loggers into the jungle on the new roads the loggers created; an increased population requires more fuelwood to cook their meals; cities expand and require more fuel, and fuelwood is converted into charcoal very wastefully in order to ship it to the cities.

The problem is not simply one for the farmers involved. Those of us in industrial societies are not so distant; we share the same Earth, and we are beginning to realize that such extensive changes influence worldwide **climate**.

Tropical forests are the Earth's most species-rich regions, and plant and animal **species are being depleted** with the forests. Many of us are embarrassed to be members of the species that has done most to

destroy other species. The problem is not simply aethetic or moral. We may need the varietal complexity that we are destroying, to sustain the productivity of existing cultivars, to provide genetic strains that can resist the toxins that the industrial world is unloading upon the environment in an unprecedented variety and amount, or to adapt to the climate changes that the human tribe is fostering.

With the advent of genetic engineering, some Cornucopians are in a state of potentially terminal hubris. The vision is that we don't need natural species, that we can engineer the Earth. That is a very big gamble, at very long odds. Technology has raised yields of certain crops we want, but at a cost in by-products that environmentalists are just beginning to recognize. As a species, we have not yet established a track record showing that we know how to manage a planet.

There are several agencies attempting to arrest the destruction of tropical forests, principal among them FAO, U.S. Agency for International Development (AID), and the new International Tropical Timber Organization (ITTO). None of the official agencies, so far as I know, has proposed control of population growth as a way to stem the progressive destruction of tropical forests.

Congress' Office of Technology Assessment (OTA) has recently published a detailed study of genetic depletion.[4] At one point, it briefly mentioned acid rain, carbon dioxide and marine pollution as threats to genetic diversity, but it did not mention the growth of human populations. Its ten "findings" were mostly technical fixes and did not mention demographic or human settlements policies as a part of the solution.

Economic progress. Desertification. Tropical deforestation. Climate. Species extinction. Each cluster of specialists and policy makers is trying to solve its problem in isolation. Causes cross disciplinary lines, and so do consequences, and so do solutions.

Population growth has led to **urbanization** on an astonishing scale. As urbanites, people use much more infrastructure to support them than they did as peasants. When the urban services cannot keep pace, the ghettoes become appalling.

Again, this has relevance to those of us in the industrial world. The situation is an invitation to epidemics, which sometimes do not respect national frontiers. Moreover, urban crowds are traditionally more volatile and dangerous to governments than peasants. (Does the reader recall Shakespeare's evocation of Brutus and Mark Antony competing to win over the Roman mob?) Americans may differ as to whether we have become obsessively afraid of revolutions -- and whether they in turn are automatically inclined to be hostile to the United States -- but most of us would agree that orderly government is essential to sustained human happiness.

The final act is **migration.** Those who can, get out. They are attracted to the United States by the reality of vastly higher wages and by the image of wealth. For the American, this brings the remote question of third world population growth directly into U.S. domestic policy, and I shall treat it there. At this point, be it said only that there is a vast disparity between the numbers of people who would like to escape the third world and the numbers that the industrial world is prepared to accept.

Let us consider the **strategic issues** a bit further. The government, in its perpetual search for "stabilization," sometimes seems to resemble King Canute on the beach ordering the tide to stop. In Central America, we are obsessed with the conjectural effects upon our own security of the struggles between established interests and revolutionaries. This struggle isn't taking place in an economic vacuum, as U.S. Government pronouncements seem to suggest. In El Salvador, for instance, the population per acre of cultivated land has more than doubled since 1950, and the ratio is getting rapidly worse. People are pouring into urban slums,[5] and some are migrating to the U.S.

A system that may be tolerable in one condition may be made intolerable simply by crowding. Would our government not be better advised to look at the pressures that are generating tensions there, then consider how much the United States can do to resolve those tensions in the El Salvadors around the third world and finally -- in the classic definition of good diplomacy -- match its commitments to its resources?

In the Middle East, the strategic issues are perceived to focus around petroleum. Yet (and not altogether for foreign policy reasons) our Middle East

policy is built upon two of the few countries there that have little oil to export: Israel and Egypt. The two countries are the major recipients of U.S. bilateral aid. Their dependency appears to be increasing. In Egypt, the population is doubling every 27 years at the current rate. Food imports have risen 729 per cent since 1950,[6] and the prospect is for further increase. Israel's population in the same period has more than trebled, most of its current increase is Arab, and its dependency upon the U.S. Government has risen sharply since 1967.

Can we afford the increasing burden that the economic and demographic data suggest is likely? Can we ameliorate it, as President Carter was probably trying unsuccessfully do at Camp David? If not, should the government be asking itself whether its policies are viable over the long term, or whether it should be examining our national interests and how they might be protected in the light of alternative possible futures?

To offer these examples is not to propose alternatives, or to suggest that they would be easy. The purpose is rather to suggest that key determinants of our strategic calculations are shaped by demography and the forces that arise from it, and that it is not presently a component in our national security thinking.

What would have happened if the government had been quicker to bring demography into Agency for International Development decisions? Most third world countries are now struggling to bring population growth under control. Their problems would have been simpler by literally billions of people if foresight had led them to approach both sides of the equation together.

Now that the problem is better understood, what are we doing together about it? Nothing. The United States has shifted its foreign aid increasingly away from long-term efforts and into short-term tactical programs. Population aid is now 1.5% per cent of U.S. foreign aid and it is declining.[7]

To its credit, AID itself has become more sensitive to demographic issues than any other policy component of the U.S. Government, but still one wonders why this awareness has not regularly been brought to bear upon all our aid policies.

What, for instance, has the U.S. Government done to consider the effects of long-term food aid on recipient countries and their ecological future? Has it considered whether we might be driving those countries deeper into a trap, as they strip their forest cover to cook the food that we supply, thus reducing their ability to produce food precisely when population growth increases the requirements. Have long-term projections been made of their food requirements and of our ability to supply them?

In short, do present trends in supply and demand pattern for food constitute a viable pattern for the future? What are the alternatives, and what should we be doing about it? (Early in the Carter administration, an NSC report was being prepared on U.S. relations with the third world. When I argued that the population and food issues should be brought into it, the compromise was to insert a preambular sentence recognizing the issues but saying that they would not be addressed because the study "dealt only with the next 18 months." When, one may ask, does the long term start?)

Population growth has probably closed certain options off to most of the third world. One of these is **industrialization** along the pattern of existing industrial countries. At one time, this was the model; it probably still is, for some emerging countries like South Korea. However, as a general model, it would probably be a disaster. On present patterns, total world energy needs would rise five- to tenfold (depending upon one's assumptions) if a world population of ten billion were to be entirely industrialized. Finding the capital and the sources for so much energy is only part of the problem. There are frightening environmental and climatic implications if reliance is to be placed upon fossil and fission fuels. There are immense questions in attempting to visualize a more benign energy future. One must begin to try to rethink the model. No automobile cultures; no conspicuous consumption for all. There is no evidence -- aside from some of the futures studies described in Chapter VII -- that a serious effort is being made to develop even a mental model of where the third world may be heading. How can we give aid, or others receive it, without any real plan or picture of its intended use?

The people who have gotten into this situation are not stupid. Many see what is happening to them. One

thinks of the "tree huggers" in the Himalaya, peasants who organized a movement to put themselves, physically, between the chainsaws and the trees when commercial logging began to strip their mountains.

The knowledge exists -- enough at least to justify some decisions very different from the ones we are making. The problem is that the people who understand are disconnected from the people who decide. **There is no systematic process of bringing that knowledge to bear upon decisions.**[8]

The industrial world. We trade with, argue with, and pollute with the other industrial countries. We cause each other a number of problems, but demography is not central to most of them.

There is at least one exception, and it is the reverse of the demographic problems of the third world.

Natural population increase has stopped and reversed in West Germany, Denmark and now Sweden and Austria. At present fertility levels, populations in most of Northern and Western Europe will soon begin to decline (barring immigration at levels that most of the countries oppose). The change affects not only the totals; it also means more old people and fewer young ones.

For each country domestically the change will have multiple effects.[9] On balance, they may be better off with a smaller population for the post-fossil fuel era. For us, the Europeans and the Soviets, however, military and strategic thinking tends to be traditional and to lag behind new realities.

Our key European allies will have shrinking military-age cohorts in coming decades. The Soviets will have more, but their young men increasingly will be non-Russians.

There is a classic interaction here that foresight should address. For eminently sane reasons, the United States is endeavoring to reduce the nuclear component of NATO defenses. By extension, given current strategic assessments, this means greater reliance on conventional forces. With fewer young men to fill them.

There would seem to be here a considerable opportunity, and an urgent need, to survey the

strategic relationships in the light of present demographic and other realities, rather than trying to force the new objectives and new realities into a conceptual framework that froze into place about forty years ago.

The United States. One would assume, from its official caution about the subject, that the United States Government simply does not deal with demographic issues. In fact, its policies -- undertaken under whatever name -- regularly influence our demographic future; and demographics intervene to lead other policies to success or failure, whether or not we intended it.

As one example, let us take the pursuit of a major national goal, **racial justice.** Let us look at what happened when we failed to connect the pursuit of two very good goals a generation ago.

At that time, we embarked simultaneously upon one of the nation's greatest moral crusades -- ending racial discrimination -- and one of its greatest engineering programs -- the construction of the interstate highway system. Both thoroughly desirable. One unanticipated by-product has, however, undone much of what was intended. School busing, to achieve one of those goals, precipitated white flight from the cities, which was made feasible in part by the new highway system being created. The result was resegregation in cities impoverished by the loss of part of their tax base. Would we have pursued both objectives in somewhat different ways to avoid that result if we had enlisted the advice of urban specialists and demographers as to the probable results of this combination of developments?

Time marches on, and reality sometimes changes faster than our perceptions. Martin Luther King, Jr., had a dream, to which much of the nation subscribed, of "one nation, black and white." That idea is becoming simply an anachronism. Recent demographic studies have suggested that California and Texas are becoming multi-racial states, because of immigration and differential fertility.[10]

The studies portray a doubling of both states' populations in the next fifty years. Long before that, both states will have become truly multi-racial. Neither will have a white majority. They will consist rather of two large minorities -- White (or "Anglos")

and Hispanics (who in Texas will be on their way again to a majority) -- and two smaller minorities of Asians and Blacks. The Whites and Asians will be generally affluent and well-educated, while most Hispanics and Blacks will be poor, ill-educated and scrambling for the less attractive jobs, in the face of an expansion and qualitative decline in the labor force.

The demographers have done the nation a service. The nation as a whole may be trending, more slowly, in the direction in which California and Texas are moving very quickly.

If we seriously thought about that future, it seems to me that the present debate about "reverse discrimination" would already have ended. We are approaching the absurdity of trying to give special consideration to a majority. Moreover, as positive action programs have in some measure succeeded, some portion of the minorities has reached the middle class or the top of their professions. By its own success, special favoritism becomes decreasingly effective as a way of helping the truly disadvantaged. As we slowly evolve toward a nation of minorities, we would do well to choose consciously among the alternatives ahead. Do we wish to perpetuate policies that encourage us all to think as minorities and to seek competitive advantage on racial grounds, with the nation becoming bilingual as a result of growth of the Hispanic minority? Or does nationhood itself require a sense of community and shared identity? If the latter, perhaps we should again put the "melting pot" ahead of the "salad bowl" as a symbolic goal of social policy. Perhaps our special programs should be directed toward the economically disadvantaged as a group, rather than toward specific races.

I offer these as conjectures, not as finished conclusions. My purpose in this book is to promote the process of foresight, not to become a one-man foresight bureau. My point is that the demographic trends are there, and they are the result in part of governmental policies. Somebody in the government should be charged with looking at the trends and their implications and bringing them to bear on policy decisions. As of now, there is nobody there.

Immigration policy or non-policy has been a factor in the demographic trends described in California and Texas. It provides another dramatic example of policies at cross purposes. On the one hand, the

nation has been engaged in a massive effort to get Blacks and other minorities onto the economic ladder. On the other, and in considerable degree out of deference to some employers who wanted cheap and docile labor, it was following what the *New York Times* called the "policy of the wink": enforcing the laws against illegal immigration in a very lackadaisical way, so as not to cut off the flow of labor. (The California study cites evidence of Black migration out of southern California, probably a result of job competition from Hispanic immigrants.) We cannot successfully have it both ways, improving the conditions of our own poor while acquiescing in an influx of labor that pre-empts the jobs they should be getting, and that can only tend to depress U.S. wages toward third world levels.

The Immigration Reform Act of 1986 was an attempt to control the future flow of illegal immigration. It was a compromise, and perhaps a flawed one. It exchanged a prohibition against hiring illegal aliens for an amnesty for many established illegals, with additional concession in the form of broad loopholes for agricultural workers, won by agricultural employers. It will be several years before the country knows whether the law has slowed or accelerated immigration and U.S. population growth. This in turn will have important but so far unexamined impacts upon the future of employment and earnings, resource and environmental issues in the United States. The processes of foresight should be employed as the country monitors the progress of that law.

The connected issues of immigration and the size of the labor force go far beyond the question of minorities' employment. The United States and the industrial world are in the midst of a technological revolution that is fundamentally changing jobs, productivity and unemployment. The changes generate some deep questions about equity and social policy, and they are inseparably connected with demographics.

Accelerating computerization and automation are resulting in astonishing labor productivity in industries where sufficient capital can be accumulated to equip the labor force, but parallel to that phenomenon is the spread of unemployment and a two-tiered labor force. Those without the capital attempt to match it by lowering the wages for labor. Sweatshops are reappearing in our cities, marginal employment such as sidewalk stands is visibly proliferating, and parts of the economy are taking on a

distinctly third world look. Colorful, perhaps, but is that the way we want to go?

Unemployment, despite cyclical swings, has been on a secular rise for decades. Exacerbating that trend, an increasing number of Americans have dropped below the poverty line in this decade, median household real income has dropped for more than a decade, and there seems to be an increasing concentration of wealth at the top.[11]

This widening disparity is in part a result of tax and welfare policies. Whether we choose to do anything about it depends upon national judgments about equity, budgets, and the competing claims of different objectives: economic motivation and capital accumulation versus the social costs of unemployment and a potentially alienated underclass. Demography can, however, give advice as to the size of the problem, the trends, and the interconnections among immigration, fertility, the labor force, and the effects upon them of proposed social and economic policies.

As of now, the Bureau of Labor Statistics approaches future labor projections from the opposite end: it assumes population change as a parameter, and it hypothesizes the distribution of the resulting labor force among different industries and occupations on the basis of present employment trends, while it holds the unemployment projections to politically acceptable levels. Real foresight is needed here, and a systematic inspection of the real issues.

Let us turn to the question of energy.

The use of energy is a central pillar of industrial societies, and it is also a central cause of the ecological perturbations that we now recognize may change the very conditions for life on Earth: acidification of the environment; climate change; the nuclear issues.

As a nation, we are addicted to our comfortable habits: our automobiles; air conditioners; dispersed settlements. The specialists tell us that we are coming to the end of the petroleum era, and they do not differ by much as to the timing. A fundamental reordering of our energy system requires heavy capital investments and very long lead times. It should already be under way.

What have we done? The first "oil shock" of 1973 led to a number of national measures to encourage conversion to coal, practice better conservation, and develop synthetic substitutes. Some were effective; some were not. When OPEC failed to hold the line on monopoly pricing, the Reagan administration apparently decided not to worry. Many of the measures were weakened, reversed or allowed to lapse: the synthetic fuels program (which was in deep trouble); tax incentives for home insulation; the schedule for improved automobile fuel efficiency; the 55 mile speed limit. (Congress has passed one useful measure -- efficiency standards for appliances -- and the President signed it on the second passage, after pocket vetoing the first.)

During this period, there was a notable improvement in the nation's efficiency in using oil, and a consequent slackening of demand growth. Much of the improvement came from industry, not from government, as industry adjusted to higher oil prices in the 1970s.

Does this not argue for reliance upon the price mechanism, and against formal efforts at governmental foresight? Not necessarily. The two are not necessarily in conflict. A system of foresight, operating through this period, would have reminded the decision makers that the price fluctuations have not changed the underlying estimates as to the long-term supply of the resource. It would have provided arguments for greater fixity of policy. It would have been assessing the effectiveness of the various measures that were taken after 1973. It would perhaps have provided guidance as to what price levels for oil would be compatible with the development of oil conserving strategies and alternative fuels, outlined the different mechanisms for affecting oil prices, and weighed their impact on the pursuit of other objectives such as the control of inflation. Finally, it would have begun to examine the ramifications of the energy transition, such as the ways of accommodating higher energy prices in agriculture, transportation and urban planning.

How does demography fit in?

We have become so used to the words "per capita" that we may forget their meaning. Economic well-being is measured, not by gross figures, but by availability

per capita. There is an energy component in each of the goods and services we consume. It may be possible to supply wants more efficiently through technical change and conservation, but at any given level of technology or of conservation, energy availability per capita equals

$$\frac{\text{total availability}}{\text{population}}.$$

This equation would not be important if the marginal cost of new energy were not rising and if there were not environmental penalties to increased energy consumption. Neither of these conditions holds true.

The nation can, and should, explore the energy alternatives and seek to conserve energy. The demographic point is that, at any level of success in these directions, the overall problems of developing and financing benign alternative energy paths are intensified by population growth.

Demography is concerned, not just with numbers, but with other characteristics of people, such as where they live. Americans apparently prefer a spread-out life style. Witness the typical pattern of city/suburb/exurb. It would be hard to visualize a more energy-intensive settlement pattern. At present, the nation subsidizes transportation, since (with the partial exception of the interstate system) user fees do not cover the costs of roads, traffic control, highway emergency services, or urban transit. In most places, the other costs of suburban sprawl are subsidized by the more closely-grouped consumers, since utility rates are seldom based on the cost of delivery to a given location.

An energy policy must eventually look at such questions as whether to subsidize suburban sprawl and urban gridlock, and the demographers should play a role.

There are energy studies in abundance, but none of them (so far as I am aware) treats such demographic patterns as an element of the problem or the solution. At a more basic level, the energy planner would do well to point to future fertility and immigration policy as relevant to the scale of the problem. The most recent Department of Energy (DOE) study[12] touched briefly upon population growth as an element of demand growth but did not identify immigration, population, land use or

transportation policies as possible elements in an energy policy.

In part, this is a result of the DOE decision (Chapter II) to limit its forecasts to short time frames (in this case 1995), while population change is a long-term process. This short-term mindset comes home to roost in the basic perspective of the planners: find "incentives to increase U.S. oil exploration...as a means of enhancing U.S. energy security." In other words, if we are admittedly heading into a transition away from oil, the long perspective would say "conserve the resource and save it for priority uses such as chemical feedstocks -- and defense." The short perspective says "find ways of pumping it faster, so for the next few years we won't be entirely dependent on imports."

DOE thus provides us with a splendid example of a failure of foresight on both counts: failure to seek causes and solutions outside of one's own area of competence; and failure to look ahead.

Even the Brundtland Commission, in an impassioned plea to address world energy problems, failed to make the connection between energy and human numbers.

These are compelling arguments for better foresight.

What has been said of energy can also be said of the related ecological issues of **acid precipitation, climate change,** and the **ecological by-products of nuclear energy.** With these, as with other environmental problems such as **toxic substances,** one can address the problems through conservation and by seeking ecologically more benign ways of satisfying human wants, but -- at any given level of success in these endeavors -- the magnitude of the problem is related to population size. The problems are not so tame that the nation can afford to ignore any element that would aid in their amelioration. (I assume that readers are familiar in broad outline with the principal environmental and resource issues facing the world. For those seeking such an overview, I would commend to them the Worldwatch Institute's annual *State of the World* reports and the World Resources Institute/International Institute for Environment and Development's *World Resources 1987*.)

Demographic and energy policies must be integrated into these environmental policies. Since demography and energy policies in turn have consequences for the economy and society, foresight must be a web crossing bureaucratic and disciplinary boundaries.

These vast issues of energy and the ecology transcend national boundaries and underscore the interconnections between domestic and foreign policy. By examining them all, and by assessing the role that demography plays in the the pursuit of other objectives, we may come informally or formally to a national consensus about population goals.

If we do, it will be time to recognize that the connections run both ways. Population change is not simply a factor in addressing other issues. Other decisions in turn affect population change.

The connections can be pretty straightforward. Most people can see the connection between immigration policy and population growth, and it has been quantified by demographers.[13] Other connections may initially be more obscure.

For example, national decisions about the financing of education bear upon fertility, especially in the middle class. In the United States, where parents bear most of the responsibility, those who want their children to have the best educational opportunities will feel strong pressures to limit the number of their children in order to be able to put them through college. On the other hand, our welfare laws (the AFDC) may reinforce the incentives for the unmarried ghetto girl to have babies.

One cannot be very certain about either of these statements, because the connections have not been sufficiently studied. There is, however, at least a rebuttable presumption that our educational and welfare policies conspire to encourage fertility among those least prepared to raise children and to discourage it among the potentially most responsible parents. If true, this has implications for the number and quality of coming generations and for the pursuit of other goals such as the current drive for national "competitiveness."

Let me finish with that note. Other examples could be given. Perhaps this sketchy survey of the single issue of demography and its connection to

several other goals and policies will make the point: there is a seamless web of cause and effect, but as a world and as a nation we are attempting to address problems piecemeal.

I have mentioned that, in our foreign aid, the government has no apparent sense of direction beyond the tactical, and no real idea where we are trying to help third world countries to go. More important, in our domestic policy, we are equally rudderless. From the scientific community, we have gotten very clear warnings of the dangers of drifting in the direction the nation is presently heading, but there has been no sign of the political will needed to develop a coherent strategy and a sense of direction to deal with the issues. Lead times for these issues are very long. When the problems have become so intense as to demand political action, we may have lost our more attractive options. An institutional foresight process, with mandated periodic forecasts of issues that are becoming critical, could help to mobilize government into action, and a foresight network to examine the potential consequences of different policy options would provide the means to cross-check the policy choices and to refine a coherent program to deal with change.

The Brundtland Commission was right in saying (see Chapter VII) that a unified approach is "simply beyond the reach of present decision making structures and institutional arrangements."

Slaying Dragons and Exorcising Taboos

We humans arrive at our conclusions by sometimes mysterious routes. The population issue is an excellent example. In the issues cited above, the failure to include demographic policies as elements of the solutions was not necessarily a product of ignorance. Population growth was sometimes identified as a cause of the problem, but limitation of that growth mysteriously dropped out as an element of the proposed solution.

There seems to be a very strong taboo about manipulating fertility. People have done it for centuries, but they don't talk about it.

The leaderships of developing countries, having been faced with the consequences of population growth,

have been growing increasingly explicit about the need to control it. The taboo is not yet gone, however. Even the Brundtland Report was much more circumspect about population issues in the final version than in the initial terms of reference.[14]

Similarly, any questioning of affirmative action programs in the United States, or of U.S. Middle Eastern aid policy, courts the danger of charges of racism toward Blacks or Jews. Having as a society made a tremendous commitment to extirpating racism, we seem to have thrown a halo effect around it, and anything that would seem to represent a backing away from that commitment comes under a new taboo.

The systematic practice of foresight, by forcing the examination of cross-disciplinary consequences, could perhaps help to clarify our thinking processes, somewhat as the scientific method has done for the disciplines to which it is applied. Above all, it would require the examination of proposed actions in terms of their consequences, rather than from preconceptions and conscious or unconscious biases.

Mobilizing the Public Interest

Policies may go wrong, not as a result of ignorance, but because they are pulled by special interests. The farm labor provisions of the Immigration Reform Act of 1986, or the survival of oil depletion allowances in the tax reforms of the same year, are good examples.

An institutionalized foresight process, particularly if it is accessible to the public, provides a partial corrective to such distortions in policy. At least, if the special interest is accommodated, the costs to the general interest will be explicit, clear to the decision makers, and -- wherever possible -- in the public domain.

To Dispose of Some Doubts . . .

In all the cases above, there is or was solid information available which, if brought into the policy process, would force at least a reexamination of strategy and which might lead to fundamental debates and changes in our national view of the future -- to

the exploration of "alternative futures." This short list is only the beginning.

The opponent of foresight can differ with some of the conclusions I have so casually stated, but that does not help his case. He must make the argument that demography is irrelevant to the issues I have described, and that would be a tough assignment indeed.

In Chapter I, I attempted to answer some of the frequently-heard doubts about foresight, by pointing out what is **not**. It is not simply prediction. It is not an effort to create a single, official perspective on the future. It is not central planning. It does not surrender human judgment to mathematical models.

There is a counter-argument particularly popular in the Reagan administration with its predilection for less government, to the effect that projections are regularly wrong, and that it may be more harmful to make major decisions based on faulty forecasts than it would have been to muddle through without trying to see into the future.

It is healthy to be reminded how wrong one can regularly be about the future. However, that argument itself impales its adherents on a dilemma, since any decision making process -- beyond simply rolling dice or drawing a card to make a decision -- involves an effort at foresight. If proponents of "foresight" were simply arguing that there should be a periodic description of the world a generation or so hence, and that governmental decisions should reflect an acceptance of that portrait, the opponents of foresight would have a better case.

In this book, however, the case will be made, not for some such rigid approach, but for an ongoing process to develop the best possible image of present trends and where they may be leading, and to bring this information into the pursuit of policy goals. This is not a proposal to reverse current decision making processes, but rather to extend them to encompass those lateral and long-term considerations that are presently missed, and to use the best available techniques for handling the information available.

To foreswear the possibility of such an improved approach is to choose to govern half-blinded. Government will not go away -- whatever the preferences of a portion of our populace -- because nobody has

developed an alternative way of doing the things that society must do as a group. There is no alternative. That is why government is so durable, if not popular.

The rate of change in the world is faster than it has ever been before, and the impacts of human decisions on the future of mankind and of the Earth are more fundamental than ever before, if only because of the sheer numbers and the growth of human population and the rate of technological change.

In such a world one cannot rationally argue against improving our national ability to look ahead. The legitimate question is: what will work best?

FOOTNOTES

1. Readers may be interested in a new scholarly study in this area. The AAAS Population, Resources and Environment Program (PERP; see Introduction Footnote 8) is launching a project entitled "The Effects of Technological Change on Population, Resources and the Environment," which is to consist of a survey followed by a series of case studies "selected to represent development processes that, in retrospect, we recognize were not sustainable... We will then try to develop a set of 'counterfactual scenarios' of history to specify what realistic alternative strategies might have been undertaken that would have resulted in sustainable development." The principal investigator is Harvey Brooks.

2. The World Bank, *World Development Report 1984* (London & New York: Oxford University Press, 1984); see especially Figure 4.4, p.70.

3. H. Breman and C. T. de Wit, "Rangeland Productivity and Exploitation in the Sahel"; *Science*, September 30, 1983, p.1346.

4. "Technologies to Maintain Biological Diversity," OTA March 1987 (Washington: USGPO).

5. "Central America: Population Growth, Instability, Migration, and the U.S.," TEF*Data* #5 (Washington: The Environmental Fund, September 1982).

6. United Nations Food and Agriculture Organization, *FAO Trade Yearbook*, Vols. 14 and 34, Rome, 1960 and 1980. The "doubling time" is from Population Reference

Bureau, "1986 World Population Data Sheet" (Washington: April 1986).

7. Lindsey Grant, "A Population Focus for U.S. Aid", *NPG Forum* paper, June 1987. Available from Negative Population Growth, Inc., 16 East 42nd Street - Suite 1042, New York, NY 10017.

8. This point is made with respect to ecological knowledge in a recent National Research Council report: Committee on Applications of Ecological Theory to Environmental Problems, "Ecological Knowledge and Environmental Problem Solving," March 1987. (National Academy press, 2101 Constitution Avenue, NW, Washington DC 20418.)

9. For a detailed discussion, see Kingsley Davis *et al*, "Below-Replacement Fertility in Industrial Societies: Causes, Consequences, Policies", *Population and Development Review* Supplement to Vol. 12, 1986.

10. Leon F. Bouvier and Philip Martin, *Population Change and California's Future* (Washington: Population Reference Bureau, 1985). F. Ray Marshall and Leon F. Bouvier, *Population Change and the Future of Texas* (Washington: Population Reference Bureau, 1986.)

11. See Frank Levy, "Changes in the Distribution of American Family Incomes, 1947 to 1984" in *Science*, 22 May 1987; Ravi Batra, "An Ominous Trend to Greater Inequality" and Frank Levy, "Actually, We Are All Getting Poorer," both in the *New York Times*, May 3, 1987, p. E2.

12. Department of Energy, *Energy Security: A Report to the President of the United States* (Washington: USGPO, 1987).

13. The most accessible presentations on the demographic impacts of different assumptions about immigration are "The Impact of Immigration on U.S. Population Size" and "Immigration and its Impact on U.S. Society," both by Leon F. Bouvier and both published in 1981 as occasional papers by the Population Reference Bureau, Washington.

14. The Brundtland Commission's original workplan said "the Commission will wish to consider strategies that offer the prospect of (population) stabilization during the next century." Compare the more cautious final treatment cited in Chapter VII.

X.

Current Proposals

There have been various foresight proposals, some of them conflicting. Let us here attempt to summarize some of the recommendations by various commissions and individuals during the past few years, then describe the current status of various legislative proposals reflecting those initiatives, and finally undertake to define some broad criteria for evaluating these proposals.

Proposals to Congress and the President

As the reader may have noticed, there was an upsurge of interest in dealing with long-term issues in the years around 1970: the environmental legislation; NEPA; the National Goals Staff; the Rockefeller Commission; presidential attention to the population issue; the creation of OTA. During those years, there were proposals for improved foresight machinery (by other names) that are still germane.

Senator Humphrey proposed that Congress address the need for coordinated long-term assessment by creating a "Joint Committee on Balanced National Growth and Development."[1]

In 1970, the Senior Executives Council of the Conference Board developed a proposal for the creation of a public-private Institute for National Objectives, which would attempt to understand and interpret social change, consider the choices before society, develop criteria for choosing national goals, and suggest strategies and policies. The Institute was to be divided into a Center for Integrative Studies of National Policies, Priorities and Alternatives (this title may set some sort of world record) and an Advisory Council. Major public and private leaders

would be involved. This proposal was presented personally to President Nixon, but nothing came of it.[2]

In 1973, the Smithsonian Institution's Woodrow Wilson Center for Scholars convened a "Project on Sustainable Growth" which eventuated in "A Proposal for Developing a Capability at the National Level for Strategic Policy Assessments." The Proposal called for the creation of an Office of Strategic Policy Assessment in the Executive branch, with a counterpart in Congress. The purpose would be "to improve national decision making as it relates to long-term policies. More specifically, these groups should endeavor to identify emerging long-term trends and problems, formulate and evaluate alternative courses of action to deal with them, and evaluate the effects of actions that may have been put in train." In the Executive, the Office would be lodged in the Executive Office of the President, either as an independent office or as part of OMB. In Congress, the parallel capability would be lodged in OTA. (These recommendations were developed by a Working Group drawn mostly from government. In a dissenting view, one member proposed instead that the "strategic choice assessment" function be lodged in a permanent public-private Commission on National Policy Choices.)[3]

These recommendations foreshadowed most of the specific proposals that have subsequently been made concerning national foresight machinery. They received regrettably little attention and did not result in any action.

During the 1970s, there was a torrent of Congressionally-sponsored commissions, transient or permanent. (In 1960, in all areas, the General Services Administration counted nearly one thousand advisory committees and commissions in the government, 689 of which were mandated or specifically authorized by Congress.)[4] Many of them addressed broad areas of national growth policy, resource management and economic futures. Several of them recognized that the issues they addressed could not be dealt with in isolation and they offered suggestions for what would now be called foresight machinery.

The "Rockefeller commission" did not address the broad question of foresight machinery, but it did propose the creation of an Office of Population Growth and Distribution within the Executive Office of the President. Similarly, the National Commission on

Materials Policy (1970) proposed the creation of a Cabinet-level agency for materials, energy and the environment, with a parallel Joint Committee of Congress.

Three "Report[s] on National Growth Policy" (1972, 1974 and 1976) were sent to Congress by the Executive branch in response to the Housing and Urban Development Act of 1970. In passing, they mentioned the need to develop ways to reconcile national growth objectives with other national pursuits, the need to end the fragmentation of federal support for state and local growth planning, and the 1976 report for the first time pointed out that the public must be brought systematically into any governmental debate about growth policies. The 1976 report also gave Senator Humphrey an opportunity to remind the government that it had not yet developed "the capacity to make public policy decisions in a rational, informed, future-oriented and coherent way."

Creation of the National Commission on Supplies and Shortages (1974) resulted in two conflicting sets of recommendations about foresight machinery. The Commission simply recommended that a unit be created in OMB manned by specialists who would monitor federal activities in the area of minerals and materials, plus a beefing up of the Council of Economic Advisers to permit more detailed sectoral and industry analysis. However, Senator Humphrey had appended to the Commission an Advisory Committee on National Growth Policy Processes with a broad mandate to make recommendations about a policy making process to relate resource and commodity issues to the "total problem of balanced national growth and development." The Advisory Committee recommended the creation of an independent agency in the Executive branch called the National Growth and Development Commission. It would consist of independent, long-tenured appointees who would make annual public reports identifying long-term issues and suggesting ways to deal with them. The President and Congress would be obligated to respond. The Commission would have no administrative authority.

Separately, the Committee proposed an independent Center for Statistical Policy and Analysis to coordinate (without any executive authority) federal statistical work.

Finally, the Committee proposed that Congress attach an impact analysis (apparently akin to an EIS) to every legislative proposal.

The Commission dismissed its Advisory Committee's proposals as impracticable. Nothing came of either report.

Senator Humphrey's unflagging efforts to promote the creation of a broad foresight capability in the Executive did not bear fruit. In 1975 he and Senator Javits introduced the Balanced Growth and Economic Planning bill, which was intended to create an advisory machinery in the Executive, but drew intense conservative criticism because it contained the dread word "planning." It failed. He did, however, succeed (in the Humphrey-Hawkins Full Employment and Balanced Growth Act of 1978) in requiring that the Executive set goals, institute systematic planning procedures, and report annually on efforts to lower unemployment, reduce inflation and balance the budget.

The nation's recent history suggests how little one piece of legislation can accomplish if its goals are not the goals of the Executive branch.

At the close of the Carter administration, a group chaired by CEQ published *Global Future: Time to Act* as a follow-up to the *Global 2000 Report*. Aside from its policy recommendations, it made a proposal for future foresight machinery.

> *...a Federal Coordinating Unit...preferably within the Executive Office of the President, with the mandate to coordinate ongoing federal programs concerning global population, resource and environmental issues; to evaluate long-term trends in these areas; and to report to the President with recommendations for action. A staff of about 20 and an annual budget of about $6 million would be adequate...*
>
> *...A single government center should act as coordinator for the federal government to insure availability of adequate data and modeling capability to carry out policy analysis on long-term global population, resource and environmental issues. To be most effective, this center should be part of the Federal Coordinating Unit for policy...*

The Global Population, Resources and Environmental Analysis Institute, a hybrid public-private institution, should be created... Included...should be a Forum for Global Models.[5]

The report also recommended the adoption of new administrative procedures and legislation forcing federal agencies to address long-term global issues, and it made several suggestions to promote greater awareness of these issues among the business community and general public. The Reagan administration has not followed up on these proposals, except to create, under the Chairman of CEQ, the Global Issues Work Group described in Chapter III.

In May 1982, the oversight subcommittee of the House Committee on Energy and Commerce held a workshop on foresight proposals. In the summary of the workshop proceedings, there is a very succinct statement of what the various workshop participants (most of them distinguished private individuals) said would improve our foresight capability:

Creation of multiple "institutes of the future," publicly funded but insulated in an endowment manner from year-to-year political considerations.

Creation of a federally-chartered institute largely dependent on private sector financing which would do global trend analysis and their policy implications.

A "Report on Global Trends in Population, Environment, and Natural Resources" by the Executive branch to the Congress. Every other two-year Congress would "respond to this report," via an unspecified "Joint Committee of Congress." To encourage interaction with the private sector a public/private advisory commission on global problems would be created; an interdisciplinary global modeling group also would be created to review and critique the Executive branch report.

A "Future State of the Union Report" by the Executive branch to the Congress. It would focus on the U.S. with one or more chapters looking outward to the global with a time perspective of the next decade, the next two decades, and beyond

the year 2000. Every other year the Joint Economic Committee would respond to this report.

Establishment of an "Office of Research Analysis on Global Population Resources, Energy, and the Environment," which would work in cooperation with the Office of Management and Budget's Office of Regulatory and Information Policy, but would report directly to the President.

Stimulation of government/private sector exchange on data, modeling and use of projections as well as analysis.[6]

These proposals, it will be noted, all emphasized the creation of new structures to make periodic reports, separate from and in various degrees insulated from existing government agencies. They did not pick up the *Global 2000 Report* suggestion that there be better coordination of existing governmental foresight work, and they did not suggest how the proposed periodic reports would be brought into governmental decision making.

The Global Tomorrow Coalition, a Washington-based coalition of public interest groups mostly in population/resource/environmental fields, from its inception in 1981 has called for improved government foresight capability in those fields. It has made "the achievement of a stronger federal commitment to an improved, integrated and permanent national foresight capability" a focal point of its program, and individual members of the coalition have sketched out possible machinery for such a capability.

The Coalition has not endorsed specific legislation, but it has recommended the following actions:

(1) establish in the Executive Office of the President an improved capacity to coordinate and analyze data collected by federal agencies and other pertinent sources on the long-term interactions of trends in population, resources, and environment--and their relationship to social and economic development--and to provide information relevant to current policy decisions responsive to the needs of the national and global future;

(2) encourage and facilitate widespread public participation in the discussion of choices for a desirable national future; and

(3) invite other nations to expand their own foresight capability and share in an international exchange of relevant data and information.[7]

Another private group, the Year 2000 Committee, existed for three years and disbanded in 1984. It was composed of distinguished individuals under the chairmanship of Robert O. Anderson (of Atlantic Richfield) and Russell Train (former Chairman of CEQ and Director of EPA). It undertook to focus attention upon the need for improvement of information about global trends. It drafted proposed legislation. This group favored the creation of (a) a global trends information office in the White House; (b) a quadrennial report by the Executive branch to Congress of the long-term global trends which affect global economic and political stability, with Executive branch policy proposals; (c) a response from Congress; and (d) a public-private advisory group to comment on that dialogue. The group did not take an explicit position on substantive population, resource or environment issues.

In closing this survey of recent proposals about foresight, let me remind the reader that I have confined it to specific proposals as to the governmental machinery for exercising foresight, at the national level. There is a remarkable variety of futures reports by governments, international organizations and private groups. Many of these contain generalized exhortations as to the need for better statistics, better coordination, and a way of bringing the projections into policy making, but there is remarkably little about how those improvements should be achieved.

Recent Legislative Proposals

Three bipartisan bills were introduced into the 98th Congress that bear directly on the foresight process. They are generally known as the Hatfield/Ottinger, the Gore/Gingrich and Scheuer bills.

In addition, Rep. Mavroules sponsored House Joint Resolution 248 calling upon the government to improve its ability to project population, resource and environmental trends.

Rep. Wirth and others introduced the "National Economic Cooperation Act of 1983" which, although focused on the better coordination of economic, employment and international trade policies, was treated within Congress as a form of foresight legislation.

Let me describe the key features of these bills.

Hatfield/Ottinger. The Global Resources, Environment and Population bill of 1983 (S.1025-H.R.2491) was an outgrowth and a fusion of separate bills submitted by the two sponsors to earlier sessions of Congress. It was both a **substantive** and a **process** bill. It stated the objective of population stabilization in the United States and the rest of the world. Its origins lie in the effort to bring Congress to adopt a population policy. The foresight functions appear to be an add-on, intended to provide the means to make the population policy effective. No effort was made to include issues other than population, resources and the environment.

It would require that "the policies, regulations, and public laws of the United States shall be interpreted and administered in accordance with" its population goal. It proposed to establish a Cabinet level Council on Global Resources, the Environment and Population, which would see to the preparation of projections of those trends and would assure that they are taken into account in federal, state and local policies and programs relating to a wide range of topics, from "education" to "service to senior citizens." The Council would be chaired by the Chairman of the Council on Environmental Quality.

All federal government agency heads would be required to identify and remove any impediments "which limit or prevent compliance with the purposes, policies and provisions of this Act." The Council was instructed to monitor that process and to recommend administrative and statutory changes to the President in order to bring it into effect.

The bill was clearly intended to do for population what the National Environmental Policy Act of 1969 (see

Chapter II) did for the environment in general. It was, however, considerably stronger than that Act, since it required compliance with, rather than consideration of, the goals it set forth. As with NEPA, the language quoted above presumably would open federal actions and policies to judicial review for compliance with the Act, and the basis for challenge would be far broader.

The bill, in short, would make population stabilization an absolute national target, to which all other policies must conform.

No funds were proposed to carry out the bill, but the expenses of the Council were to be paid out of appropriations for the Executive Office of the President. Moreover, "the head of each agency represented on the Council shall promptly furnish necessary services, equipment, personnel and facilities to the Council" and would be obligated to furnish it with any information requested, "to the extent permitted by law."

The Council would make a periodic report to the President on world population, resource and environmental trends, and the President would report annually to Congress.

Upon examination, perhaps the most unsettling characteristic of this bill is the disparity between its reach and its grasp. If it had been passed, it would have promoted population policy -- which does not presently even exist -- into the central element of federal decision making. It would turn the Chairman of CEQ into one of the most powerful figures in Washington. It would open federal processes as never before to judicial challenge, forcing the government to pursue policies leading to population stabilization.

On the other hand, the instruments to achieve this epochal change were frail indeed. A bureaucrat without staff support is usually at an extreme disadvantage. No Cabinet-level committee could itself possibly carry out the technical functions assigned to this one. It would need massive staff back-up, and for this the Chairman would be at the mercy of the participating agencies. It is hard to imagine that any line agency would willingly turn over to this new entity the sorts of power envisaged in the draft legislation. It would be a super-agency far stronger, for instance, than the NSC. Their instinct would be to starve it. Meanwhile,

population groups -- if they are worth their salt -- could be expected to be instituting lawsuits challenging each federal action that did not demonstrably accord with the goal of population stabilization. Congress would then come under mounting pressure to get the courts off the government's back.

In short, one wonders whether the bill, laudably intended as it was, could pass, or be signed by a president, or work.

This bill had 50 co-sponsors. The House version was referred to the Subcommittee on Census and Population of the Committee on Post Office and Civil Service, which held one hearing on it in July 1984.

The testimony at that hearing reflected heartening progress in thinking about the nuts and bolts of how one translates broad aspirations into real policy making. While much of the testimony was directed toward the implications of third world population growth and of current immigration levels into the U.S. (naturally enough for a population bill), some of it was addressed to the workability of the proposed foresight arrangements. Russell Peterson, an erstwhile chairman of CEQ, speaking for the National Audubon Society, questioned whether the proposed Cabinet-level Council would be workable. He recommended that a coordinating point for national foresight be placed in the CEQ or elsewhere in the Executive Office of the President. Aside from the usual requirement for a periodic report, he suggested that such a group be charged with recommending ways to improve the coordination of foresight activities within the government. He also urged a quick GAO study of the Executive branch foresight capabilities--its data gathering, analytical techniques, the compatibility of assumptions used in different government models, the coordination of foresight efforts, the communications between governmental and private foresight work, and the success or failure in bringing these efforts into the decision process. The purpose would be to inventory the available foresight resources, to see what else may be needed, and to see how well the nation uses its present resources.

Dr. Rupert Cutler of The Environmental Fund (since renamed Population Environment Balance) made many of the same points. Specifically, however, he would lodge the task of statistical coordination in the Office of Management and Budget (OMB). He would assign the

primary responsibility for monitoring and interpreting the data to Congress, through a periodic appraisal by OTA and through the creation of a Joint Committee of Congress on Population and the Environment.

If better foresight is to be achieved, it will be through an informed consensus built upon the examination of specific recommendations such as these.

It is worth noting that both speakers treated foresight as if it were limited to trends in population, resource availability and the environment. We will return to the question of whether that is a broad enough definition.

A somewhat less ambitious version of the bill, the Global Resources, Environment and Population bill of 1987, was introduced into the 100th Congress in 1987 by Rep. Kenneth MacKay and nine co-sponsors (as H.R.2212) and Senator Hatfield (as S. 1171). The proposal for a Council on Global Resources, the Environment and Population was dropped, and along with it the charge to develop a "national population policy" and the extraordinary powers to call upon other government agencies for support. Most references to planning and coordination were dropped. The annual presidential report was changed into a triennial report by the CEQ. Agency heads are still charged with a one-time review of their statutory authority, regulations and policies to assure that they "are consistent with the attainment of population stabilization in the United States as soon as practicable," but the earlier proposal that the Council oversee this process is reduced to an obligation on CEQ to report what the agencies have done.

The bill's sponsors obviously listened to the comments in 1984. The bill has gained realism at the expense of inter-agency involvement. With the demise of the Council idea, agencies other than CEQ have no responsibilities other than the one above for "consistency." They must under Section 4 "coordinate...findings," but the meaning of this injunction is unclear.

Neither the 1983 Hatfield-Ottinger nor the 1987 Hatfield-MacKay bill, be it noted, makes provision for an ongoing process of reviewing policy proposals to assure their consistency with the demographic purposes of the bill.

Gore/Gingrich. The Critical Trends Assessment bill, (H.R.3070), introduced by a liberal Democrat and a conservative Republican, was considerably more modest in intent than H.R.2491. It mentioned demography and the environment only once, in passing. It was solely a process bill, directed toward the "need to supplement existing capabilities to provide a systematic and comprehensive use of . . . information to guide policy makers concerning critical trends and alternative futures . . . for use by the public and private sectors of the United States economy."

To provide for that systematic process, it would create an Office of Critical Trends Analysis in the White House. One function of the Office would be to prepare a Quadrennial Report on Critical Trends and Alternative Futures, which would include an evaluation of "the effects of existing and alternative government policies on such trends." The Congress would respond to this report with reports of its own, on a biennial basis.

Second, the Office would also review federal laws, regulations, programs and other activities to determine their long-term effect.

Third, the Office would establish a public-private Advisory Commission.

The bill authorized $5 million per year for the Office.

Other than providing for comment on the office's work by government agencies and private groups, the bill does not involve the rest of the government in its processes. It does not provide for coordination of statistics and information as proposed in *Global 2000*.

Section 5, authorizing the Office to review federal activities, is perhaps the sleeper. In the hands of a powerful person with access to the President, this could turn the Office into a powerful presence. More likely, since no institutional arrangement is provided to assure that it is involved in the flow of policy documents, it would be seen by the White House and department chiefs as an annoying post-hoc critic of their policies and would be shunted off to the sidelines.

The bill died in the Government Operations Committee in the House in the 98th Congress. Gore (now

a Senator) introduced it in the Senate in April 1985 (S.1031), and Rep. Gingrich and Rep. Kenneth MacKay reintroduced it in the House (H.R.2690). The bill died again for lack of a constituency, and it has not been reintroduced in the 100th Congress.

Scheuer bill. The "Environmental Monitoring Improvement bill of 1984" (H.R.5958) was introduced by Rep. Scheuer and five co-sponsors in the 98th Congress. Under this bill

* the Administrator of the Environmental Protection Agency (EPA) would prepare an annual Environmental Monitoring Report describing and evaluating programs to monitor the quality of the physical environment in which the U.S. participates, and summarizing the current state of that environment.

* a public-private National Commission on Environmental Monitoring would be created to assist in the preparation of the first Environmental Monitoring Report and to make recommendations to the President and to Congress for the improvement of national and international environmental monitoring. The Commission would then go out of existence.

The bill is narrowly focused on improving the quality and coordination of national environmental monitoring. It does not address population or resources. It does not propose to evaluate the impact upon the environment of trends in these areas or in other parts of the economy. Environmental monitoring for law enforcement purposes is specifically excluded from its purview. No provision is suggested for giving effect to the recommendations made by the National Commission, and there is no provision made for bringing environmental analysis more systematically into national decision making. It is, in effect, a proposal as to how to put a single brick into the edifice of national foresight.

Rep. Scheuer did not exclude all these other elements of foresight because of ignorance. He has been a leading figure in warning the nation of the implications of population growth. He chaired the Congressional Select Committee on Population (Chapter IV) which in 1978 presented a detailed assessment of the impacts of population growth upon the pursuit of

other national objectives and which made sweeping recommendations for a national population policy.[8]

The Scheuer bill should probably be viewed as one veteran politician's conclusion that a national foresight capability can be built only through a block-by-block approach, and that better environmental monitoring is one such block. A staffer on Rep. Scheuer's Subcommittee has privately explained that the narrowness of the bill is intended to improve its chances of passage by narrowing jurisdictional squabbles with other committees.

The bill has not been reintroduced since the 98th Congress.

The Mavroules resolution (H.J.Res.248). With 23 co-sponsors, Rep. Mavroules introduced a resolution stating "That it is the sense of Congress that the executive branch take immediate action to systematically coordinate and improve its projections of world population, resource and environmental trends, and their analysis, as outlined in *Global 2000*."

In the previous Congress, Senator Pell had introduced a parallel resolution in the Senate, but he did not do so in the 98th Session.

The Mavroules resolution is just what it seems to be: a very general reminder to the President that Congress would like to see the Executive improve its foresight practices. In a way, the guidance is even broader than it looks, since in fact *Global 2000* did not outline the ways in which the Executive might systematically coordinate and improve its projections; it simply stated the need.

The resolution was referred to the same committee as the Hatfield/Ottinger bill. It was mentioned in connection with the hearing on that bill, but it was not reintroduced into the 99th or 100th Congress.

This recitation of proposed bills is hardly cause for rejoicing. Thousands of bills are introduced in each Congress. Few are ever reported out of committee.

In April 1985, Senators Mathias and Stafford held a joint oversight meeting of the Committee on Environment and Public Works and the Subcommittee on Government Efficiency and the District of Columbia to call attention to the need for better foresight

machinery.[9] Shortly thereafter, Senator Gore convened an informal meeting of foresight proponents to learn whether he could develop some effective advocacy for his foresight bill. He did not get much help, and the topic has since languished. (By way of example, a legislative assistant in Congressman Gingrich's office did not even realize that his Congressman had reintroduced the Gore-Gingrich bill in the 99th Congress.) It will take much more constituent pressure before the subject is likely to move in Congress.

It is worth noting that the Hatfield-Ottinger-MacKay bills have stayed alive while the others are at least temporarily moribund. Perhaps this is because they state a position about something "real" -- population -- and it has a dedicated constituency: in this case Zero Population Growth, Inc.

The others deal with the abstraction of process, and it is hard to mobilize a committed constituency. Unfortunately, the roles would probably be reversed if it came to a Congressional vote. An improvement in process would probably face much less opposition than an effort to state a national position on population.

The "National Economic Cooperation" bill. H.R.3443 was introduced by Rep. Wirth and 60 co-sponsors as an amendment to the Employment Act of 1946 (the "Full Employment Act.") Its purpose was "to improve the collection and use of economic data by the Government, to promote economic cooperation between labor, business and government, to develop consensus economic policies. . ." in order to promote employment and to make U.S. products competitive in international trade.

From the environmentalists' point of view, the bill is parochial in that it limits its foresight activities to economic matters.

The bill would create a National Economic Cooperation Council to "acknowledge that the restoration and expansion of America's economy is a national priority," to create public fora to develop national and regional economic strategies, to improve economic data collection, to monitor the economy, to promote international trade and U.S. access to foreign markets, and "to report to the President and the Congress annually on the state of the national economy."

The Council would have staff, working committees, subpoena powers and the right to require responses to its suggestions from Executive branch departments. It would cost $20 million annually. The President would be required to designate a President's Special Adviser for Economic Coordination, who would provide the liaison between the Executive branch and the Council and would "act as the principal official responsible for the coordination of executive branch trade and economic functions and activities" -- an economic czar.

It is not made clear what the Council could do that an Economic Policy Council and the Council of Economic Advisers could not do.

It is remarkable with what ease Congressional bills would re-arrange the power structure and the political landscape. This bill presumably was the product of an urge among its co-sponsors to show themselves ready and able to mend America's economic problems, coupled with a Congressional urge to inject Congress more deeply into the executive process (six of the nine members of the Council would be, in effect, appointed by Congress). But it is not the purpose of this book to speculate about such things.

My purpose in reviewing this bill is to

* forewarn readers that H.R.3443 is not foresight legislation as they would understand the term. Another blindered Council is hardly the way to widen the national perspective.

* remind them that other groups have their own interests and priorities, and their own idea of foresight, which they would be happy to promote with their own governmental apparatus.

* illustrate the legislative penchant for addressing any perceived problem with the creation of another Committee or Council. If organizations already exist with responsibilities for the issues at point, this is a recipe for territorial warfare rather than improved decisions.

H.R.3443 was referred to the Committees on Government Operations and on Banking, Finance and Urban Affairs, where it died at the end of the 98th Congress.

Evaluating Foresight Proposals

This brief review suggests that there is enough Congressional interest in foresight to generate legislative proposals, but not yet enough to get those proposals very far down the legislative road. Moreover, the confusion of H.R.3443 with foresight legislation suggests how fuzzy the perception of foresight remains.

I have commented on the particular characteristics of the individual bills. Let me attempt to set forth, more broadly, some criteria by which one may evaluate the existing proposals and develop new ones.

In principle, most people concerned about the environment could enthusiastically endorse Hatfield/Ottinger, Gore/Gingrich, the Scheuer bill, or the Mavroules resolution. Any of them would be better than the present governmental inattention to foresight, and any of them could provide the springboard from which to develop a more systematic foresight process.

In specific terms, however, it is important that the proponents of action come to some general agreement as to what they want, so that differences about detail do not undermine the shared purpose of introducing into government the kind of foresight process described in Chapter I.

There are five issues concerning machinery and procedures apparent in the different proposals that have been described.

First, substantive goals vs. procedure. Some of the proposals stake out a position on substance, e.g. that population should be stabilized. Others confine themselves to procedure. It will be argued in the closing part of this paper that any proposal will gain more adherents if it does not require that Congress or the President take a position on substantive goals. The object is to create the process; the process itself should help lead to the right conclusions on substance.

Second, scope. Most of the proposals emphasize the triad of population/resources/environment. This is natural enough, since much of the impetus for better foresight has come from those who recognize the deficiencies of the present system in dealing with those issues. I will argue, however, that environmentalists will gain more allies if they broaden

the scope of proposals to cover other legitimate areas of governmental concern. The economist will have no more interest in Hatfield/Ottinger than the environmentalist does in H.R.3443.

The list of issues could be long, but environmentalists should see the advantage of looking ahead at the whole array of interpenetrating issues. It is hard, for instance, to imagine a serious analysis of the food balance that does not make some reference to balance of payments--the ability of food-deficit nations to pay for imports or, alternately, the willingness of food-exporting countries to provide the food as aid.

Third, machinery. There is a wistfulness and an underlying similarity about most of those proposals from the 1970s. Almost all of them seek to create councils of "wise men," undistracted by the duties of administration, who would examine the portents and lead us all from error.

What is missing? This Platonic process is disconnected from the real world of policy choices.

The decisions that shape the future are made, very practically, day by day, in juggling current problems, weighing what is possible, and judging alternatives against a sense (usually implicit and ill-defined) of personal and national interest.

An avid reader could arm himself with a very impressive collection of briefing materials -- well selected, tightly edited -- from CSPA, from the Clearing House, the World Future Society, and a host of other sources. If he had the time, he would be wiser for reading the six volumes of the Rockefeller Report. There is much to be learned from the *Global 2000 Report*.

What is missing? People who are making decisions don't have time to be avid readers.

Foresight to be meaningful must be delivered, very succinctly, at the decision point, and it must explore the ramifications of precisely the issue being addressed.

There is another problem with that Platonic ideal. Every choice, every description of alternatives, is being tugged at and influenced by competing departments

and agencies, each with its own perception of the national interest, and each with a well-developed sense of self-preservation.

Those departments are unlikely to welcome a new player, insulated from them, with the authority to make utterances about the national interest and the choices available.

In this real Washington, any proposal for foresight machinery would do well to enlist rather than antagonize these present power centers.

This suggestion is not cynical. Fragmented and ill-managed as they are, the specialists and analysts around the government -- properly organized -- can bring a wide range of useful perspectives into the foresight process. And they are probably better qualified to understand their constituents' needs than would be true of a small band of thinkers sequestered together in the rarified atmosphere of the Executive Office Buildings.

Fourth, product. Descriptions of Hatfield/Ottinger and Gore/Gingrich have emphasized the proposed periodic "World in the Year XXXX" reports and have tended to ignore the provisions for review of governmental activities to analyze their long-term implications. The periodic reports are a useful adjunct to foresight, but that second point -- bringing foresight into the regular decision making process -- is the heart of the issue. How that is done -- how the foresight proponents propose to get foresight into the decision makers' door -- will determine their success or failure in getting the process adopted and in making it work if it is adopted.

An office, even in the White House, is not enough if it is not connected to policy. The object is not to generate studies, but to broaden the decision making process.

Fifth, the private role. Some recommendations have called for a public-private advisory group. Experience suggests that the public role can inhibit the private one in such enterprises. Governments do not particularly relish the idea of creating organizations to second-guess and criticize the administration's conclusions, and one might expect any administration to endeavor to manipulate the membership of any such group so that it would endorse the

administration's views. Failing that, a politically-sensitive administration would tend to play down any "difficult" conclusions as the Nixon administration did with the Rockefeller Commission report in 1972.

I will suggest another variant: a truly private process paralleling the governmental one and keyed to comment on the governmental projections. Let the "wise men" be beyond the reach of government. Such a process would sharpen the policy debate. It would also help to enlist the electorate in the debate about national goals and choices. This last point may be critical. Without the support of an informed electorate, Congress and the Executive are unlikely to face the difficult choices that foresight may point out to them.

FOOTNOTES

1. "A Proposal for Achieving Balanced National Growth and Development," submitted by Senator Hubert Humphrey to the Subcommittee on Economic Progress of the Joint Economic Committee, Congress of the United States, February 26, 1973. U.S. Government Printing Office, 1973.

2. Except as otherwise noted, the discussion of foresight initiatives 1970-1978 is taken from the materials assembled by the Congressional Research Service for the Committee on Energy and Commerce, *Strategic Issues: Historical Experience, Institutional Structures and Conceptual Framework, op cit*, and from "Lessons from the Past," *Global 2000 Report to the President*, Vol. II, Appendix A.

3. The Working Group was chaired by Chester L. Cooper, then a Fellow at the Woodrow Wilson Center, now with Resources for the Future. The proposals are succinctly stated in "A Proposal for Developing a Capability at the National Level for Strategic Policy Assessments," August 9, 1973, (Woodrow Wilson International Center for Scholars, Smithsonian Institution, Washington DC 20560; 10 pp. with Annexes; unpublished).

4. Congressional Research Service, *Congressional Foresight: History, Recent Experiences, and Implementation Strategies, op cit,* p. 124.

5. Council on Environmental Quality and Department of State, *Global Future: Time to Act.* Washington, 1981, pp. 168, 160 and 179.

6. Congressional Research Service, *Congressional Foresight: History, Recent Experiences, and Implementation Strategies, op cit,* p.19.

7. Position Statement of the Global Tomorrow Coalition, Washington, D. C., December 1981, *The Need to Improve National Foresight.*

8. *World Population: Myths and Realities,* US Government Printing Office, 1978.

9. The record of hearings was published in 1986 under the title *Global Foresight Capability of the United States Government.* (See footnote 23, Chapter III.)

XI.

The Obstacles

An abstract model of foresight may be of academic interest, but to achieve any real results, any proposal must be constructed to accommodate political and bureaucratic realities. It must be accepted. Once in place, it must work.

In the ways of Congress and of the Executive branch, there are certain patterns of behavior which may initially dispose both branches against foresight proposals. If recognized and properly used, however, these same characteristics may be exploited to gain support for the proposal.

Let me here offer an impressionistic description of some of the characteristics that proponents of foresight proposals should be considering.

I will touch first upon those matters specific to Congress. Theoretically (see Chapter XII), foresight processes could be introduced in the Executive without a Congressional mandate, but proponents have focused on Congress, and there are solid arguments for going the legislative route. A statutory process is less likely to be dissolved by a change in the administration than is a solely Executive one. Moreover, there are reasons for Congress itself to be involved in foresight.

Congress

These remarks are directed principally toward getting legislation passed.

Dealing with the real Congress. The first obstacle, for many proponents of better foresight, is their own idealization of how Congress works. Among those proponents, one regularly encounters the starry-eyed misperception that all one need do is to convince

Congress that there is a better way of making decisions, and Congress will forthwith adopt it.

Congress doesn't work that way. There are undoubtedly many Congressmen who hope, somehow, to contribute to the nation's well-being. However, even the most idealistic, if they are to remain Congressmen, must respect the cynical old maxim: the politician's first duty is to get elected. They must pay attention to the powerful and the vocal in their own constituencies, and they must trade votes within Congress if they are to pass legislation they want passed. Some Congressmen may even be opposed to proposals that promise to clarify the implications of decisions on which they must vote, if they suspect that such a process may tend to advertize the cynicism of the vote they plan to cast.

Moral: *Don't just show that foresight is better. Build a constituency, either by riding a popular idea (e.g. "efficiency in government") or by enlisting those to whom Congressmen listen, or both.*

Building a constituency. Uncommitted legislators will want to see that there is significant support for any proposal, and that their own support would not only be conceptually sound but likely to improve their political position.

We have shown that there are groups interested in improved foresight that do not necessarily share the environmentalists' specific concerns. Business is interested in the best available estimates of the geographic and age distribution of populations in the future. Investors and insurers are interested in potential risks. The lumber and building industries will be interested in projections of saw timber resources. Labor and educators share with business an interest in forecasts of the economy and the sectors of growth and stagnation. Educators and local governments are most interested in how large the coming school-age cohorts will be. And so on.

These are all potential allies and represent a very powerful constituency for improved foresight. In earlier chapters, we have described business's interest in better governmental data, the Grace Commission's recommendation for their better management, and local and state governments' need for better federal statistics.

Moral: *Find allies in these groups, and define "foresight" broadly enough to interest them.*

Substantive goals vs. procedure. Many legislators probably perceive that the system as it now works is not performing adequately in foreseeing tomorrow's critical issues. Not all of them are willing to embrace specific views about demography or the environment. There is also a widespread perception that process bills, those that establish more or less permanent techniques for dealing with issues, should in principal be divorced from legislation stating a substantive position. This perception is likely to be shared even by some legislators who agree with foresight proponents about the substantive issues.

Moral: *To increase the chance of passage, go for process legislation without mixing it with substantive value judgments. The foresight proponents' purpose will be adequately served if population, resources and environment are included among the issues to be addressed.*

The Administration's role. Any bill will pass more easily with the administration's support than without it, since, after all, the bill must be signed. Congress is hardly likely to override a veto on such an issue, and the administration would be unlikely to make effective use of machinery it didn't want anyway.

Moral: *If proponents are aiming for legislation during this administration, don't treat the administration as an adversary. The same advice will apply to the next -- or any -- administration.*

The Committee system. Congress doesn't often override its own committees. Before a bill reaches the floor, it must be reported out of its committee. The way a bill is drafted will influence the decision as to which committee has primary jurisdiction. Committee chairmen have varying records of support for this sort of legislation.

The history of the Gore-Gingrich bill is instructive. It kept dying in Rep. Brooks' Committee on Government Operations. Rep. Brooks has not shown himself interested in foresight. Rep. Dingell's Committee on Energy and Commerce was much more receptive to the need to find ways to improve the process of governance, and his committee staffers played an active role in developing the legislation.

Perhaps, had the language in the bill included explicit reference to the need for better ways to shape energy policy, it might have been concurrently referred to Dingell's committee, with better prospects for a hearing.

Moral: *Talk to those who know Congress, and cooperate with the staff of friendly committees to shape legislation to go to those committees.*

The Executive Branch

The following observations apply principally to the problem of making "foresight" work, but they also bear upon the problem of gaining initial support for a proposal.

The remarks under "Congress" concerning political constituency and the role of the Administration, of course, apply also to the Executive.

"Pull, don't push". By and large, presidents and their advisers didn't get there by being weak willed. It is easier to gain their support for a proposal that can be shown to be consistent with their own position than it is to force a proposal down their throats.

Moral: *This chapter is being written during the Reagan administration. If foresight proponents wish to go ahead with legislative proposals now, they should be talking with the administration to see whether there is any basis for an approach acceptable to both sides. Population, resource and environmental arguments are unlikely to generate much interest in this White House. The argument for more efficient government, coupled with a broader constituency, seem the most likely points of departure for such a dialogue. One approach would be to organize a single-purpose coalition to begin a dialogue with key staffers in the Office of the Chief of Staff, the NSC, the Domestic and Economic Policy Councils, the White House Office of Policy Development and OMB.*

Money: The gap between the government's obligations and its resources -- the budget deficit -- has never been larger.

Moral: *Proposals to use existing governmental machinery will fare better than proposals to create expensive new machinery.*

Manageability: To keep some sort of workable decision making process going in an increasingly complex world, the issues must be defined as explicitly as possible, the policy choices kept few enough in number to be graspable, and the potential implications of each choice described in very broad-brush strokes. Holism -- the recognition that everything is somehow connected, but frequently in very arcane and vague ways -- is perpetually at war with this need to limit, to define, and to focus on a few key issues.

Moral: *If foresight is to be brought into current policy documents, a way must be found to be very brief and dramatic. (Greater depth and length are permissible in "World in XXXX" projections -- and there is a need for such periodic in-depth surveys of developing trends -- but the cost is likely to be exclusion from current real-world decisions.)*

Words: No President has time to read all that is offered him, and they are all faced with bureaucracies that won't believe that simple fact. Prolixity is mistaken for profundity and, as any erstwhile staffer knows, the White House staff substitutes a few pages of summary for volumes of departmental briefing papers. The departments have learned to live with this process, but it poses an especial danger to foresight proposals. The White House staffer may understand his own specialty, but he will probably not understand what the foresight people are saying about lateral implications.

Moral: *If you want to reach the President, keep it brief, or somebody else will garble your message.*

The "clearance" process, The more broadly defined an idea, the more departments and agencies will have a right to "clear off" on the proposal, and each of them will have its own specific projects and objectives which it will attempt to insert into the proposal. The proponent of an idea learns to define his project as narrowly as possible to minimize the clearance process, to keep the thing pointed in the direction he wants, and simply to move it through government.

In the hypothetical example about biomass in Chapter I, the policy debate would very likely bog down in a contest between the Departments of Energy and Agriculture to assert primary responsibility for biomass/fuel decisions. The smart energy planner (if not the wise one) would have obviated the problem by

posing his initial question more narrowly: "What kinds of support should be offered to biomass conversion plants?" The ensuing debate would miss all the major implications of a shift toward biomass for energy, but it would become much simpler. It could be done intra-agency, and only the OMB need approve it before it went to the President. There is a natural conflict with the foresight advocate's desire to explore all possible ramifications.

Moral: *If foresight is to work better, control over who sees and "clears" -- or at least comments on -- a proposal must be vested in somebody whose exclusive assigned responsibility is the foresight process, not in the hands of those seeking action.*

"Turf." As a principle, any organization will resist any proposal which would shift away from it any reponsibility which it now possesses. Proposals to create super-agencies for planning or foresight run head-on into this principle; proposals to strengthen the agencies' own foresight capabilities do not.

Moral: *Foresight proposals will encounter much less resistance in the bureaucracy if they keep the responsibility within the existing system rather than creating new bureaucratic structures empowered to deal with existing agencies' "turf."*

Time. Clearances may take weeks or months, particularly if the other agency is reluctant. Major policy studies may take years. Some issues can wait for such delays. Many cannot; and frequently the government is forced to act by external events that do not wait.

Moral: *Any proposal for improved foresight -- which is inescapably a complicating addition -- must avoid adding to those delays and would better show how they might be shortened.*

The "need to know." Leaks are endemic in Washington, as each successive president learns to his anger. The leaks may be generated simply by indiscretion or self-puffery, but more frequently they are a tactic by opponents of a proposal, to give the opposition time to mobilize. Administrations invariably react by restricting knowledge of policies under consideration to those who "need to know."

Nothing could be better calculated to frustrate an improvement in foresight. Those who decide who "needs to know" themselves do not know what an excluded participant might have been able to tell them about the potential results of proposed action. In the hypothetical biomass example, the most intractable problem might turn out to be maintenance of water quality. But what bureaucrat would have thought of inviting an EPA water specialist to comment on a Department of Energy proposal about energy from biomass?

Moral: *The "leakage" problem cannot be completely escaped. Any proposal to widen access to policy documents should show how it will control access to sensitive documents.*

"Face." No administration is likely to welcome post-hoc criticism of a decision once made, and such criticism generates an interest in getting rid of the offending voice.

Moral: *Inject the foresight into the policy process before the decision is made. Don't create a machinery that will tend to second-guess completed decisions.*

The urgent vs. the important. The deferral of long-term issues to address urgent ones is chronic in a political system trying to keep up with the geometric growth of the issues to be dealt with.

Moral: *Tie foresight to current issues. Show the long-range or lateral implications of currently proposed actions. Don't prepare a general briefing about "declining water tables in western aquifers." Show "here's what your proposal for a slurry pipeline will do to agricultural production, farm income and exports."*

The "black box" syndrome. Many officials are very suspicious of complex computerized models. They suspect (rightly) that the results can be manufactured by manipulating the equations and coefficients in the computer program (the "black box" which they cannot see inside). Global futures projections contain hundreds of such variables, and even so, are too crude an approximation of reality to predict with confidence. The non-specialist asks "why address a problem that may never exist?"

Moral: *Keep it simple. Begin, perhaps, with projections "if other factors are held constant." Emphasize that the central element of foresight is not to introduce computer models but to bring the appropriate human expertise to bear on policy proposals.*

Access to the President. Washington is a city of courtiers. The name of the power game is access to the President. There are a few glamorous agencies -- State, Defense, Treasury, the CIA -- that have such access. Defense would certainly be heard from, for example, if EPA wanted to do something about water quality that might affect national security; but it is much less certain that EPA would be heard (or even know in advance) if Defense planned to do something that affected water quality.

Most agencies seek access and chafe at their lack of it. They may be expected to defend any system that improves their access.

Moral: *Broaden the number of agencies with a role in foresight, and you gain support for the proposal.*

Momentum: Governmental inertia is not altogether a bad thing. It provides continuity and stability. It is also a force more awesome than most people outside of government can imagine. The force of inertia tends, like the Juggernaut, to crush or brush aside anything that might change its direction.

Moral: *You need a well-placed friend in the White House, if proposed institutional changes are in fact to change the customary ways of doing business.*

XII.

A TENTATIVE PROPOSAL

> *. . . the United States must improve its ability to identify emerging problems and assess alternative responses . . . the Study found serious inconsistencies in the methods and assumptions employed by the various agencies in making their projections. . . .*
>
> *. . . the primary problem is one of coordination. The U.S. Government needs a mechanism for continuous review of the assumptions and methods that the Federal agencies use in their projection models and for assurance that the agencies' models are sound, consistent and well-documented. The improved analyses that could result would provide not only a clearer sense of emerging problems and opportunities, but also a better means for evaluating alternative responses, and a better basis for decisions of worldwide significance . . ."*
>
> --Global 2000, *"Conclusions," Vol. I, pp. 4-5.*

Let me attempt to put together a concrete proposal for foresight machinery that will utilize rather than fall prey to the political and human forces among which it must function.

Recall again the sad story of the President's National Goals Research Staff. I have argued that the creation of an independent office, even in the White House, doing periodic projections of the future would be largely irrelevant to the policy process in the real world. *Global 2000* described real problems, but it was not brought into actual decision making. How does foresight connect with decision making? The object should not be simply to create "The World in XXXX"

scenarios. The objective is to include in the policymaking process the issues such as population, resource and environmental impacts that are relevant to the national well-being.

The proposals below will not deal with technical tools such as computer models or academic models of how one arrives at a perception of national interest.

The heart of the proposal is the creation of a systematic machinery for getting decision making out of the tunnel -- for forcing policy makers to consider the lateral implications of what they propose to do, and make their choice among alternatives with an awareness of all the foreseeable implications of each potential alternative. The very process of creating this machinery will require that different parts of the government learn to communicate -- that they develop mutually understandable terminology, definitions and computer programs so that they can make use of each others' work. And this opening of communications should make the federal government's work more available, more useful, and more open to verification or correction by others outside the government who are pursuing their own foresight work.

Environmentalists, regularly frozen out of the central policy processes, have tended to develop a defensive reaction -- a longing for a mechanism of their own, to force policymakers to address their concerns. They would do better to figure how to create a process and a mechanism which the policymakers will come to think of as their own, as a desirable improvement in their decision making process. Inescapably, this will require that the proposed reform permit the evaluation of the broadest possibly array of lateral implications, not simply those of concern to the environmentalists.

In Chapter I, I identified three ways in which the foresight process should inform the policymakers: (a) show how the lateral impacts of a proposed action may affect other policy interests; (b) show how other issues may affect the action proposal; (c) forewarn government of issues potentially demanding its attention.

The third of these functions would justify a periodic "World in XXXX" survey, but that is only a part of the total requirement.

For the other two functions, go back to the hypothetical example of the biomass energy specialist and the foresight process in Chapter I.

The foresight process calls for an identifiable list of offices

* with specific areas of expertise and responsibility,

* known to each other,

* with technically compatible means for exchanging and handling quantitative data,

* with mutual access to knowledge about policy or action proposals that might impact upon their area of responsibility,

* each with the opportunity to call attention to that potential impact,

* with the chance to explore how changes in their own agencies' policies might achieve an objective under study.

The questions of course remain: How do you structure the decision making process to achieve this sort of interaction without foundering in a mountain of paper and a welter of variables? How do you create an institutional arrangement with the detachment to look ahead, and yet still keep it connected to the decision making process?

Let me describe such an institutional arrangement and then show how it would relate to Congressional, private, local, and international activities in the same area.

The Federal Executive Foresight Machinery

I propose

* a two-tiered network among existing agencies,

* tied together by an Ombudsman in the White House,

* with an explicit public identification of the offices and individuals in the government with the primary working-level responsibility for every identifiable issue of serious concern to government.

To elaborate:

First, the "Ombudsman" should be created. This unit (a very few substantive officers would be sufficient) would be integrated into the White House and interdepartmental decision processes. It would have no substantive responsibilities, but would

* supervise the creation and maintenance of the system described below,

* have access to the flow of all NSC and cabinet level decision documents, for the sole purpose of determining whether account has been taken of all significant lateral implications of proposed actions,

* contact appropriate members of the Policy or Working Groups below (depending upon the sensitivity of the matter) to assure that such an input is made, and impose tight time limits for comment so that "foresight" is not used as an excuse to delay decisions (this is important if foresight is to remain in the decision making process),

* as issues emerge (such as chlorofluorocarbons or acid rain), be responsible for designating a lead agency and office and for assuring that that office in turn mobilizes inputs from the other interested agencies,

* supervise the Working Group's development of common statistical data and terminology (see below), and

* initiate periodic projections of world-wide trends and developments (the "World in XXXX" scenarios).

The chief of this "Ombudsman" unit would necessarily be a strong person, with the President's backing, to have access to the traffic, to avoid being bypassed in the White House, and to command the attention of the departments. A natural place for him

to sit would be in the office of the White House Chief of Staff, or perhaps as Director of the Office of Policy Development.

It is important that the Ombudsman **not** have substantive responsibilities, or he will soon come to be seen as a partisan player in policy debates, to be circumvented by opponents when possible. His job is simply to make sure that the relevant perspectives and implications are brought forth in decision packages. We must go back to the Brownlow report (Chapter II) for the model of this role.

Second, the government should create a functional directory, which would

* identify the areas of policy importance that must be scanned for relevance when decisions are being made; and

* assign the responsibility for each such area to an agency, an office in that agency and, one might hope, a named individual.

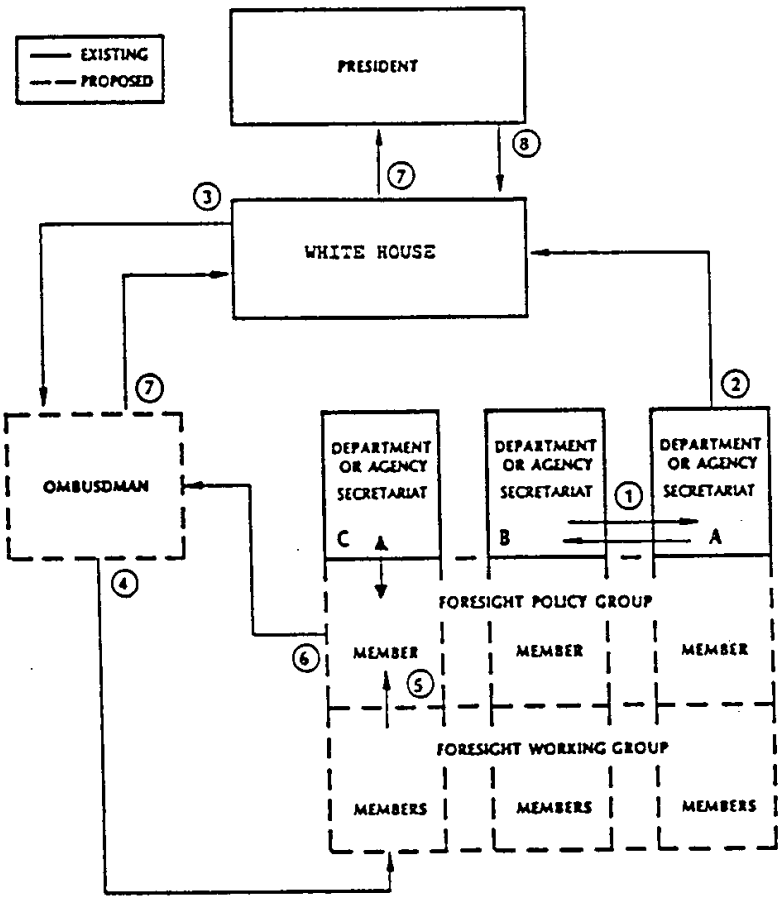
This clarification of responsibilities is essential to any proposal for better foresight (see Chapter II). The uninitiated may legitimately wonder why it does not already exist.

The functional directory would identify the officers on the Foresight Working Group who hold the "watching briefs" covering topics of national concern such as balance of payments, full employment, a stable currency, military security, technology and industrial and agricultural productivity, environmental quality and the preservation of renewable resources. This would identify for the Ombudsman the offices he should invite to comment on the lateral implications of proposed policies, and it would provide a point of contact on policy issues for others inside and outside the government.

There is no need for a new organization and some giant single functional directory. The department directories could be upgraded and standardized to make it possible to approach them by subject rather than by title, as is presently done with the Country Officers list in the Department of State directory.

Figure 2

Proposed Role of the Foresight System in Presidential Decision Making



1 Policy originates and receives traditional clearances (e.g. from Agency B).

2 Proposal goes to White House.

3 Ombudsman receives policy proposal and considers what other agencies may have an input.

4 Ombudsman sends copies to those agencies (e.g. Agency C) with a deadline for reply.

5 Working Group member sends comments to his Policy Group member.

6 Policy Group member transmits comments to Ombudsman, clearing with his own front office according to whatever internal guidelines agencies establish.

7 Comments are included in the final recommendations to the President or White House Council.

8 President or Council makes decision, for action by appropriate departments or agencies.

Third, there should be a Foresight Policy Group (Anybody who can help bring this proposal to reality is entitled to improve on these names.)

* This group would be at the policy level. Each department or major agency would have one member, senior enough to participate in the Secretary's regular staff meetings, and presumably a person charged with planning or overall executive/coordination responsibilities.

* The agencies would nominate their members who would, in the first instance, be responsible for those areas of concern to government that are assigned to that agency.

* Individually, the Policy Group members would nominate their agencies' members of the Working Group, and would be available for consultation with the Ombudsman and with other Policy Group members concerning the coordination of policy proposals.

* These Policy Group members would review proposed foresight submissions from their agency and would coordinate the foresight work with the agency's participation in other policymaking machinery.

* Collectively, the Foresight Policy Group would

  (a) identify policy areas on which the Working Group should be focusing,

  (b) assure that the process is working, i.e., that agencies' comments on proposed decisions are, in fact, being incorporated in the decision document,

  (c) referee Working Group disputes on technical issues (e.g., what computer languages to choose as standard; what geographic divisions to use in assembling information; how to define terms; how to reconcile or present to policymakers any inter-agency differences about the interpretation of data), and

  (d) provide general supervision for the periodic "World in XXXX" reports discussed below. They would not formally clear such reports.

That point about clearance requires some clarification. It will be discussed later in the section titled "The Report."

High level policy groups have been established before and have dissolved into impotence as Cabinet officers devolve the task of participation to progressively lower-ranking officers. The proposed level of this proposed Foresight Policy Group reflects that problem. It would be below the top few managerial officers of an agency, but at a high enough level to assure access to those managers. For most departments, this would be an assistant secretary or chief of policy planning. If further assurance is needed that the Group not degenerate, there is an effective strategem with precedents in the government: require participation by principals only, not by their designees. If issues are discussed important to an agency, it will learn to be there to protect its interests. (As a further refinement, one could allow attendance by the Working Group members "along the wall," without the right of participation, to keep their agencies informed.)

Fourth, there should be Foresight Working Group, nominated as above, consisting of planners or policy officers in the respective agencies, each one explicitly charged with keeping abreast of immediate and long-term developments concerning one of the issues identified in step two.

* These individual members would be the normal contact point for the Ombudsman in seeking lateral input into policy proposals.

* They would constitute an informal, interacting net of experts, to carry out the ongoing give-and-take process of policy formulation described in Chapter I. (Foresight should not be limited to decisions taken in the White House.) Is it fanciful to envisage a day when these experts will be linked through their mini-computers, with access to computerized data banks (such as already exist in private industry) and with a computerized "bulletin board" to exchange information about studies underway and to solicit input?

* They would submit through their Policy Group member brief comments on the relationship of

proposed White House actions to their specific fields of responsibility. (May one hope that a limit of, say, 500 words would be put on such submissions? It can be done.)

* They would sit as a body, in cooperation with statisticians and other specialists, to develop common definitions and procedures so as to simplify the use of each other's statistical data -- an important function in a time of rapid computerization of information. (How did our forefathers ever manage to standardize the typewriter keyboard? Their descendants cannot discipline themselves to make computers that can communicate with each other, and as a result, the "information revolution" threatens to become a Tower of Babel. This would be a good early project for the Working Group.)

* They would draft periodic reports on major, long-term trends (the "World in XXXX" reports).

* Their names would be known, and they would be accessible to non-governmental experts, to educate each other about developments in fields of common interest.

* They would be available to their own departments in the planner's traditional roles.

Finally, the report. A few more words are in order about the periodic "World in XXXX" report, and the way in which the "look ahead" function would be carried out.

These would be, in essence, shorter *Global 2000* reports, pegged to a long time frame. The political cycle being what it is, a quadrennial report would seem sufficient. One might hope for a report at midpoint in a Presidential term, when it might have some effect, rather than at the end of a term when it can become politically contentious or irrelevant to a new incoming administration, or both.

The reports would focus on trends and, more important, on the interaction of trends and the discontinuities or "surprises" generated by that interaction.

As a **product**, the periodic reports would be of value in forewarning the government and the country of

looming issues that, unresolved, portend trouble.

The reports also have an important function as a **process.** They help to identify gaps in our information and weaknesses in our thought processes. They make possible the development of dynamic models with feedback from one area of governmental concern to another. This "feedback" is the heart of a sophisticated foresight process, and it is something that can be achieved only with a collegial group, not within a single department. These feedbacks shape the future, and they are best identified by periodic futures reports bringing different specialists together.

This very process has its own valuable **by-products.** It forces the specialists to make their assumptions clear, to develop mutually understood terminology and definitions so that they can use each others' product. The forecasting process requires that each specialist identify the inputs and outputs from his sector to the other parts of the economy -- including such undesirables as pollution. By identifying these inputs and outputs, and by establishing communication with each other, the specialists engage in a process of mutual education that should result in a much better understanding of how the pursuit of different national activities and objectives may influence each other. Eventually, the different specialists may, as one participant in the *Global 2000 Report* remarked, "stop expecting to use the same water and the same capital."

The reports may help to provoke and inform a **national debate** about developing trends and what they may mean. If this debate leads to something approaching consensus, it generates the political base -- in the face of special interests that may be formidable -- that politicians require if they are to address the issues.

Departments would not be asked to clear or endorse these reports. Departments are strongly inclined to resist projections that seem to run counter to their bureaucratic interests, and they will fight to delay or change such projections. The Department of Defense, for example, would probably resist formally endorsing a study that suggested that the USSR was becoming less threatening -- even if CIA, State and DOD's own analysts agreed in such a projection -- because it might weaken their case for a larger budget. The

record does not show it, but publication of *Global 2000* was delayed by the reluctance of Department of Agriculture policy officials to clear projections by their own analysts.

This sort of bias will never be eliminated. That is a major reason for the existence of parallel private analytical capability to be advocated later in this chapter. The bias -- and the delays -- would be better controlled if the Report is seen, not as a policy document, but as a best effort by the technicians to identify future directions.

Interdepartmental differences of interpretation should not be artificially resolved or squelched. Such differences may point to important conceptual issues. No "party line" would be established through processes other than the existing political ones, and agencies would have their own participants in the process of developing the report.

There would be no policy recommendations in these "World in XXXX" reports, but the President, in forewarding them to Congress, might well outline policies or propose legislation.

Precursors of this system. The machinery is less novel than it may seem. Its novelty is the proposal to apply certain established techniques consistently across the decision making process. Individual precedents are relevant. I have mentioned the Department of State's Country Desk Officers. They have for years played a role somewhat similar to that described here. They act as the central clearing point concerning specific countries, and they function smoothly within the system -- though unfortunately they have not been called upon to look ahead as often or as far as the proposed system would demand.

A somewhat loose precursor of the proposed system of intercommunication was created for *Global 2000*, and it made a real contribution to the government's understanding both of itself and of world-wide trends. That machinery was dissolved when the report was complete.

The most important precursor is the Cabinet Council system itself (see Chapter II). As we have seen, it provided for inter-departmental review of proposed decisions, on a more systematic basis than was ever before attempted. If this machinery is revived in

future administrations, it would clearly be desirable to integrate the foresight machinery into it.

There is an important point to be made here. This proposal calls for the **input into decisions** of a broader range of perspectives. It does not necessarily involve an expansion of the **decision making group.** Too many cooks can wreck a coherent program. This may indeed have been a fatal flaw in the Cabinet Council system set up and then abandoned in the Reagan administration. The survivors at least believe that they now have a better system because it is smaller.

Advantages of the system. At the risk of belaboring the obvious, let me detail some of the ways in which this machinery would fit the needs of the foresight process as they have been set forth in earlier chapters.

* The strength of the system proposed here is that it provides systematically for bringing lateral and long-term implications to the attention of the decision makers, without attempting to prejudge who those decision makers will be. Every President organizes the Presidency his way, from personal and centralized (Johnson), to delegated (Eisenhower), to collegial with a commanding central presence (Roosevelt). The process proposed here would function under any of those arrangements.

* The key to this structure is that it undertakes to link people, not data banks. With the best data in the world, organized to be available on request, an individual cannot practice effective foresight. There is simply too much information. The purpose here, rather, is to identify and make use of the experts, each of whom, in his own area, may hope to stay abreast of the current state of knowledge.

* It would provide the linkages at the technical level that would generate cross-communication, and it would provide a forum and a means for adopting standard definitions and terminology where possible, which in turn would make it easier for different departments to use each others' work.

In this instance, what is good for the government would be good for those outside it. Accessibility, clarity and uniformity would make it easier for Congressional, private, local government, academic and business people to use the statistics.

* It would connect foresight with policy.

* The existing agencies, with their role assured through their control of the appointment of Working and Policy Group members, would probably support the new machinery rather than opposing it.

* The public identification of specific offices and individuals with specific issues of policy concern would provide a useful key to the bureaucracy, whether for businessmen or local governments developing their own plans, environmentalists trying to get their point into decision making, or private specialists attempting to inform the government of important information it may not have. This whole process of interchange should help to correct the insularity of thinking in the different components of our society.

* This is probably the least expensive of all the foresight proposals that have been made.

* The proposal is focused upon bringing informed human judgments to bear on current issues, not upon constructing futures models; it puts computers where they belong -- as tools rather than arbiters.

* The proposal emphasizes the role of the White House in setting time limits for lateral comments on proposals. The existing rather amorphous practice usually requires originators of proposals to seek the clearance of other interested departments before making the proposal. The change could actually speed up the decision process rather than delaying it.

Critics will argue that this system, by broadening the number of people involved in decision making, will lead to more "leaks." To a degree, the criticism is valid. Any effort to broaden the perspective in decision making will necessarily require the participation of people not currently involved. In amelioration, however, let me make two points:

This machinery rigorously controls the process by limiting access to identifiable individuals who need to know. The only additional people with access to the entire range of pending decisions would be the small Ombudsman staff close to the President, and this staff might well replace rather than add to existing White House positions.

Among those of us who have watched the decision making process from steerage class, there is the rather cynical saying that "the ship of state is the only vessel that leaks at the top." Veteran reporters would probably agree that most of the leaks that embarrass presidents come, not from the depths of the bureaucracy, but from a small group at the top, and this would not be significantly expanded. Bureaucrats generally know that contact with the press is usually only a source of trouble for them, personally. It is the politically ambitious who feel the need to cultivate the press.

Finally, as to the spectre that the new procedures would add still more words to the decision making process: Does the addition of perhaps 50 or more areas mean the addition of 50 more enclosures to decision documents? Perhaps. That is why they must be brief. (Averill Harriman as Undersecretary of State refused to read more than a 5" x 7" card summary of any document, and he was very well-informed and effective.)

On most proposals, most foresight officers would probably report "no significant impact." Moreover, originators of policy memoranda naturally try to minimize challenges to their proposals. If they know that another agency will have the opportunity to comment on the proposal, they are likely to consult with that agency to adjust features of the proposal that might cause problems. The foresight network would provide a natural vehicle for such informal adjustment, and the lateral issues would be more likely than at present to be considered in the proposal itself.

The Role of Congress

Congress gets involved in foresight in two ways:

* What it asks the Executive to do; and

* What it does itself.

Since Congress is generally more accessible to private citizens than the Executive bureaucracy, environmentalists have tended to go to Congress more than to the Executive branch, saying, in effect: "Make the President do something about foresight."

Congress can only go so far in making the President do things. If the President really wanted to

improve foresight capability, he could do so with an Executive Order. If he felt that he needed some mandate from Congress to address population, resource and environmental issues (an unlikely contingency) the National Environmental Policy Act of 1969 (NEPA) provides the statutory authority.

The Washington landscape is littered with vestigial commissions (each with its sinecured Commissioner) that the incumbent President doesn't want the bother of abolishing but doesn't want to use. If the President chooses to guard the henhouses with foxes, even Congress has only limited power to dissuade him.

This gloomy observation notwithstanding, there are things that Congress could well do to encourage the Executive Branch to improve its foresight capability.

First, it could pass foresight legislation. Such a bill might well

* state the need for broader foresight capability than now exists, given the increasing complexity of issues with which government is concerned,

* identify the issues that should be incorporated in the foresight process,

* offer as much guidance as to the nature of the foresight machinery as the Congressional proponents consider desirable in light of the intricacies of Congressional-Executive relations and the need for delicacy in telling the Executive how to organize itself,

* require that the administration attach to any future administration-originated legislative proposals a statement of the long-term impact of that legislation on the issues identified,

* call for a quadrennial report to Congress by the President, identifying long-range global issues which may lead to a need for Congressional attention (a means of giving focus and importance to the periodic "World in XXXX" reports),

* urge the President to encourage and increase U.S. participation in international data-gathering and foresight studies (see below).

The Critical Trends Assessment bill (the "Gore-Gingrich bill") is a good beginning at such legislation.

Second, it could hold oversight hearings on the operation of NEPA. Oversight hearings would dramatize the need for more systematic foresight capability.

So far, I have discussed what Congress might do to influence the Executive branch. It is not so easy to propose what Congress might do to improve its own foresight process, since it is aleady well ahead of the Executive branch in this area. Here are a few tentative thoughts.

First, it could expand its own system of "impact statements" accompanying legislation -- the House and Senate already have some such requirements -- to address the broader list of issues identified in the proposed foresight legislation.

Second, it might examine the existing processes of oversight hearings and the multiple referrals of proposed legislation to potentially interested committees. Is this process itself sufficient assurance that all the significant potential implications of proposed legislation are considered? One wonders whether broad surveys such as those occasionally undertaken by the Congressional Clearinghouse on the Future might usefully be referred formally to the Congressional Committees to see if Congressional activity is justified.

Third, Congress could usefully refer the proposed quadrennial Presidential report to its committees for hearings as to any proposals for Congressional action.

The Role of Private Groups in the Foresight Process

In earlier chapters, it should have become clear that the federal government hardly has a monopoly on foresight. State and local governments, business, philanthropic organizations, scientific associations and academia have thir own foresight processes, and from time to time they have attempted to help shape the federal government's practices. (State and local government are here treated as "private" simply for brevity.)

The federal government should be asking

* what can it do for them? and

* what can they do for it?

What can it do for them? I have proposed a regularization of data gathering and analysis, and a way of making it clearer who in the government is responsible for what. This is essential for the government's own thinking processes; it would also be very useful for local governments and businesses who need to know where information can be found in the federal government.

Given the importance to the national well-being of good planning in these centers of decision making, the federal government has an interest in making that improvement.

What can they do for it? Government foresight will not improve very much unless there is a broad base of public support. Most of us tend to forget that. Because the private role tends to be diffuse, one can easily forget how pervasive it is.

Foresight, if it is used, involves trade-offs: paying higher taxes or prices to preserve pure groundwater; paying more for energy to avoid losing forests to acid precipitation. These trade-offs become politically feasible only when there is a broad agreement that they are needed. This is another, and a compelling, argument for opening government to a broader information exchange with the private sector.

The government might even learn something from the exchange. Without attempting a fine judgment, one can safely assert that the technology that generates the issues requiring foresight has come mostly from the private sector, and that the private sector as well as government has been deeply involved in studying the ramifications of technological and economic change.

There is an explosion of knowledge underway, and the private sector is probably ahead of government in figuring how to keep up with it. Data banks and information retrieval systems such as Lockheed's "Dialogue" or Mead Data Central's "Lexis" and "Nexis" services can be as useful to the governmental as to the private analyst. (See Chapter VIII, footnote 1.)

These examples all argue the generalized desirability for more open governmental processes.

There are more explicit ways in which the private sector could improve governmental foresight efforts.

First, it could organize itself to press for the reform of governmental foresight.

For two generations, there has been a growth of private "think tanks." Particularly for those around Washington such as The Brookings Institution, Resources for the Future, the World Resources Institute or the American Enterprise Institute, an avowed purpose has been to bring private scholarly perspectives to bear upon issues with which the federal government is (or perhaps should be) wrestling. Most of these groups have some multidisciplinary capability. Some of them undertake periodic cross-disciplinary surveys of critical trends. If one defines foresight broadly, there are probably hundreds of private organizations in the Washington area alone that have an interest in better governmental foresight.

The American Society for Public Administration (ASPA) has existed for nearly fifty years, "dedicated to better government." Over the years, its *Review* has carried much of the national debate about governmental decision making processes.

The National Academy of Public Administration is interested in the way the White House organizes itself and has sponsored a first rate study of the planning function at that level.[1]

The National Planning Association was created to address questions closely akin to foresight. It "was founded during the Great Depression of the 1930s when conflicts among the major economic groups -- business, labor, agriculture -- threatened to paralyze national decisionmaking on the critical issues confronting American society. It was dedicated to the task of getting these diverse groups to work together to narrow areas of controversy and broaden areas of agreement and to provide on specific problems concrete programs for action..."[2] In a sense, it was thus setting up a foresight process in microcosm. Moreover, it concerned itself (as have few other private groups) with the decision making machinery of the federal government itself. It claims paternity for the post-World War II

legislation creating the Council of Economic Advisers and the Joint Economic Committee of Congress.

The Global Tomorrow Coalition was created in the wake of the *Global 2000 Report* to seek action on the problems identified in that report, including the need for better foresight.

Improved governmental foresight machinery may possibly come about because of an internal initiative within some future administration, but it is more likely to happen if organizations such as these make common cause with the other private groups that use federal government data and analyses, to press for better and more open governmental decision machinery.

Advocacy, however, comes close to lobbying, which is limited by law and organizational charters. No group has arisen to spearhead such advocacy, and none is presently in sight.

Until such a coalition is formed, there is not likely to be much improvement in governmental foresight.

Second, the private sector should systematically second-guess the government's "looking ahead" exercises. There are no present plans for a new *Global 2000 Report*, but there are plenty of sectoral or single-issue forecasts. Private organizations already critique such forecasts and sometimes issue their own forecasts on the same topic. A good example is the ongoing debate about the potential effects of nuclear war, in which the Department of Defense and the Federal Emergency Management Agency (FEMA) have been pitted against a shifting coalition of non-governmental scientists, with NOAA's National Center for Atmospheric Research closer to the non-governmental scientists than to the other two government agencies.[3] On an issue central to the survival of civilization, it is well that the nation has not had to rely simply on the official view, influenced as it is by massive bureaucratic self-interest.

It would be valuable if some coalition or organization were to undertake the responsibility of systematically scanning new government studies and either itself providing comment or identifying an appropriate private respondent and encouraging it to do so. The media would soon discover this source of information about new government studies, and its

existence would thereby provide a way of informing the public of the range of viewpoints on the issues.

The very fact that a capable private group exists and plans to comment on any governmental report is itself a protection against government's shaping the report for political convenience. If the private group is in communication with the governmental specialists, and if it can have access to the reports in draft form, its influence will be greater. (This is another reason for making public the names and responsibilities of the Foresight Working Group.)

Private commentary on *Global 2000* was hardly more than peripheral praise mixed with a few potshots. No private group was able to duplicate or comment in depth on a study of that sort.

This argues for the creation of a private Foresight Foundation, either as a new group, if sufficient funding can be found, or through the cooperation of existing groups. Its function would be to influence and to comment on forecasts prepared by the government, to mobilize other groups, and to offer policy suggestions. It could make its own projections, if the government did not. The private group would need to be sufficiently sophisticated and well-financed to analyze the government's computerized projections and to do its own.

Even if the private Foundation's primary focus were on the periodic long-term projections, it would naturally come to play a role in the government's other foresight functions, particularly through its connections with Foresight Working Group members. It would not be constrained from commenting after the fact on governmental policy announcements.

The Foundation's sponsors should include business and labor organizations and other functional groups, if possible. The broader the spectrum it represented, the more weight would be given to its voice, even though this might be achieved at the expense of crispness in its policy recommendations. These other groups are natural allies. They need forward information in order to do their own planning.

International Cooperation

Many issues transcend national borders, and cooperation with international organizations and other sovereign governments is required if they are to be resolved.

I have described some of the foresight efforts elsewhere in the world and I have argued in some detail why the United States should cooperate in those efforts.

It is to our own national interest to pursue international cooperation, not only in the exchange of data but in ongoing cooperation to develop the techniques of foresight and forecasting. This is the groundwork for the consensus which will be essential if we are to cooperate to address multinational problems.

In turn, this suggests:

* that Working Group members should participate in relevant international studies.

* that environmentalists interested in the foresight function should be making common cause with the scientific community in arguing against further U. S. withdrawals from international data exchange and cooperation in futures modeling.

* that this is a legitimate point for inclusion in foresight legislation (see above).

Postcript

An observer of the present Washington scene, if asked to identify the critical problems facing the nation, might justifiably include -- somewhere near the top of the list -- the question whether our thought processes and institutions are adequate to deal with the complex, accelerating and interactive world in which we live.

Institutional changes alone will hardly guarantee that the nation will make the right decisions. That will continue to depend on the quality of the people who make the decisions.

Differences will persist as to what the trends are and how important they are. Bureaucratic and political self-interest will not go away, and they will continue to shape decisions.

No analytical framework is more than a crude simplification of reality, and we are unlikely ever to know enough about all the variables to predict the future.

Nevertheless, an effective institutional structure can help to channel and organize the ways in which decisions are approached. Advocates of better foresight can legitimately claim that it will make the system a lot better than it is now. By itself, that is sufficient justification for reform.

The institution should become part of the landscape, like the NSC. Each new administration should not have to try to re-invent it.

Some commentators dismiss the importance of institutional reform, on the grounds that the individuals are crucial and that the system of institutions in which they work is unimportant. If the reader doubts the importance of the institutional framework, I would suggest that he examine the past and consider

* the impact of a single institutional concept -- representative democracy -- upon the evolution of the political process; or

* what the concept of the limited liability corporation has meant for the growth of modern economies; or

* the evolution of the scientific method as a key element in the present explosion of knowledge.

It would perhaps be grandiose to make a comparable claim for this or any other foresight machinery, but who knows? With a better system to help to accommodate and direct the extraordinary burst of creative invention amid which we now live, our society may even succeed in riding this technological tiger that we have so nonchalantly mounted.

FOOTNOTES

1. John E. Harr, "The Planning Function in the Executive Office," prepared for the Presidential Management Panel of the National Academy of Public Administration, April 1980. (Unpublished; contact the Academy at 1120 G Street NW, Suite 540, Washington DC 20001; (202) 347-3190.)

2. Description of purpose, p.1, "Publications 1985," National Planning Association, 1616 P Street NW, Suite 400, Washington DC 20036; (202) 265-7685.

3. For the recent status of the debate, see "Nuclear Winter Debate Heats Up," *Science*, 16 January 1987, "Armageddon Revisited," *Science*, 12 June 1987, and "Economic Collapse Tied to Atom War," *New York Times*, Sunday, June 21, 1987, pp. A1 and A26.

APPENDIX A

The Cabinet Council System in the White House

The Cabinet Council system lasted from February 1981 until April 1985.

The creation of the system was announced in the following press release from the White House, dated February 26, 1981.

Statement by the Press Secretary

The membership of each Cabinet Council has been finalized. The Cabinet Councils are designed to operate as subgroups of the full Cabinet, with the President presiding. Full Cabinet meetings will continue to focus on broad issues affecting the entire government and on overall budgetary and fiscal matters. Cabinet Council procedures have been developed and endorsed by the President. The procedures are intended to create an orderly process for reviewing issues requiring a decision by the President.

The Cabinet Council procedures are:

- Each Cabinet Council will be chaired by the President.
- Each Cabinet Council has a designated chairman pro tempore who will guide the direction of the Council and will serve as the chairman of working sessions in which the President is not in attendance.
- An executive secretary will be appointed for each Cabinet Council from the Office of Policy Development. This individual, working with the Office of Cabinet Administration, will coordinate the activities of each Cabinet Council, composed of the executive secretary, representatives of the member departments, and other personnel as needed, to prepare background materials, refine policy options and recommendations, and otherwise assist the Cabinet Council.

- Issues will be sent to Cabinet Councils by the Office of Cabinet Administration. Notification of such assignments will be communicated immediately to all Cabinet members to assure full opportunity to participate in consideration of each issue.

- Presidential decisions, made in or after Cabinet Council meetings, will follow full discussion by any Cabinet member who wishes to participate. Council meetings are open to any member of the Cabinet. Decisions will be reported to the full Cabinet as they occur. When full Cabinet review is required, the matter will be set for a meeting of the full Cabinet.

Cabinet Council on Commerce and Trade

Secretary of Commerce, *Chairman Pro Tempore*
Secretary of State
Secretary of the Treasury
Attorney General
Secretary of Agriculture
Secretary of Energy
Secretary of Labor
Secretary of Transportation
U.S. Trade Representative
Chairman, Council of Economic Advisors
*The Vice President
*Counsellor to the President
*Chief of Staff
*Assistant to the President for Policy Development

Cabinet Council on Human Resources

Secretary of Health and Human Services, *Chairman Pro Tempore*
Attorney General
Secretary of Agriculture
Secretary of Labor
Secretary of Housing and Urban Development
Secretary of Education
Administrator, Veterans Administration
*The Vice President
*Counsellor to the President
*Chief of Staff
*Assistant to the President for Policy Development

Cabinet Council on Economic Affairs

Secretary of the Treasury, *Chairman Pro Tempore*
Secretary of State
Secretary of Defense
Secretary of Commerce
Secretary of Agriculture
Secretary of Labor
Secretary of Transportation

Director, Office of Management and Budget
U.S. Trade Representative
Chairman, Council of Economic Advisors
*The Vice President
*Counsellor to the President
*Chief of Staff
*Assistant to the President for Policy Development

Cabinet Council on Natural Resources and the Environment

Secretary of the Interior, *Chairman Pro Tempore*
Secretary of State
Attorney General
Secretary of Agriculture
Secretary of Commerce
Secretary of Transportation
Secretary of Housing and Urban Development
Secretary of Energy
Chairman, Council on Environmental Quality
Chairman, Council of Economic Advisors
Administrator, Environmental Protection Agency
*The Vice President
*Counsellor to the President
*Chief of Staff
*Assistant to the President for Policy Development

Cabinet Council on Food and Agriculture

Secretary of Agriculture, *Chairman Pro Tempore*
Secretary of State
Secretary of the Interior
Secretary of Commerce
Secretary of Transportation
U.S. Trade Representative
*The Vice President
*Counsellor to the President
*Chief of Staff
*Assistant to the President for Policy Development

Cabinet Council on Legal Policy

Attorney General, *Chairman Pro Tempore*
Secretary of State
Secretary of the Treasury
Secretary of the Interior
Secretary of Commerce
Secretary of Labor
Secretary of Health and Human Services
Secretary of Housing and Urban Development
Secretary of Transportation
Director, Office of Management and Budget
Counsel to the President
Chairman, Administrative Conference of the United States

*The Vice President
*Counsellor to the President
*Chief of Staff
*Assistant to the President for Policy Development

Cabinet Council on Management and Administration

Counsellor to the President, *Chairman Pro Tempore*
Secretary of the Treasury
Secretary of Commerce
Secretary of Defense
Secretary of Health and Human Services
Secretary of Transportation
Secretary of Energy Director, Office of Management and Budget
Administrator, General Services Administration
Chairman, Administrative Conference of the United States
Director, Office of Personnel Management
*The Vice President
*Chief of Staff
*Assistant to the President for Policy Development

* Ex officio member

APPENDIX B

Abolition of the Cabinet Councils

THE WHITE HOUSE

Office of the Press Secretary
(Santa Barbara, California)

For Immediate Release April 11, 1985

STATEMENT BY THE PRESIDENT

Today I am announcing the creation of two cabinet-level bodies -- the Economic Policy Council and the Domestic Policy Council -- to assist me in the formulation and execution of domestic and economic policy. I will chair both Councils. These two Councils will replace the seven existing Cabinet Councils and the Senior Interagency Group-International Economic Policy. The new entities will streamline policy development and decision making. Together with the National Security Council, they will serve as the primary channels for advising me on policy matters.

The Economic Policy Council will be composed of the Secretaries of State, Treasury, Agriculture, Commerce and Labor, the Director of Office of Management and Budget, the United States Trade Representative and the Chairman of the Council of Economic Advisors. It will provide advice to me concerning all aspects of national and international economic policy. The heads of the national security community departments and agencies and the Assistant to the President for National Security Affairs will participate in Council meetings whenever international policy or budget matters are discussed. In my absence, the Secretary of the Treasury will serve as Chairman Pro-Tempore.

The Domestic Policy Council will be composed of the Attorney General, the Secretaries of the Interior, Health and Human Services, Housing and Urban Development, Transportation, Energy and Education, and the Director of Office of Management and Budget. It will provide advice to me on domestic and social policy. In my absence the Attorney General will serve as Chairman Pro Tempore.

The heads of non-member departments and agencies will be invited to participate in either Council's deliberations whenever matters affecting their organizations are on the agenda. The Vice President and Chief of Staff will serve as ex-officio members of both Councils.

The new, streamlined decision making process enhances my commitment to cabinet government. It will provide for added accountability and efficiency in formulating and implementing policy.

# # #

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APPENDIX C

Federal Directories Relevant to Foresight

There are several directories that identify U.S. Government offices and officers or provide guides to federal data sources and modeling programs. Except for the very broad language of the *U.S. Government Manual*, none of these undertakes to define who has what policy responsibility in the government -- the need for such a guide being one of the four recommendations in Chapter XII. Nevertheless, an awareness of these directories may be of use to the researcher or the foresight advocate.

The broad governmental directories have been described in the text: the *U.S. Government Manual*, the *Congressional Directory* and the departmental directories for those departments and agencies that publish them. All are available from the Government Printing Office and listed in its bibliography of "Directories and Lists of Persons and Organizations" (Subject Bibliography SB-114, November 5, 1986, periodically updated.) Most of the individual directories are simply listed by title down to the office or division level. Some departments and major agencies are not covered, whether from bureaucratic lethargy or misplaced zeal for secrecy. (One wonders, for instance, if it is necessary for CIA to protect its research and estimates staff so completely from contact with the outside world.)

The privately published *Federal Executive Directory* covers about the same ground as those three sets of sources, but does so more systematically and is updated bimonthly. It is cross-indexed to a name list of several thousand officers in Congress and the Executive, and the Congressional section is cross-indexed by individual, committee and district. There is a key word index, confined almost entirely to an alphabetical listing of office names. For the generalist, it is the best single synoptic guide to Washington; it includes a number of semi-governmental organizations such as the Smithsonian and the National Academy of Sciences and, somewhat mysteriously, one multilateral organization, the World Bank. (Carroll Publishing Company, 1058 Thomas Jefferson Street NW, Washington DC 20007; (202)333-8620. Updated bimonthly; sold by subscription for $140 per year. The company publishes similar county, state, city and other directories.)

Congressional Information Service (CIS) publishes a much more ambitious set of directories keyed to data rather

than to individuals. For our purposes, the relevant publication is *American Statistics Index*, "a comprehensive guide to the statistical publications of the U.S. Government." It consists of an index volume and a volume of abstracts, published monthly with cumulative annual editions. One can search the index by subject, name, title, type of data breakdown (e.g. regional and by age group), and agency report number, and then look up the appropriate abstract. A companion microfiche library makes it possible to complete the search within the CIS system. The service is aimed at libraries, and costs $770 to $2055 per annum (not including the microfiches), depending upon the size of the library. A review of the index confirms the publisher's claims for it. It is indeed a single, comprehensive guide to federal statistics. It effectively replaces the *Federal Statistical Directory*, which was published until 1979 by the now-defunct Office of Federal Statistical Policy and Standards.

CIS publishes comparable directories covering international statistics, the U.S. Federal Register, Presidential Executive Orders and Proclamations since 1789, the Code of Federal Regulations, Congressional committee hearings and other Congressional data, U.S. Supreme and Appeals Court records, plus various state and urban documents. (Congressional Information Service, Inc., 4520 East-West Highway, Suite 800, Bethesda MD 20814-3389; (301)654-1550 or (800)638-8380.)

The private Bureau of National Affairs provides somewhat similar services, but in more restricted areas: environment; labor; legal; business and economics; and tax management. (1231 5th Street NW, Washington DC 20037; (202)452-4200.)

Two other private publishers specialize in publishing guides to data and data sources. Let me call attention particularly to Paul Wasserman *et al, Statistics Sources* (8th Edition, 1983), a two-volume guide to U.S. statistical publications (Gale Research Company, Book Tower, Detroit MI 48226). Facts on File Publications, of New York, offers a *Sourcebook of Global Statistics* (1985).

The closest thing to an overall official directory of data and sources is produced by the General Accounting Office (GAO). It is entitled "Federal Information Sources and Systems." Theoretically, it is limited to sources and information systems covering "fiscal, budget and program-related information." In fact, that is a lot of ground, and this would already be a valuable source for a foresight group. It is not well indexed for our purposes, but the

format is excellent. For each entry, there is an OMB funding code, a program title, a note on "Congressional relevance," the statutory authority for the system, a note whether it is available for public access, a description of its geographic scope, and a brief characterization of the system, with inputs and outputs. For each entry, an agency contact and telephone number are given. The directory is updated every four or five years.

Unfortunately, GAO no longer distributes the directory through the Government Printing Office, relying instead on its own much more restricted distribution. The author has not found anybody in the bureaucracy who is aware of the directory. This suggests that another problem for foresight is the basic task of interesting different cells of the government in what is going on elsewhere. ("Federal Information Sources and Systems, A Directory Issued by the Comptroller General, 1985." General Accounting Office, stock number AFMD-55-3. Available from GAO at P.O. Box 6015, Gaithersburg MD 20760; (202)275-6241; or at 700 4th Street NW, Suite 1100, Washington DC; $24.00.)

There are a few other governmental publications of historical interest or of more limited scope.

In 1978, the old Office of Federal Statistical Policy and Standards published a *Statistical Policy Handbook* including federal statistical directives and listing various interagency committees with statistical responsibilities. (U.S. Government Printing Office, Publication Stock Number 003-005-00179-4; 85 pp; $5.50.)

On the specific question of foresight, the U.S. Geological Survey (USGS) commissioned a small volume that was intended to be the beginning of a computerized data bank on federal organizations involved in strategic planning. A brief First Edition was published for USGS by Virginia Polytechnic Institute in 1981, but the funding ceased and the principal author knows of no ongoing work on the project. (Robert C. Stuart and David Weaver, "Strategic Planning in Federal Agencies: A Directory," 59 pp; Division of Environmental and Urban Systems, College of Architecture and Urban Studies, Virginia Polytechnic Institute & State University, Blacksburg VA 24061.)

The GAO undertook a somewhat half-hearted attempt to survey computer models in use in the Executive branch and in 1982 published a "Survey to Identify Models Used by Executive Agencies in the Policymaking Process." It is limited to mathematical models, and it does not characterize the models listed or give directions as to how

to access them or make contact with the modelers, but it is a start. (GAO/PAD-82-46, September 24, 1982; U.S. General Accounting Office, Document Handling and Information Services Facility, P.O. Box 6015, Gaithersburg MD 20760; (202)275-6241.)

It would be imprudent in this short survey to try to identify the more limited directories or guides to data put out by government agencies covering one or another sector of activity. Given the importance attached throughout this book to environmental and resource concerns, however, let me identify one or two in that area that were or are of use.

In 1977 *Federal Environmental Data: A Directory of Selected Sources* was assembled by a private contractor for the National Science Foundation. The directory, dated November 1977, was distributed through the National Technical Information Service (NTIS), Department of Commerce, 5285 Port Royal Road, Springfield VA 22151. The format is clear and explicit and would provide a useful model for future efforts.

More recently, and in response to business criticism of the difficulty of finding information sources in government, the U.S. Department of Energy and CEQ have jointly published a "Sourcebook: Gaining Access to U.S. Government Information on the Environment and Natural Resources." Within the limits of its title, this is a very impressive contribution; it has helped to offset the decline which had otherwise seemed to be taking place. It describes data banks, lists individuals and organizations, public and private, in the U.S. and abroad, has a subject index, and gives advice as to how to pursue elusive information. (DOE/PE-T1 (DE 84017419), November 1984. Available from NTIS, U.S. Department of Commerce, Springfield VA 22161.)

I apologize to the authors and the issuing organizations if I have left any useful titles out of this survey.

APPENDIX D

Survey of Selected Citizens' Goals and Futures Projects (@ 1987, Institute for Alternative Futures)

The Institute for Alternative Futures is in the process of updating its 1981 survey of futures and goals projects around the world. The listing below includes the contacts for the active or recently completed projects as of June 1987. If you know of other projects (now active or completed) please send information on them to:

IAF
1405 King St.
Alexandria, VA 22314

Arkansas

Jobs for Arkansas' Future
Craig Smith
Governor's Ofc. State Capital
Little Rock, AR 72201
501-371-2345

California

California Tomorrow
Debbie Wenzel
Fort Mason Center
Building B
San Francisco, CA 94123
415-441-7631

Pasadena Renaissance: Planning for the Year 2000
Judith Weiss
Pasadena City Hall
100 N. Garfield Avenue
Pasadena, CA 91109
818-405-4222

Placentia 2000 Project
Roger Kemp
437 Kiolstad Drive
Placentia, CA 92670
714 993-8117

Colorado

Blue Print for Colorado
Ms. Mary Pat Wilson
1860 Lincoln Street
Suite 560
Denver, CO 80295-0501
303-831-7411

Citizens' Goals for the Colorado Springs Community
Ms. Tweed Kezziah
P. O. Box 128
Colorado Springs, CO 80901
303-632-2618

The Economic Renewal Project, Carbondale
Michael Kinsley
Rocky Mountain Institute
Drawer 248
Old Snowmass, CO 81654
303-927-3128

Connecticut

Commission on Connecticut's Future
Dr. Gary Yohe
80 Washington Street
Hartford, CT 06106
203-566-8344

Fairfield 2000
Lynn Laitman
Regional Plan Association
500 Summer Street
5th Floor
Stamford, CT 06901-1306
203-255-1011

Florida

Beacon Council: Strategic Proposal for Dade County's Economic Future
Tom Ferguson
80 S.W. 8th Street
Suite 2400
Miami, FL 33130
305-536-8000

Goals 2000, Orlando
Fred Kittinger
Post Box 1234
Orlando, FL 32802
305-425-1234 ext. 226

House Advisory Committee on the Future
Gail Albritton
324 The Capital
Tallahassee, FL 32399-1300
904-488-0710

Vision 2020, Ocala
Dr. Cash Pealer
2130 NE 8th Street
Ocala, FL 32670
904-854-2322

Visions 2000, Gainesville
John Hotaling
618 N.W. 13th Ave
Gainesville, FL 32601
904-377-7635

Idaho

Boise Future Foundation
Gary Lyman
1910 University Drive
University Research Ctr.B-139
Boise, ID 83728
208-385-3576

Illinois

Tri County Tomorrow, Peoria
Richard Neumiller
CILCO
300 Liberty Street
Peoria, IL 61602
309-672-5439

Illinois 2000 Foundation
David Baker
Suite 1960 North Wacker Dr.
Chicago, IL 60606
312-372-7373

Indiana

The Futures of Indiana
Indiana Economic Development Council, Inc.
Brian Bosworth
One N. Capital
Suite 425
Indianapolis, IN 46204
317-631-0871

Iowa

Grinnell 2000
Ben Webb
Grinnell 2000 Foundation
P. O. Box 771
Grinnell, Iowa 50112
515-236-6311

Kentucky

Project 21
John Clark
P. O. Box 817
Frankfort, Kentucky 40602
505-695-4700

Kentucky Tomorrow: The Commission on Kentucky's Future
Kris Kimel
Chief Administrative Asst.
Office of the Lt. Governor
The Capitol
Frankfort, KY 40601
502-564-7562

Louisiana

Baton Rouge 2000
Robert Dolese, Director
City Parrish Planning and Zoning Commission
P. O. Box 1471
Baton Rouge, LA 70821
504-389-3144

Maryland

Commission on the Future of Montgomery County Govt.
Justine Ferber
100 Maryland Avenue
Rockville, MD 20850
301-251-7926

Toward the Year 2000
Michael E. Hickey
Howard County Public School System
10910 Route 108
Ellicott City, MD 21044
301-992-0500

Massachusetts

Special Senate Committee on Long Range Policy and Planning
Cynthia Costas
State House
Room 416B
Boston, MA 02133
617-727-7200

Blue Print 2000
Chris Scott
State House
Room 259
Boston, MA 02133

Mississppi

Mississippi 2020
Bob Kochtitsky
P. O. Box 31292
Jackson, Mississippi 39206
601-366-8467

Missouri

Missouri Opportunity 2000 Commission
Gregg Hartley
830 Truman Bldg.
Jefferson City, MO 65102
314-751-5154

New Jersey

General Assembly Task Force on the 21st Century
Robert Larson
6 Fairview Place
Montclair, NJ 07043
201-746-8788

The Regional Forum
Dianne Brake
621 Alexander Road
Princeton, NJ 08540
1-609-452-1717

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Morris County 2000
Theodore Goodman
230 Madison Avenue
P. O. Box 197c
Convent Station, NJ 07961
201-984-2000

New York

Commission on the Year 2000, N.Y.C.
Robert Leitman
New York City Commission on the Future
100 Church St., 20th Floor
New York, NY 10007
212-566-0047

Project 2000
Dr. Jeryl Mumpower
The Nelson A. Rockefeller Institute of Government
411 State Street
Albany, NY 12211
518-472-1300

Westchester 2000
Dr. Sal J. Prezioso
County Office Bldg.
Room 707
148 Martine Avenue
White Plains, NY 10601
914-285-2882

North Carolina

Greensboro Visions
Ed Kitchen
City of Greensboro
P. O. Box 3588
Greensboro, NC 27402
919-373-2002

Western North Carolina Tomorrow
Edgar P. Israel
P. O. Box 222
Cullowhee, NC 28779
704-277-7492

Oklahoma

Oklahoma 2000, Inc.
Judith Evans
9020 Lincoln Blvd.
Oklahoma City, OK 73072
405-424-4003

Oregon

Oregon Commission on Futures Research
Scott Bassett
Executive Department
155 Cottage Street N.E.
Salem, OR 97310
503-378-3119

Pennsylvania

Berks 2000
Bill Vitale
1242 Hill Road
Reading, PA 19602
215-373-1725

Choices for Pennsylvanians
Harold Miller
506 Finance Building
Harrisburg, PA 17105
717-787-1954

Lehigh Valley Futures Forum
Charles E. Anderson
P.O. 3053
Allentown, PA 18106
215-481-9110

York 2000
Carol A. Murphy
York Area Chamber of Commerce
P. O. Box 1229
York, PA 17405
717-848-4000

Tennessee

Directons 2000,
Johnson City
James Pierce
P. O. Box 180
Johnson City, TN 37605
615-926-2141

Vision 2000
Jim Hassinger
Chattanooga Venture
606 Georgia Avenue
Chattanooga, TN 36402
615-267-8687

Texas

Goals for Dallas, Inc.
John Lewis
500 S. Ervay - Suite 410-C
Dallas, Texas 75201
214/741-1738

Target '90, San Antonio
Ms. Maria Toralda
Project Cyprus Tower
1222 N. Maine Ave.
San Antonio, Texas 78212
512-224-1292

Virginia

Fairfax County Goals
Advisory Commission
Theodore Austell III
The Office of the
County Executive
4100 Chainbridge Rd
Fairfax, VA 22030
703-691-2531

Future Horizons: Virginia
in the 21st Century,
League of Women Voters
Jean McCart
610 N. Main Street
Suite 224
Blacksburg, VA 24060
703-552-5625

Governor's Commission on
Virginia's Future
Bob DeVoursney
Institute of Government
University of Virginia
207 Minor Hall
Charlottesville, VA 22903
804-924-3396

Norton 2000
Charles R. Brown
P. O. Box 618
Norton, VA 24273
703-679-0961

Southwestern Virginia
Economic Development
Commission
Bob Stuart
College of Architecture and
Urban Studies
Arch Annex, Virginia Tech.
Blacksburg, VA 24061
703-961-7660

Williamsburg Commission on
Growth
Judy Knudson
P. O. Box 78
Williamsburg, VA 23187-0078
804-220-1556

The Williamsburg Project
Jack Hobbs
James City County Planning
Dept.
400 North Boundary
City of Williamsburg
Williamsburg, VA 23185
804-229-4821

Virginia Beach Tomorrow
Dr. Joe Buchanon
Tidewater Community College
Virginia Beach, VA 234356
804-427-7244

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Washington

Future Spokane
Elenor Magnusen
S. 2224 Rockwood Blvd.
Spokane, WA 99203
509-624-0036

King County 2000
Anne Bugge
2505 3rd Ave
Suite 300
King County, WA 98121
206-728-6100

Vision 2000
Clark County
Gil Malory
P. O. Box 5000
Vancouver, WA 988668
206-696-2000

REGIONS

The 1986 Commission on the
Future of the South
Southern Growth Policies Board
P.O. Box 12293
Research Triangle Park,
NC 27709
919-549-8169

NABC III/Bioregional Project
David Haenke
HCR 3, Box 3
Brixey, Missouri 65618
417-679-4773

Regional Plan Association
William Shore
1040 Avenue of the Americas
New York, NY 10018
212-398-1140

ASSOCIATIONS OF PUBLIC OFFICIALS

Council of State Governments
Keon S. Chi
Iron Works Pike
P.O. Box 11910
Lexington, KY 40578
606-252-2291

Council of State Planning Agencies
Jim Souby
Hall of the States, Suite 291
400 N. Capital St.
Washington, D.C., 20001
624-5386

International City Managers Association
Jim Hansell
1120 G St., NW
Washington,D.C. 20005
202-626-4600

National Association of Counties
John Thomas
440 1st St. NW
Washington, D.C., 20001
202-393-6226

APPENDIX E

"Corporate Use of Information Regarding Natural Resources and Environmental Quality"

Russell E. Train, World Wildlife Fund
for the Council on Environmental Quality
May 16, 1984

Chapter VI summarizes the findings of an intensive study, financed by a CEQ grant, conducted through personal interviews at 30 of the largest corporations in America. These corporations make significant resource allocation decisions in the U.S. and abroad. They represent a wide range of industries, including: agribusiness, commercial and investment banking, chemicals, resource extraction, manufacturing, forest products, petroleum refining, food retailing, and electrical power generation. In addition to these 30 corporations, seven trade associations and eight private information companies participated in the study. In total, 229 middle-to-top managers and analysts were interviewed. Among these participants were presidents, vice presidents, chief economists, directors of strategic planning, directors of marketing research, environmental managers, materials purchasers, engineers, and many others.

In addition to the 229 personal interviews at 45 organizations, 110 individuals at 20 of the participating corporations were asked to respond to a written survey. The purposes of the survey were (1) to identify the types and sources of resource reports used by analysts, (2) to determine the users' opinions of these reports, and (3) to discover what characteristics (e.g., timeliness, clarity, accuracy) are most important in determining user satisfaction with these reports. Furthermore, the survey yielded insights as to how well information providers (e.g., government, trade associations, publishing companies) perform on these characteristics.

Upon completion of the interviews and the written survey, the interviewers distilled the results into six draft recommendations. Those recommendations were then sent to the participating business executives for their comments. Of those who responded (58 percent), 72 percent agreed with the recommendations, 24 percent agreed with qualifications, and only 4 percent disagreed. Those recommendations, modified to reflect the comments, appear in Chapter VI.

The results of the study are summarized in a 72-page report to the Council on Environmental Quality, (CEQ), with

a short appendix reporting the very mixed corporate views of the desirability and importance of electronic information systems. In addition, the World Wildlife Fund delivered the following products to the CEQ:

1. Participant guide listing the names and titles of the 229 study participants.

2. A 500-page document detailing interviews conducted for this study.

3. A document containing the 124 evaluations of this study's recommendations.

4. Computer printouts including the factor and regression analyses of the survey responses.

5. The 877 report listings and publication sources submitted by corporate survey respondents as their 10 most important resource reports.

6. List of the top five ranked reports categorized by rank, overall rating, type of source, and frequency of use.

7. List of environmental quality related reports cited by survey respondents.

The report is unpublished. Further inquiries concerning this report or the other products should be addressed to Council on Environmental Quality, Executive Office of the President, 722 Jackson Place NW, Washington, DC 20006. Copies of the report, while they last, may be purchased at $8.50 from the World Wildlife Fund, 1601 Connecticut Avenue NW, Washington, DC 20009.

The study was conducted by Joel Horn, who at the time was Special Assistant to Russell Train, responsible for coordinating the World Wildlife Fund's long range planning, and Executive Director of The Year 2000 Committee.

Organizations Participating in the Study

Corporations

AMAX
American Express
Armco
Atlantic Richfield
Bank of America
Boeing
Cargill
Conoco
Du Pont
Exxon
Firemen's Fund
Ford Motor Company

Frito-Lay
General Motors
Hewlett-Packard
Kroger
Mead
3M
Monsanto
Occidental Petroleum
PepsiCo
Phibro-Salomon
Reynolds Metals
Shearson/American Express
Southern California Edison
Standard Oil of California
Tenneco
Union Carbide
U.S. Steel
Weyerhaeuser

Trade Associations

American Iron & Steel Institute
American Paper Institute
American Petroleum Institute
Chemical Manufacturers Association
Edison Electric Institute
Information Industry Association
Motor Vehicle Manufacturers Association

Private Information Companies

Chase Econometrics
Conrad Leslie
Data Resources, Inc.
DIALOG
I.P. Sharp Associates
McGraw-Hill, Inc.
Mead Data Central
National Planning Data Corporation

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APPENDIX F

21st Century Studies
April 21, 1987

As the year 2000 approaches, increasing numbers of nations are undertaking long-term multisectoral studies of their development and security. These "21st Century studies" are multisectoral studies typically covering economics, demography, resources and the environment. They look ahead at least to the year 2000, and in many cases, well into the 21st century.

The Global Studies Center maintains a list of the 21st Century study projects. The following is our most recently updated compilation. We welcome suggestions for additions, corrections and improvements.*

AFRICA 2008. Completed. The published report is entitled: *ECA and Africa's Development 1983-2008*, Economic Commission for Africa, Addis Ababa, 1983. The 103-page report is very readable and consists of four major sections: An Overview of Africa's Present Conditions; The African Region by the Year 2008 Under a Historical Trends Scenario; Perspectives of the African Region by the Year 2008: a Normative Development Scenario; and the Way to a Willed Future: Some Concluding Remarks. This report is unique and important in that it presents the Africans' own vision as well as reflections on the possibilities for achieving the African vision. Contact: M.W. Makramalla, Chief, Socio-Economic Research and Planning Division, U.N. Economic Commission for Africa, Africa Hall, P.O. Box 3001, Addis Ababa, Ethiopia, TEL 447000 or 447200.

AFRICA 2020. This project is just beginning. Contact: Mr. T. Gedamu, Director, Planning and Research Department, African Development Bank, Abidjan, Ivory Coast.

AUSTRALIA. Just beginning. Contact: Honorable Barry O. Jones, Minister of Science, Canberra, Australia, or Dr. Keith D. Sater, Dean, Wesley College, P.O. Box 84, Camperdown, NSW, 2050, Australia.

BRAZIL 2000. As of this writing, we know little about this study except that it was prepared by Prof. Helio Jaguaribe. Instituto de Estudios, Politicos y Sociales, Rua Baras de Oliveira. Carto 22. Rio de Janeiro 22460 Brazil.

CANADA. Completed. *Report of the Royal Commission on the Economic Union and Development Prospects for Canada*, The Canadian Government Publishing Center, Supply and Services Canada, Ottawa, Ontario, KIA 0S9. Contact: Donald S. MacDonald, Royal Commission on the Economic Union and Development Prospects for Canada, P.O. Box/CP 1268, Ottawa, Canada K1P 5R3. The Commission woked for three years to produce this large three-volume report which is available to the public for $45.00. Summary reports are available in both English and French. The topics addressed include the global outlook for Canada, trade relations, industrial policy, natural resources and the environment, human resources and social support, and the institutional setting of the Canadian government. Also see D. Drache and D. Cameron, eds., *The Other MacDonald Report*, Toronto: James Lorimer and Company, 1985; and G.O. Barney, P.H. Freeman, and C.A. Ulinsky, *Global 2000: Implications for Canada*, Oxford: Pergamon, 1981.

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* Send suggestions to Dr. G.O. Barney, Global Studies Center, 1611 N. Kent St., Suite 610, Arlington, VA 22209, USA.

CARIBBEAN. Nearing completion of the second phase. Contacts: Sir Philip Sherlock, Executive Vice President, Caribbean Resources Foundation, 7855 NW 12th St., Suite 217, Miami, FL 33126, and Dr. Eddie Green, Director, Institute of Social and Economic Research, University of the West Indies, Mona, Kingston, Jamaica.

CHINA. The first phase, prepared by Mr. Lin Zixin, now Editor in Chief of Science and Technology Daily, 18 Xisanhuan Zhonglu, Beijing, China, has been completed and published. The purpose of the study is to envision and structure a uniquely Chinese socialist nation. An English translation has been made by the Joint Publications Research Service and is available through the National Technical Information Service (NTIS), Springfield, VA 22161, TEL 202-487-4600. To order, ask for *China Report - Economic Affairs, China in the Year 2000*, JPRS-CEA-86-023, March 6, 1986, Foreign Broadcast Information Service. Premier Zhao has endorsed the first phase, and a much more ambitious second phase has been conducted at his request. For further information on the second phase project, contact: Mr. Wang Huijiung, Research Center for Economic, Technological, and Social Development, Beijing, China. The second phase China 2000 is in draft form (13 volumes) and consists of three parts: forecasting, analysis, and strategies for directing the future through government policies. The second phase report is regarded as sensitive information and is not scheduled for open publication or translation.

EUROPE 2000. Completed. *Europe 2000*, Peter Hall, ed., c/o Gerald Duckworth & Co., Ltd., 43 Gloucester Crescent, London NW 1, 1977.

EUROPE 2050. Just beginning. Contact: William M. Stigliani, IIASA, Environment Program, A-2361 Luxemburg, Austria. TEL 02236 715210. Telex 079137 IIASA A.

EUROPE (WESTERN) IN THE YEAR 2000. Contact: J.C. Britton or George F. Ray, National Institute of Economic and Social Research, 2 Dean Trench Street, London SWIP 3HE, England.

ICELAND 2000. Completed. *Iceland 2000: Production, Population and Prosperity*, by Dr. Agust Valfells, Box 5073, Reykjavik, Iceland, August 1979.

ICELAND. Nearing completion. *Iceland in 25 Years: A Future Study*, presented at the Workshop on Mexico 2010, Mexico City, Mexico, August 1985 by Steingrimur Hermannsson, Prime Minister of Iceland and Vilhjalmur Ludviksson, Director, The National Research Council, Iceland. Summary of the entire project now available in Icelandic and English from the Project Director: Dr. Jon Sigurdsson, Executive Director, National Economic Institute, Raudararstig 25, 105 Reykjavik, Simi 23133, Iceland.

INDONESIA 2000. Completed, but not openly published. Contact: Mr. Peter D. Duncan, J1. Pagangsaan Barat 18, Jakarta Pusat, Indonesia, TEL 355741, Telex 45019 INDIA.

IRELAND. Completed. *Ireland in the Year 2000: Towards a National Strategy*, The National Institute for Physical Planning & Construction Research, Ireland, February 1983. Contact: G. Walker, Director, Planning Division, Anforas Forbartha, National Institute for Physical Planning and

Construction Research, National Board for Science and Technology, Shelbourne House, Shelbourne Road, Dublin 4, Ireland. TEL 683311, Telex 30327 NBSTEI.

JAPAN. Completed. *Japan in the Year 2000*, The Japan Times, Ltd., 5-4, Shibara 4-Chome, Minato-ku, Tokyo 108, January1983. Contact: Hon. Saburo Okita, Government Representative for External Economic Relations, Ministry of Foreign Affairs, 2-2-1 Kasumigaseki, Shiyoda-Ku, Tokyo, Japan.

KOREA. Completed and published. Contact: Mr. Ki-Hoo Lee, Economic Planning Bureau, Economic Planning Board, Seoul, 82-1 Sejung-vo, Chongro-ku, Korea.

LADAKH 2000. Well along. Contact: Ms. Helena Norberg-Hodge, Ladakh Ecological Development Group, Leh-194101, Ladakh, India.

MAURITIUS. Continuing. Contact: Professor J. Manrakhan, Vice-Chancellor, The University of Mauritius, Reduit, Mauritius.

MEXICO 2010. In progress. Preliminary resuls have been reported at various conferences. Papers available in Spanish and English. Contact: Dr. Antonio Alonso Concheiro, Director, Fundacion Javier Barros Sierra; APDO, Postal 20061, 01000 Mexico D.F. Mexico.

NETHERLANDS IN 25 YEARS. Completed. *The Next Twenty-five Years*, Contact: Professor J.S. Kramer, Netherlands Scientific Council for Government Policy, 2 Plein 1813, P.O. Box 20004, 2500 EA, The Hague, The Netherlands, 1978.

NETHERLANDS. Completed. Published as a book. Dutch only. This study is based on a new model and a revised system of economic accounts. The new system of economic accounts measures adverse economic impacts of resource depletion and environmental pollution. Contact: Dr. Roefie Hueting, Central Bureau of Statistics, Department of Environmental Statistics, Prinses Betrixlaan 428, Boorburg (The Hague), The Netherlands. TEL 070-694341.

PERU. In progress. Contact: Francisco R. Sagasti, Director, Group of Analysis for Development (GRADE), Apartado 5316 Miraflores, Lima 18, Peru. A number of reports and papers are available.

PHILIPPINES. Completed about 1975. Contains an enormous collection of data in many volumes of appendices. Contact the Ford Foundation archives, New York. The Global Studies Center has donated its copy to the Library of the World Bank, 1818 H Street, N.W., Washington, D.C., USA.

POLAND. Continuing. Contact: Prof. Z. Kaczmarek, Chaiman "Poland 2000" Committee, Polish Academy of Sciences, PKIN, Box No. 24, 00-901, Warsaw, Poland. Several papers are available.

SOUTH AFRICA. In progress. Contact: Elisabeth Dostal, Institute of Futures Research, University of Stellenbosch, Stellenbosch 7600, South Africa. Several reports are available.

SWEDEN 2000. Just being organized. Contact: Hon. Briggitta Hambraeus, M.P., Riksdagen, S-100 12 Stockholm, Sweden. TEL 08 786-46-28.

TAIWAN. In progress. Contact: Prof. Chang-Yi David Chang, Chairman, The *Taiwan 2000 Study*, c/o Department of Geography, National Taiwan University, Taipei 107, Taiwan, Republich of China. Also Mr. Allerd Stikker, 76 Denbigh St., London, SW1 V2EX, United Kingdom, TEL 011-44-630-9126. A prospectus and study plan are available. Study should be completed in the fall, 1987.

TANZANIA. In progress. Contact: Sibusiso M. Bengu, The Lutheran World Federation, P.O. Box No. 66, Route de Ferney 150, 1211 Geneva 20, Switzerland. TEL 98-9400. A project description is available. The study focuses primarily on sisal and the impact of foreign governments and corporations on the global sisal market.

UNION OF SOVIET SOCIALIST REPUBLICS. Continuing. Contact: Mr. Victor Gelovani, Institute for Systems Studies, 9 Prospekt 60-Letija Oktiabria, Moscow, U.S.S.R. A number of reports have been published.

UNITED STATES OF AMERICA. Only a small report has been prepared on the future of the USA to the year 2000. The title is *U.S. Carrying Capacity: An Introduction*. Contact: Maryla Webb and Judith Jacobsen, Carrying Capacity, Inc., 1325 G St., N.W., Suite 1003, Washington, D.C. 20005. TEL 202-879-3045.

VENEZUELA. Contact: Gonzalo Martner, PNUD, Apartado 69005, Caracas 1062-A, Venezuela.

WORLD (BUDDHIST PERSPECTIVE). This project is well advanced. A book manuscript is in draft form. Contact: Ms. Nancy Nash, 5H Bowen Road, 1st Floor, Hong Kong. TEL 5-233464, Telex 72149 SIDAN HX.

WORLD (METHODIST PERSPECTIVE). *The Global 2000 Project: The Churches' Social Witness for 21st Century*. Just beginning. Contact: Dr. Ned Dewire, The Methodist Theological School in Ohio, 3081 Columbus Pike, Delaware, Ohio 43015.

WORLD (WORLD COMMISSION ON ENVIRONMENT AND DEVELOPMENT). This independent commission has been working for several years now under the leadership of Dr. Gro Harlem Brundtland, Prime Minister of Norway, and is about to present its report. Contact: Mr. Jim MacNeill, Secretary General, WCED, Palais Wilson, 52, rue des Paquis, CH-1201 Geneva, Switzerland. TEL 022 32 71 17, Telex 27910 CSEN CH.

APPENDIX G

The Authors

Clement Bezold is the Executive Director of the Institute for Alternative Futures, which he established with Alvin Toffler to encourage "anticipatory democracy." He has worked with a number of state and local governments to involve the public in strategic planning. He has developed concepts for describing the evolution of health care and has been consultant to a number of hospitals and health care associations. He received his PhD in Political Science from the University of Florida, where he was also the Assistant Director of the Center for Governmental Responsibility. He has been a Visiting Scholar at the Brookings Institution and he teaches a course on the future at American University.

Lindsey Grant, a retired Foreign Service Officer, was a China specialist for years, and his concern about population/resource/environment issues reflects that experience as well as his service in India. At retirement, he was Deputy Assistant Secretary of State for Environment and Population Affairs. His interest in the problem of foresight in governmental decision making stems from service on the National Security Council Staff and on the Department of State's Policy Planning Staff. He was the Department of State Coordinator for the *Global 2000 Report*.

John D. Sterman is Assistant Professor of Management, Sloan School of Management, MIT. He received his PhD from the Sloan School. He has been associated with the U.S. Department of Energy and with the International Institute for Applied Systems Analysis (IIASA). He has been a consultant on systems dynamics models to the governments of the U.S., China and Mexico and to the State of California. He has published a number of papers particularly in the fields of energy resources and macro-economics.

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