FUTURES RESEARCH: A NEW SCIENTIFIC DISCIPLINE?

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It was perhaps no mere coincidence that one week before Armstrong and Aldrin landed on the moon, President Nixon announced the establishment, within The White House, of a National Goals Research Staff. The Apollo program illustrates the dramatic enlargement which our generation has witnessed in the scope of "the feasible." Faced with the consequent plethora of alternative futures, choices among them -- if they are to be solidly based on preferred values, presuppose careful and logical analysis of the implications and consequences of alternative policy decisions.

The Institute for the Future (IFF) was established a year ago to institutionalize systematic and comprehensive studies of the long-range future. IFF thus became America's first organization expressly designed to analyze the long-term implications of today's major policy decisions. As such, it assumed the task of forecasting technological, social and economic developments in order to identify workable and desirable departures from established trends. IFF does not presume to "predict the future" but only to identify and assess alternative futures in terms of their social costs and benefits, and so to contribute to the better definition of national goals and programs.

As a priority task, the staff of IFF is endeavoring to evaluate and refine methodologies of forecasting. But as early as November, 1967, when our initial prospectus was written, IFF accepted that "it is not enough to simply forecast, research and report... it is essential that as many key executives as possible -- in government, business, universities and foundations -- develop the competencies required to utilize the reports and services of forecasting centers." Therefore, we were delighted when President Nixon, in his statement of July 13, 1969, underlined the "urgent need to establish a more direct link between the increasingly sophisticated forecasting now being done and the decision-making process." And, the President added, "our need now is to seize on the future as the key dimension in our decisions, and to chart that future as consciously as we are accustomed to charting the past."

Statisticians readily appreciate the inadequacy of extrapolation from the past as a method of forecasting future developments, especially on a long-range basis. So much of our economy depends on the evolution of science and invention that responsible forecasting efforts must include data as to new technological developments and, equally, the reactions of ordinary people to technological change and its social consequences. We must, somehow, account for the baffling discontinuities of modern life!

But to develop responsible and - within limits - reliable forecasts requires judicious combinations of innovative methods and approaches. Among these is the Delphi technique described in Olaf Helmer's Social Technology.[1] Helmer and his colleagues found that, in the average meeting, experts tend to react to each other, to the detriment of concentration on and refinement of the exact questions at issue. Whereas, in Delphi studies, successive questionnaires are sent to panels of carefully selected specialists; after several rounds of expert judgments from the respondents, a consensus can often be derived as to the probabilities of future events and their impacts on society.

IFF has completed a number of Delphi studies devoted to anticipated developments in physical technology, bio-medicine and social change. Of course, this method differs fundamentally from statistical sampling, where it is important that pollsters have the same distribution in the sample as in the population as a whole, and the sample must duplicate the larger group in important respects so that the profile of the smaller group represents the profile of the larger. However, Delphi studies rely on expert judgment and seek consensus from those best able to make disciplinary contributions to a central question. The disciplines involved may, in a given study, overlap or be adjacent, but must be combined in some explicit way before there can be confidence that a complete answer is at hand. The Delphi procedure was developed precisely because scientific questions cannot be decided by majority vote, even among scientists! What is wanted is a logical process of debate so that mutual criticism and stimulation can refine issues and reduce ambiguities. Where, nonetheless, ambiguities persist, the feedback process is useful in crystallizing opposing points of view.

But an agreed list of probable future developments can, itself, be a source of confusion. There is a need for systematic analysis of the

inter-actions of the forecasted events. One event may enhance or impede the emergence of others, and the effects of one on another may be slight or immense, as well as immediate or remote in point of time. Accordingly, T. J. Gordon has developed a "cross impact matrix" method of forecasting the interactions of future events.[2] This method shows great promise as a means of testing and refining the results of Delphi studies.

IFF has also developed simulation models so that planners and decision-makers can better visualize the implications of policy and investment decisions. For instance, under a grant from the Connecticut Research Commission, and using Delphi and cross-impact techniques, IFF designed a simulation game of the future economy of the State of Connecticut. Under a grant from Wesleyan University, we are undertaking preparatory studies for an urban simulation laboratory.

Work is going forward on the design of games simulating corporate decision-making, as well. And in-house programs are currently devoted to the advance of the theory of social indicators, analysis of the so-called quality of life and clearer definition and measurement of societal values. There are many statistics about society but often these are not in useful form for assessing the "health" of society. The movement for utilizing statistics as a basis for understandable social indicators is therefore one in which your participation is urgently needed, as a basis for better assessment of the nation's present position and its plans for the future.

We are also studying the development and use in forecasting of electric communications facilities to interconnect a world-wide network of scholars. This "D-Net" will be an on-line interactive group communications system which will make it possible for decision-makers to focus expert judgment on some of the more urgent problems of today. Our basic research, then, has two major components:

> development of forecasting methods and other tools for the analysis and synthesis of potential futures, and
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> the application of such techniques to the problems of society.

We concede that studies of potential futures are, in and of themselves, an insufficient response to the greater problems of our age. A common characteristic of today's social problems is that their solution requires not only multidisciplinary intellectual in-puts but also inter-sectoral social action. The sectors of our society usually designated as "public" and "private" need improved methods of collaboration, if either sector is to accomplish its job effectively.

We must, therefore, accept the necessity for innovative relationships between "knowledge" and "authority." Numerous expert studies which are not applied - but could or should be - only add to the disparity between our potential for impressive social achievement and the persistent and embarrassing realities of urban blight, atmospheric pollution, road and airport congestion, the alienation of youth, and other well-publicized ills of our time. Even in a "knowledge society," knowledge is not automatically translated into effective decisions. There is an institutional gap, often the more insidious because it remains unrecognized. We need to pay increased attention to the institutional mechanisms whereby feasible and desirable plans can enter the mainstream of life. Harold Lasswell, of Yale, has recommended "decision seminars," - study groups whose members represent both expert knowledge and the authority to apply it in defined areas. For this idea, there are useful precedents: the Channel Tunnel Study Group, for example, combined governmental and private interests in a common program to establish a permanent land link between Britain and France. In our own country, COMSAT demonstrated the important services which can be rendered by a "mixed economy" corporation based on the latest state-of-the-art technology. But isolated achievements should not blind us to the fact that we lack a whole range of institutions capable of transforming social research into social achievement. The recently established New York Urban Development Corporation was one response to this problem of the "institutional gap."

How can we encourage a new union of intellectual and financial resources, a union that shuns outmoded disciplinary attitudes and sectoral dogmas and yet retains a genuine capability for concerted and useful action?

One approach, I suggest, is the establishment of study groups in which systems analysts and other experts can meet informally with representatives of the financial and governmental institutions which must make or approve major policy and investment decisions. This may be a fundamental step if American society is to achieve the quality of life which all of us now recognize as being within our grasp. One such

study group recently resulted in the organization of the "Geo-Transport Foundation of New England, Inc." which will test the willingness of industry and government to invest cooperatively in a modern inter-urban transport system between New York and Boston. For a highly developed country such as ours, conditions on the New Haven Railroad constitute an anachronism. No effective center of decision or responsibility exists: the railroads alone cannot provide the required level of service; governmental interests are fragmented among numerous Federal, state and municipal authorities, and industry has not had a clear channel for the coordination of plans and programs that would provide an essential element of the future infra-structure of New England and New York. The new Geo-Transport Foundation, which groups support from public and private sectors, may serve as a model for "combined operations" in many fields where social and private interests alike require agreement on choice of system and choice of investment program.

A sober respect for statistical reality must, of course, be a constituent element of any scheme for institutional engineering. But the forecasting business has peculiar hazards: just as "systems analysis" offers an approach to decision-making under conditions of uncertainty, so "institutional engineering" must allow for flexibility and adjustment as conditions change and knowledge improves. The study group, in this sense, may be thought of as a device to avoid an over-rigid organizational form; it is a step preliminary to the formation of a public authority, a mixed economy corporation, a joint venture, or some other appropriate institution.

So conceived, study groups might well be established to assess the cooperative use and development of continental water resources; the financing on a more systematic basis of our educational infra-structure; the adaptation of information systems to the needs of education; the future of the Bering Straits; the long-range control of environmental pollution, and a host of other recalcitrant problems.

Just as PPBS represented an advance over traditional departmentalized concepts of government administration, so the inter-sectoral study group can be useful as a procedural device to marshall community resources on behalf of agreed national and international goals. Indeed, the inter-sectoral study group may be viewed as a step beyond the "think tank" -- as an embryo "action tank" capable, in time, of translating systems analysis into the systems and institutional arrangements of the future. Such a development, broadly conceived, could constitute a fundamental contribution to the program for identifying and achieving realizable national goals. In the resulting social context, both "forecasting" and "inventing" alternative futures could lose any residual tinge of "gamesmanship" and enter, at last, the valhalla of scientific respectability.

[1] Social Technology, Olaf Helmer, Basic Books, New York, 1966.

[2] "Initial Experiments with the Cross Impact Matrix Method of Forecasting," Futures, Vol. 1, No. 2, December 1968.