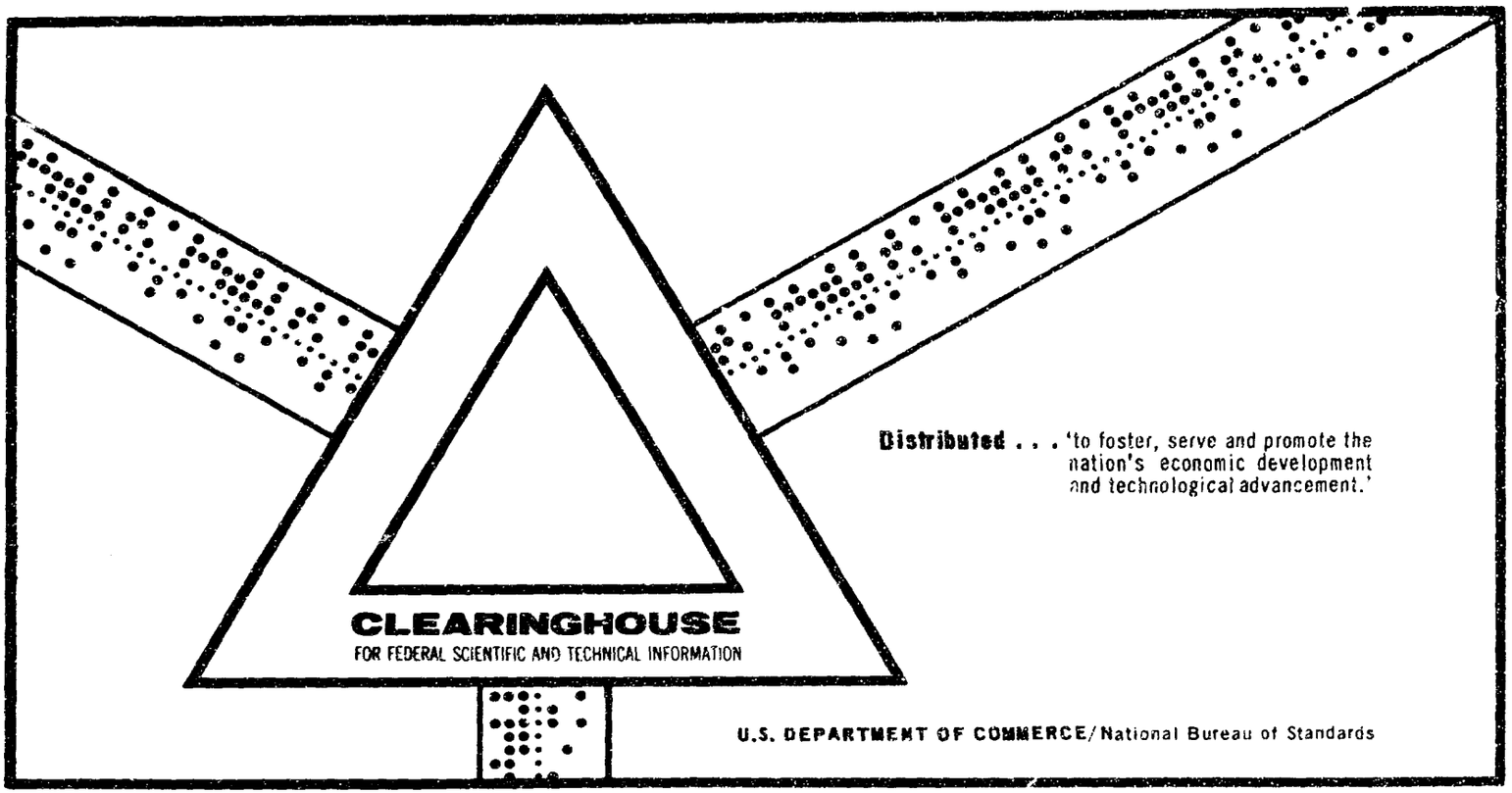
PROLEGOMENA TO POLICY SCIENCES

Yehezkel Dror

Rand Corporation
Santa Monica, California

January 1970



PROLEGOMENA TO POLICY SCIENCES

Yehezkel Dror*

The RAND Corporation, Santa Monica, California
on leave from The Hebrew University of Jerusalem

Introduction

The concept of "policy sciences" was first proposed in 1951 by Harold D. Lasswell.[1] During the twenty years which have since passed, many components of policy sciences were invented or significantly developed -- such as operations research, systems analysis, theory of games, cyberretics, general systems theory, strategic analysis, systems engineering and various branches and aspects of applied social sciences.[2]

---

*Any views expressed in this paper are those of the author. They should not be interpreted as reflecting the views of The RAND Corporation or the official opinion or policy of any of its governmental or private research sponsors. Papers are reproduced by The RAND Corporation as a courtesy to members of its staff.

Prepared for publication in Policy Sciences, Vol. 1, No. 1 (Spring 1970).

Parts of this article are based on papers delivered at the 136th Annual Meeting of the American Association for the Advancement of Science (Boston, December 26-31, 1969) and at the 65th Annual Meeting of the American Political Science Association (New York, September 2-6, 1969).

[1] In Daniel Lerner and Harold D. Lasswell, ed., The Policy Sciences: Recent Developments in Scope and Methods (Stanford: Stanford University Press, 1951).

[2] For selected bibliographic references on developments in these policy sciences subdisciplines until 1967, see "Bibliographic Essay"

But we still lack a pre-image of policy sciences which is both comprehensive and concrete enough to serve as a taking-off basis for building up policy sciences as an integrated area of knowledge, research, application, teaching and professionalization. For that purpose, we must move beyond the pioneering statements of Lasswell[3] to an operational conception of policy sciences.

The need for clarification of the basic nature and scope of policy sciences is all the more urgent because of the dangers of misuse of that term as a convenient symbol for whatever activity may seem most important or interesting to the growing number of individuals and institutions who want to devote their efforts to human problems and social issues. There are few ways better designed to ruin the idea of policy sciences before it really gets started than overselling policy science by ignoring the limits of science -- both inherent and social -- and overusing the concept

---

in Yehezkel Dror, Public Policymaking Reexamined (San Francisco: Chandler, 1968), pp. 327-336. For a survey of more recent relevant literature, see Yehezkel Dror, "Recent Literature in Policy Sciences," Policy Sciences, Vol. 1, No. 2 (1970), forthcoming.

[3]For recent versions see Harold D. Lasswell, "Policy Sciences" in International Encyclopedia of Social Sciences, Vol. 12, pp. 181-189, and Harold D. Lasswell, "The Emerging Conceptions of the Policy Sciences," Policy Sciences, this issue. The subject will be extensively treated in a forthcoming book by Harold D. Lasswell, A Preview of Policy Sciences.

of policy sciences by trying to put into it indiscriminately whatever one regards as needed for human progress.[4]

---

[4]Thus, for instance, I regard as misleading the proposals to focus policy sciences on invention of new values or on motivation of mass movements (e.g., see the very interesting paper, with many other points of which I agree, of Erich Jantsch, "From Forecasting and Planning to Policy Sciences," Policy Sciences, this issue. Certainly, what I call "organized dreaming" is essential for the advancement of humanity -- though the strict limits on any present efforts to shape the future should be recognized. (See also footnote 19, following.) Organized dreaming should provide inputs into policy sciences and serve sometimes as a method of policy sciences (e.g., in respect to nova-design of parts of the policymaking system); also the conditions for useful organized dreaming on basic values are a subject of much concern for policy sciences. But the substance of most of organized dreaming -- and of all other forms of value invention -- as such must stay outside (and above) the scientific endeavor, including policy sciences.

The idea that policy sciences should promote "prise de conscience" must be even more strongly rejected for two main reasons -- one moral and one behavioral: (a) the judgment of values and their propagation belong to the domain of politics; while policy sciences deals with the reform of politics, it should do so within the basic given ideologies and values and steer away from any signs of "scientocracy" (i.e., "rule by scientists") -- implicit as well as explicit; (b) mass movements have been the outcome of extrarational variables and resulted in

On a more fundamental level, I think explicit exploration of the basic concepts of policy sciences is essential because of the revolutionary character of policy sciences in respect to both contemporary "normal" social sciences and contemporary "normal" decision sciences.[5] If the development of policy sciences were to involve only incremental changes within the basic paradigms of contemporary normal sciences, the usual processes of advances in knowledge through slow trial-and-error and dispersed search within existing disciplines and research-structures would suffice. In this case, it might be adequate to use the term "policy sciences" as a superimposed term covering a broad set of studies, disciplines and professionals which cluster around the application of knowledge and rationality to perceived social problems. Indeed, if we would accept the assumption that all that is needed is advancement of "normal sciences," we might broaden the scope of the term "policy sciences" to include all applications of "intelligence," "the scientific method" and perhaps even "common sense"[6] to human affairs --

---

transrational transformation. Therefore, the "dream" (or nightmare) of a "science-based" mass transformation in values resulting in more "rational" and "enlightened" ideologies has no behavioral basis (in addition to being intrinsically incorrect).

[5]My terminology follows Thomas S. Kuhn, The Structure of Scientific Revolutions (Chicago: University of Chicago Press, 1962).

[6]It is surprising how often proponents of quiet innovative approaches to human problems like to subsume their methodologies under the term "common sense." (See, for instance, Simon Ramo, Cure for Chaos (New

and thus make the concept of policy sciences quite harmless and completely useless.

It seems to me that what needs to be done and can be done is something quite different: In order really to make science relevant for human issues we need a new type of science based on a new set of paradigms. This new "policy sciences"[7] is no substitute for present normal social sciences and decision sciences, which provide essential inputs into policy sciences and the accelerated advancement of which is necessary, among other reasons, for the progress of policy sciences. But policy sciences should constitute a new and additional approach to the uses of systematic knowledge and structured rationality for the conscious shaping of society.

All analogies are misleading when pushed beyond the limits of isomorphism with the investigated phenomenon. Keeping this caution in mind, let me

---

York: David McKay, 1969), p. VI.)

This is all the more surprising in view of the fuzzy meanings of "common sense"; namely: (1) what is obvious to the ordinary senses; (2) what is accepted by widespread opinion; (3) whatever I happen to believe in. In none of these meanings is "common sense" an acceptable source of knowledge and, indeed, the progress of science is one of getting rid of "common sense." My suggestion for policy sciences is to avoid this term and to use instead the concepts "tacit knowledge," "judgment," "widely accepted opinions," "subjective view," etc., whenever appropriate.

[7] To emphasize the multiple components on one hand and the basic unity on the other hand, I propose to use the plural form "policy sciences," but to regard it gramatically as in the singular.

nevertheless propose medicine as a helpful analogue for policy sciences.[8] The differences are significant, for instance in respect to the existence of clear criteria of "sickness" in at least parts of medicine, while evaluation of societies is at least in part a matter, with our present state of knowledge, of values and ideologies. But the analogue between policy sciences and medicine is nevertheless a very suggestive one, because of strong similarities in some of the main paradigms and other characteristics.

New Paradigms of Policy Sciences

Policy sciences hardly exists. Therefore, any proposed set of paradigms reflects more the opinions of one author than an established consensus of scholars. Furthermore, if indeed policy sciences will emerge and develop as a significant scientific and professional area, it surely will take forms and shapes which are unpredictable. Recognizing the tentative nature and inadequate subjective justification of any set of policy sciences paradigms, I nevertheless think that explicit exploration of the unique paradigms of policy sciences is essential in order to get policy sciences started and rapidly advanced.

It seems to me that the main paradigmatic innovations to be required of policy sciences can be summed up as follows:

1. Breakdown of the traditional boundaries between the various social sciences and decision disciplines. Policy sciences must integrate knowledge from a variety of branches of knowledge into a supradiscipline

---

[8] A suggestive title using this analogue is Lawrence K. Frank, Society as the Patient (New Brunswick: Rutgers University Press, 1948).

focusing on public policymaking. In particular, policy sciences is built upon behavioral sciences and analytical approaches, relying also on decision theory, general systems theory, management sciences, conflict theory, strategic analysis, systems engineering, and similar modern areas of study. Physical and life sciences are also relied upon, insofar as they are relevant.

2. Bridging of the usual distinction between "pure" and "applied" research. Policy sciences is not to be confused with the efforts to develop "social engineering" as an applied supplement of the social sciences -- an effort which has little chance of success, because of the many differences between application of scientific knowledge to defined technical missions (through the research -- development -- testing -- engineering chain) and the issues of using knowledge and rationality for resolving (but not solving) social issues.[9] Instead, in policy sciences integration between pure and applied research is achieved by acceptance of the improvement of public policymaking as its ultimate goal. As a result, the real world becomes a main laboratory of policy sciences and the test of the most abstract theory is in its application (directly or indirectly) to problems of policymaking.

---

[9]For an extensive discussion of these differences, see Yehezkel Dror, "Systems Analysis and Applied Social Sciences," to be published in the proceedings of the Rutgers University and Trans-action Magazine Conference on Public Policy and Social Science (Carpender Conference Center, Rutgers University, New Brunswick, New Jersey, November 23-26, 1969), edited by Irving L. Horowitz.

3. Acceptance of tacit knowledge[10] and experiences as important sources of knowledge, in addition to more conventional methods of research and study. Efforts to distill the tacit knowledge of policy practitioners and to involve superior policymakers as partners in the up-building of policy sciences are among the important characteristics distinguishing between policy sciences and contemporary "normal" social sciences.

4. Policy sciences shares with normal sciences main involvement with instrumental-normative knowledge, in the sense of being directed at means and intermediate goals rather than absolute values. But policy sciences is sensitive to the difficulties of achieving "value-free sciences" and tries to contribute to value choice by exploring value implications, value consistencies, value costs, and the behavioral foundations of value commitments. Also, parts of policy sciences are involved in invention of different "alternative futures," including their value contents. Furthermore, "organized dreaming" -- including value inventions -- constitute important inputs into parts of policy sciences (such as policymaking-system redesign, policy design and policy analysis); and encouragement and stimulation of organized dreaming is therefore a subject for policy sciences. As a result, policy sciences should break a breach in the tight wall separating contemporary "behavioral sciences" from ethics and philosophy of values and build up an operational theory of values (including value morphology, taxonomy, measurement, etc.,

---

[10] In the sense proposed by Michael Polany. See Michael Polany, The Tacit Dimension (Garden City, New York: Doubleday, 1966). For a more extensive treatment, see Michael Polany, Personal Knowledge (London: Routledge and Kegan Paul, 1958).

but not the substantive absolute norms themselves) as a part of policy sciences.

5. Policy sciences should be very time-sensitive, regarding the present as a "bridge between the past and the future." Consequently, it rejects the a-historic approach of much of contemporary social sciences and analytical approaches. Instead, it emphasizes historic developments on one hand and future dimensions on the other hand as central contexts for improved policymaking.

6. Policy sciences has a unique focus of interest, namely "meta-policies" (that is, policies on policies). These include, for instance, modes of policymaking, policy analysis, policymaking systems, and policy strategies. While the main test of policy sciences is better achievement of considered goals through more effective and efficient policies, policy sciences as such is in the main not directly concerned with discrete policy problems, but rather with improved methods, knowledge and systems for better policymaking.

7. Policy sciences does not accept the "take it or leave it" attitude of much of contemporary social sciences, neither does it regard petition signing and similar "direct action" involvements as a main form of scientific contributions as such (in distinction from scientists acting as citizens) to better policymaking. Instead, it is committed to striving for increased utilization of policy sciences in actual policymaking and to preparation of professionals to serve in policy science positions throughout the social guidance cluster (without letting this sense of mission interfere with a clinical and rational-analytical orientation to policy issues).

8. Policy sciences deals with the contribution of systematic knowledge and structured rationality to conscious human and social self-direction. But policy sciences clearly recognizes the important roles both of extra-rational processes (such as creativity, "intuition," charisma and value judgment) and of irrational processes (such as depth motivation). The search for ways to improve these processes for better policymaking is an integral part of policy sciences, including, for instance, possible policymaking implications of altered states of consciousness.[11] (In other words, policy sciences faces the paradoxical problem of how to improve extra-rational and irrational processes through rational means.)

On the basis of these new paradigms, policy sciences deals with a variety of novel subjects, with the help of new research tools (e.g., social experimentation and processing of policymakers' experiences); also, more important, policy sciences requires a methodology which deviates significantly from normal science methodology -- such as by doubts about Occam's Razor, encouragement of apperception in respect to investigated phenomena, and efforts to invent new social designs and new "laws" of social and political behavior. Main foci of policy sciences include, for example, (i) policy analysis, which provides heuristic methods for identification of preferable policy alternatives; (ii) alternative innovation, which deals with the invention

---

[11] See Charles T. Tart, ed., Altered States of Consciousness (New York: John Wiley, 1969).

of new designs and possibilities to be considered in policymaking; (iii) policy strategies, which provide guidelines for postures, assumptions, and main guidelines to be followed by specific policies; (iv) evaluation and feedback, including, for instance, social indicators, social experimentation, and organizational learning; and (v) improvement of the system for policymaking -- by redesign and sometimes "nova-design" (designing anew), including changes in input, personnel, structure, equipment, external demands, and so forth.

Further to concretize the contents and approaches of policy sciences, let me discuss in short three of the subjects of policy sciences, namely: (1) policy analysis; (2) policy strategies; and (3) policymaking-system redesign.

Policy Analysis

One of the foundations of policy sciences is systems analysis.[12] Indeed, if systems analysis in its present state were a sufficient methodology for improving policymaking on complex social issues there would be less need for policy sciences. But the trouble is that contemporary systems analysis seems quite helpless in facing complex social issues. In particular, systems analysis is inadequate for treating complex social issues in eight main interdependent respects:

---

[12]This is a term with many meanings. I am using it as referring to a structured approach to decisionmaking, as developed mainly at The RAND Corporation. See especially E. S. Quade and W. I. Boucher, eds., Systems Analysis and Policy Planning: Applications in Defense (New York: American Elsevier, 1968). See also C. West Churchman, The Systems Approach (New York: Delacorte Press, 1968).

(a) Systems analysis focuses on proposing preferable policies, neglecting the institutional contexts, both of the problems and of the policymaking and policy-implementation processes. Thus, "institution-building" is not within its domain of applicability.

(b) Systems analysis does not take into account political needs, such as consensus maintaining and coalition building.

(c) Systems analysis has difficulties in dealing with "irrational" phenomena, such as ideologies, charisma, high-risk commitments, martyr tendencies, and unconventional styles of life.

(d) Systems anslysis is unable to deal with basic value issues and often inadequately explicates the value assumptions of analysis.

(e) Systems analysis deals with identifying preferable alternatives among available or easily synthesized ones. Invention of radically new alternatives is beyond its scope, though it can perhaps help by showing the inadequacy of available alternatives.

(f) Systems analysis requires some predictability in respect to alternatives. Situations of primary uncertainty[13] cannot be handled by systems analysis.

---

[13]One of the troubles of the mathematical language of uncertainty is that it does not distinguish between cases where we know the dimensions of possible outcomes but not their probability distributions, and cases of "qualitative uncertainty," when we know nothing about the space within

(g) Systems analysis requires significant quantification of main relevant variables.

(h) Basic strategy choices -- such as attitudes to risk and time -- are not explicitly faced by systems analysis. Rather, maximin or minimax and discount of the future ("positive interest rates") are usually assumed.

These eight characteristics are not equally shared by all systems analysis studies. Indeed, the main pioneers of systems analysis clearly label such characteristics as inadequate and diligently search for ways to overcome them. But when we look on available systems analysis studies of real issues rather than at professions of faith or introductory statements, then my list of inadequacies of present systems analysis may justly be criticized as over-mild.

To overcome these inabilities of present analytical approaches, a new basic analytical approach rooted in policy sciences is essential. This new analytical approach, which I call "policy analysis,"[14] accepts the fundamental tenets of analysis, namely:

---

which to expect consequences. I propose the term "primary uncertainty" for the latter case and the term "secondary uncertainty" for the first case -- when we know the dimensions of the expected results, but not their probabilities. This is a relative distinction, with real situations moving on a continuum between these two poles.

[14]My use of the term "policy analysis" as an instrumental-normative heuristic aid for identification of preferable policy alternatives must be kept strictly apart from the use of the same term in the behavioral

(a) Looking at problems and alternatives in a broad way, which tries to take account of many of the relevant variables and of the probable results -- that is, taking a "systems" view.[15]

---

study of policymaking. There, the term refers to analysis of the contents and genesis of actual policies. See, for instance, Lewis A. Froman, Jr., "Public Policy," International Encyclopedia of Social Science, Vol. 13, pp. 204-208.

[15]This is the meeting point of "systems analysis" and "general systems theory." Both share a desire to look at phenomena in terms of broad interrelated sets, called "systems." Otherwise, despite the similarities in names, there is amazingly little common ground between systems analysis and general systems theory, though there is much potential scope for mutual stimulation and perhaps even some integration.

General systems theory is well presented in the following recent books: Ludwig von Bertalanffy, General Systems Theory: Foundations, Development, Application (New York: George Braziller, 1968); F. Kenneth Berrien, General and Social Systems (New Brunswick, New Jersey: Rutgers University Press, 1968); and Walter Buckley, ed., Modern Systems Research for the Behavioral Scientist (Chicago: Aldine, 1968).

It is interesting to note that the item "systems analysis" in the new International Encyclopedia of Social Sciences deals nearly exclusively with the general systems approach.

(b) Searching for an "optimal," or at least clearly preferable, solution among available alternatives within a broad "benefit-cost" frame, without being limited to incremental changes.

(c) Explicit and rational identification of the preferable alternative (or alternatives) through comparison of expected results in terms of operational goals; this is done with the help of a large set of techniques, ranging from mathematical models to human gaming and from sensitivity testing to canvassing of experts' opinions.

But these tenets must be supplemented, with many of the needed changes being based on the policy sciences paradigms. In particular, to the basic framework of systems analysis, policy analysis adds the following components:

(a) Penetration into underlying values, assumptions and strategies. These include, in particular (1) exploration of the basic values at which policies should be directed; (2) long-range goal research; and (3) explicit analysis of alternative policy strategies (to be discussed soon).

(b) Consideration of political variables, including (1) political feasibility analysis; (2) evaluation of alternative political pathways for policy approval and implementation; (3) examination of social power implications of alternative policies; (4) analysis of coalition needs and political consensus implications; and (5) specification of changes in the policymaking systems needed in order to make otherwise clearly preferable policies politically feasible. (These specifications are one

of the inputs into the study and improvement of policymaking-systems, thus illustrating the cohesion and feed-backs between the different foci of policy sciences.)

(c) Treatment of broader and more complex issues, involving (1) lower and new scales of quantification (e.g., nominal and non-metric); (2) necessity to satisfy multi-dimensional and diverse goals; (3) much primary uncertainty; (4) institutional change as a main mode of policy change; and (5) acceptance of minimum-avoidances (that is, avoidance of the worst of all bad alternatives), sensitization and long-range impacts as important goals of policy analysis, in addition to "preferization."

(d) Main emphasis on policy alternative innovation, involving (1) intense attention to creativity encouragement and input of novel policy designs into the analysis; (2) much reliance on sequential decisionmaking, learning feedback and social experimentation instead of "models," simulation and detailed policy schemes (such as PERT); and (3) much attention to systems-novadesign, in addition to systems-redesigns.

(e) Much sophistication in respect to social phenomena; for instance: recognition of "irrationality," ideologies, mass phenomena, depth-variables and similar non-rational phenomena as main variables, both of social behavior and of legitimate goal formation; and acceptance of apperception, intuition

and "experience" as valuable sources of knowledge and insight.[16]

---

[16]Let me demonstrate the specific tools of policy analysis at this point, by emphasizing a few points concerning required changes in the uses of operational code assumptions so as to take account of "irrationality," ideologies, mass phenomena, etc. (For the concept of "operational code" see Alexander George, "The Operational Code; A Neglected Approach to the Study of Political Leaders and Decisionmaking," International Studies Quarterly, Vol. 13, No. 2 (June 1969), pp. 190-222):

(i) Operational code assumptions must be multiple, including alternative codes for explaining actual behavior and predicting behavior. A very good illustration is provided by Graham T. Allison, "Conceptual Models and the Cuban Missile Crisis," American Political Science Review, Vol. LXIII, No. 3 (September 1969), pp. 689-718. Special care must be taken not to accept a priori simple explanations -- such as "economic man models." Therefore, behavior predictions should always be multiple and stochastic.

(ii) Operational code assumptions provide one of the important ports of entry for behavioral science knowledge, namely different models for describing and sometimes explaining and predicting behavior. For instance, organization theory is essential for dealing with bureaucratized entities -- such as governments, and depth psychology -- for dealing with high-leverage individual policymakers.

(iii) As explicit knowledge is inadequate for simulating behavior, reliance must in part be put on tacit knowledge, introspection,

(Footnote 16 continued)

and similar sources. This requires utilization of dynamic codes, in the form of programs and tools, such as gaming and Delphi; and training for exercising such dynamic codes through total immersion in the to-be-predicted phenomena and through encouragement of mental identification with their actors, values and culture.

(iv) Special care must be taken to overcome cultural bias in dealing with behavior of actors who do not share the same culture. Thus, in the United States, policy analysis must be on guard against tendencies to regard all behavior as low-risk taking, without ideological commitments, based on benefit-cost quasi-economic frames of appreciation and lacking aggressive values.

(v) A multiplicity of operational codes must be used simultaneously, to reduce the risks of error.

Similarly, recognition of compact ideologies as weighty factors requires significant changes in basic assumptions and concepts. For instance, much of contemporary welfare and utility theory (in the sense of welfare economics) assumes (in addition to other behaviorably doubtful assumptions, such as value transitivity) trade-offs between different goals, permitting side payments and enabling some uses of "Pareto Optimum" as a choice criterion. But when compact ideologies exist, values may assume more of a "either all or nothing" form, trade-offs within dogma-structured goals may be unacceptable and Pareto Optimum may become inapplicable (for instance, when an ideology aims at making another actor worse off).

(f) Institutional self-awareness, for instance in respect to (1) the necessity for multiplicity and redundance of analysis and analysis units; (2) early involvement of politicians, community leaders, etc., in the analytical activities; and (3) the limits of analysis as a perceptive set for cognizing human reality and aspirations.

One of the main differences between systems analysis and policy analysis as proposed, is that the latter must be embedded in policy sciences -- both as an academic research subject and as an applied professional activity. By being related to a broader discipline and frame-of-appreciation, policy analysis should avoid the dangers of doing better and and better the incorrect things.[17] In particular, this danger should be reduced by paying explicit attention to evaluation and improvement of the broader systems of which a concrete policy is only a sub-component -- namely policy strategies and the policymaking system.

---

[17]This danger is well recognized by Albert Wohlstetter in his paper "Analysis and Design of Conflict Systems," in E. S. Quade, ed., Analysis for Military Decisions (Chicago: Rand McNally, 1964), pp. 103-148, esp. p. 106.

Policy Strategies

Policy strategies involve determination of the postures, assumptions and main guidelines to be followed by specific policies. They are a kind of "master policy," clearly distinct from detailed discrete policies, though these two pure types are on a continuum with many in-between cases. Belonging to the level of meta-policies, policy strategies are a main focus of interest of policy sciences. Explicit sensitivity to policy strategies is a major characteristic of policy analysis, differentiating policy analysis from contemporary systems analysis. It is indeed quite amazing to note how neglected the problems of policy strategies are. Even the few authors who treat them explicitly -- such as Charles E. Lindblom[18] -- do deal only with a narrow range of policy strategy choices and tend to be overinfluenced by one or another a priori ideology or the socio-economic-political conditions of a particular country and period.

There are a number of policy strategy dimensions, forming a multi-dimensional matrix with a large number of cells, presenting the different combinations of various strategy dimensions. Leaving aside the problems of calibration of the different dimensions -- some of which are continuous and some of which have only a few points -- there is the possibility of mixed strategies, in which in a given area of policy different strategies can be followed in various policy instances. Whether to follow a "pure" strategy-combination (a real cell of the

---

[18] E.g., see David Braybrooke and Charles E. Lindblom, A Strategy of Decisions (N.Y.: Free Press, 1963).

multi-dimensional matrix) or whether to adopt a strategy mix (picking different cells according to a predetermined pattern, including as one possibility a random pattern) is itself a main strategy decision. There also are empty cells -- because of logical contradiction; and nonfeasible cells -- because of behavioral conflict. When we consider all this together, the picture becomes very complex, but not prohibitively so. We certainly can build up the main outline of a strategy matrix, identify essential conditions for each strategy and find out at least some criteria for preference of different strategy-combinations under various conditions.

Such a policy strategy matrix, in addition to its instrumental-normative uses, can also serve as a basic tool for behavioral study of policymaking. In fact, analyzing actual policies in terms of their implicit strategies can be an important instrumental-normative activity, because it can increase the self-awareness of policymakers and sensitize them to additional possibilities -- and this by itself is an important contribution of policy sciences to the improvement of policymaking.

To concretize the concept of policy strategy, let me mention eight main dimensions of policy strategies:

(a) Pure-mixed. This dimension deals with the choice, inhowfar concrete policies should be identical in their strategy (i.e., follow a "pure " strategy) or follow mixed strategies. Concerning mixed strategies, various sub-dimensions of consistency patterns, redundance possibilities, pluralistic choice and random selection provide rich choice -- which can be explicated and analyzed.

(b) Incremental-innovative. This dimension deals with the choice between various degrees of policy-change (defined in terms of extent of change, scope of change, and time), ranging from small incremental change in few policy details over a long period to fargoing, comprehensive, and rapid policy innovation.

(c) High Risk - Low Risk. This dimension involves the degree of risk to be accepted in policies. Here, the pure choices are between maximax on one hand and maximin or minimax on the other hand. Also involved are preferences among "average expected value," "lottery value," and similar choice principles and different forms of risk parameters. Another very important element of this strategy are the principles to be followed in comparing uncertainties.

(d) Comprehensive-Shock. This dimension involves the choice between comprehensive and "balanced" policies, which try to move multiple variables simultaneously in an internally consistent way; and shock policies, aimed at breakthroughs via main leverage points and/or aimed at systems disequilibration.

(e) Sequential-Extended. This dimension deals with the extent to which policies should adopt a sequential-decision strategy or work out in advance an extended strategy (in the theory-of-games sense. This choice should not be mixed up with the rigid-elastic dichotomy: An extended strategy can be very elastic and well adjusted to different contingencies -- if nothing completely unexpected happens).

(f) Concrete goals-capacities for the future. This dimension deals with the choices between definite and concrete goals, a number of defined future options and capacities better to achieve as yet undefined goals in the future. This is an especially important strategy choice because in most more complex policy issues, the main results of a policy will occur in the future and sometimes in a quite distant future. Therefore, such policies should satisfy future values. But future values are very difficult to predict, adding a serious primary uncertainty to the primary and secondary uncertainties of predicting the results of different policy alternatives. In such cases, the "goal" should often be to increase options and build up reserves and capacities for goal setting and goal achievement in the future.[19]

---

[19] The more we expect the future to be different, the more should we be doubtful of present effects to establish goals for the future. Taking into consideration expected changes in human capacities themselves, it seems quite absurd to try now to [illegible]ery long-range goals for humanity. Proposals to do so are often amazing in their contradictions (e.g., between expected changes in human capacities and attempts to formulate goals for homo superior by our present limited capacities) and their social naivete (e.g., on social goal formation processes). See, for instance, Gerald Feinberg, The Prometheus Project (Garden City, N.Y.: Doubleday, 1969).

(g) Positive goals - minimim avoidance. In some respect, formulations of a goal in the positive or in the negative is a matter of syntax such as when we talk about "increasing the percentage of employed" or "reducing the percentage of unemployed." But often, the positive and negative concepts are not located on a single and continuous dimension. For instance, "striving for more health" is only identical in part with "reducing sickness" as public medicine slowly begins to understand. In those many cases in which the positive goals and the negative avoidance goals are not identical, the strategy distinction between striving for achievement of more of a positive goal and between striving for reducing the negative as a goal is of much importance. This is especially the case because often it may be easier to achieve agreement on avoidance of a bad situation than on moving towards a "good" situation. For instance, it is much easier to get agreement and action on avoiding total nuclear war than on realizing a "good" international system (of which nuclear war avoidance is only one characteristic). Therefore, a strategy of minimim avoidance in which one tries to move from a worst possible situation to a worst plus one, worst plus two, and so on,[20]

---

[20]One should note that because of the stipulated condition that the positive goal is not identical with the avoidance of the negative situation, the set [worst plus n] is not identical with the set [best minus n], though there may be a shared subset. The idea of minimim-avoidance constitutes, therefore, a new approach, to be worked out -- inter alia -- in theory of games.

is a very important and often optimal strategy, which requires careful consideration.

(h) Time preferences. The common economic assumptions of positive interest rates and discounting of the future are of limited validity for more complex policy issues. Thus, because of ideological preference and/or need expectations, the future may receive priority over the present. Policy strategies must, therefore, face not only issues in which "interest rates" are heterogeneous, but interest rates will also, in part, be negative and noncontinuous. Indeed, the very terms of "interest" and "discount" rates may be quite inappropriate when we deal with future-directed ideologies, commitments to self-sacrifice, and similar phenomena. Therefore, an important strategy dimension is establishment of time preferences and yardsticks for comparing results located at different points of the time stream.

Policy strategies illustrate a level of concern of policy sciences above policy analysis. A higher and more inclusive level of policy sciences subjects are the study, evaluation and improvement of policymaking systems.

Policymaking System Redesign

Policy sciences still being in their initial phase, it is too early to predict its findings on the needed changes of the public policymaking system. But clearly, the required changes will be far-reaching, in particular, in respect to the division of functions between "politicians" and "policy scientists." Indeed, the whole nature of politics may well change, for instance, with some policy science units being constitutionally charged to present their analyses and recommendations both before the elected bodies and the public at large. The more basic roles of the politicians -- in respect to value judgment, consensus maintenance, opinion leadership, etc. -- will not only not be weakened by policy sciences, but rather will be strengthened by it (because of, for instance, clearer choice between alternatives, better control of implementation, more reliable feedback, and so forth). But many changes in politics and policymaking will be necessary to achieve a new form of symbiosis between knowledge and power. Thus, for instance, the problem of suitable academic qualifications for senior politicians will have to be squarely faced. Similarly, quite new patterns of presentation of news and of issues before the public may be required to permit improvement of the important role of public opinion in policymaking -- for instance, with prime television time to be allocated to policy analyses of main controversial issues and to public interrogation of various policy proponents.

To illustrate the areas of study and application of policy sciences in respect to redesign -- and possible nova-design -- of the public policymaking systems, let me mention, in no particular

order, a few tentative subjects for research and recommendations:[21]

1. Systematic evaluation of past policies in order to learn from them for the future. For instance, methods and institutions can be established to provide an independent audit of the results of legislation every five years.

2. Better consideration of the future. Special structures and processes may be designed to encourage better consideration of the future in contemporary policymaking.[22] This includes, for instance, dispersal of various kinds of "look-out" organizations, units, and staff throughout the social guidance cluster, and utilization of alternative images of the future and scenarios in all policy considerations.

3. Search for methods and means to encourage creativity and invention in respect to policy issues. This may involve, for instance, no-strings-attached support to individuals and organizations engaging in adventurous thinking and "organized dreaming"; avoidance of their becoming committed to present policies and establishments; and opening up channels of access for unconventional ideas to high-level policy-

---

[21] For a detailed discussion of some of these recommendations and their policy sciences theoretic bases, see Yehezkel Dror, Public Policymaking Reexamined, op. cit., esp. Part V, pp. 217 ff.

[22] The recently established National Goals Research Staff in the White House is an interesting first step in this direction; it also illustrates the possible impact of "theoretic policy sciences" ideas on reality.

makers and to the public at large. Creativity and invention may also be influenced within policymaking organizations by institutionally protecting innovative thinkers from organizational conformity pressures. Requiring careful study are also creativity-amplifying devices and medicines and arrangements for their possible use in policymaking.

4. Improvement of one-person-centered high-level decisionmaking. Even though of very high and sometimes critical importance, one-person-centered high-level decisionmaking is very neglected by both contemporary research and improvement attempts. This in part is due to difficulties of access, on one hand, and dependence of such decisionmaking on the personal characteristics and tastes of the individual occupying the central position, and the consequent difficulties in improving such situations, on the other hand. But neglect of the study and improvement of one-person-centered high-level decisionmaking is in the main a result of a lack of suitable research methods, conceptual frameworks, and instrumental-normative models in contemporary normal social and decision sciences.[23] With the help of the novel approaches of policy sciences, one-person-centered high-level decisionmaking can be improved. Thus, many conditions of better decisionmaking can be

---

[23] A collection bringing out the importance of the subject, the incapacity of present frames-of-appreciation to handle it systematically and the potential susceptibility of one-person-centered high-level decisionmaking to far-reaching improvements is Thomas E. Cronin and Sanford D. Greenberg, eds., The Presidential Advisory System (New York: Harper and Row, 1969).

satisfied by a variety of means, some of which may often fit the desires of any particular decisionmaker. E.g., information inputs, access of unconventional opinions, feedback from past decisions, and alternative predictions can be provided by different channels, staff structures, mechanical devices, communication media, etc. This multiplicity of useful arrangements provides sufficient elasticity to fit the needs, tastes, preferences, and idiosyncrasies of most, if not all, top decisionmakers.

5. Development of politicians. The idea of developing the qualifications of politicians is regarded as quite "taboo" in Western democratic societies. But this is not justified. The qualifications of politicians can be improved within the basic democratic tenets of free elections and must be improved so as to increase the probabilities of good policymaking and to build a new symbiosis between "power" and "knowledge." Thus, for instance, politicians need an appreciation of longer range political, social and technological trends, need capacities to determine policy strategies, and should be able to critically handle complex policy analysis studies. One possible approach to the problem is to encourage entrance into politics of suitably qualified persons and to vary the rules of presentation of candidates to permit better judgment by the voter. Other less radical proposals are to establish policy sciences programs in schools where many future politicians study (such as law schools); and to grant to elected politicians (e.g., members of a state legislature) a sabbatical to be spent in self-developing activities, such as studying and writing. Suitable policy sciences programs can be established at universities and at

special centers for active politicians to spend their sabbaticals in a productive and attractive way.

6. Radical changes in the school teaching of "good citizenship" and current affairs subjects. In the longer run, better preparation of the citizen for his roles in policymaking is of critical importance. A first and relatively easy step to meet urgent needs is far-reaching change in the teaching of all "good citizenship" subjects in the elementary and high schools -- in the direction of developing individual judgment capacities, learning information search and evaluation habits, and increasing tolerance for ambiguities, as well as readiness to innovate. Intensive use of new teaching methods, such as gaming and projects, and full exposition to contradicting points of view may be helpful in the desired directions. Also to be studied are possible needs and ways for reform of the teaching of various subjects (and of relevant teacher preparation) so as to introduce pupils early to a "policy oriented" view of reality and problems.

7. Establishment of a multiplicity of policy research organizations to work on main policy issues. Some of these policy research organizations would work for the central government, some for the legislature and some for the public at large -- diffusing their findings through the mass media of communications. Some policy research organizations should also operate on the international level. (Thus, it is shocking, though not surprising, that in the whole world there exists not even one interdisciplinary full-time policy research organization of minimum needed size -- about 50 professionals -- to work on the policy problems of development; this is the case despite the huge

amounts of development efforts and aid wasted because of inadequate, "minimim," policies.)

8. Development of extensive social experimentation designs and of institutions able to engage in social experimentation (including reconsideration of involved ethical problems). It seems quite clear that social experimentation is essential for finding solutions to present and emerging social issues. For instance, new experimental cities may be needed to develop suitable habitations for the 100 million additional Americans expected by the year 2000. Careful social experimentation requires invention of new research designs and of new legal-political arrangements. Also important and very difficult is the requirement for a political and social climate in which careful research and experimentation on social institutions is encouraged. (To take a United States illustration: A change is needed in attitudes which expressed themselves, for instance, in the legislative prohibition of studies on the operation of juries.)

9. Institutional arrangements to encourage "heresy" and consideration of taboo policy issues, such as the possibilities of long-range advancement of humanity through genetic policies and of changes in basic social institutions, such as the family.

Conclusion

In essence, policy sciences is directed at explicit reconstruction of policymaking through conscious meta-policymaking. Such explicit meta-policymaking aspires to break the historic continuity of incompetency hiding behind the term "muddling through." Till now, the results of bad decisions have been restricted because of the

absence of human capacities to interfere with basic ecologic, demographic, and social processes. Thanks to modern science these capacities have been exponentially raised, without any parallel changes in our policymaking abilities. To bring about a radical improvement in human abilities consciously to direct the uses of new capacities -- this is the main mission of policy sciences. In more operational terms, the ideas behind policy sciences can be viewed in a broad double context: (1) As an attempt to reassert and achieve a central role for rationality and intellectualism in human affairs. And, (2) as an effort to revise a dangerous trend, due largely to human activities and capacities, which I like to express suggestively in the form of a "law": "While the difficulties and dangers of problems tend to increase at a geometric rate, the knowledge and manpower qualified to deal with these problems tend to increase at an arithmetic rate."

To take a simple illustration: It is sufficient to consider the soon-expected capacity to influence the gender of the conceived child (a relatively minor matter in comparison with the awesome and awful possibilities of genetic engineering) or the potentials of weather control in order to realize the forgoing changes necessary in our policymaking institutions and model. These absolutely necessary changes have little probability of occurring through spontaneous adjustment and through learning by trial-and-error, or through the help of contemporary normal political and other social sciences or normal decision sciences. Rather, quite new kinds of ideas and knowledge are among the necessary requisites for building up the

needed novel policymaking systems[24] -- and the supply of such new kinds of ideas and knowledge is the main longer range mission of policy sciences.[25]

It is not necessary to go so far in order to justify the needs for policy sciences. Enough to compare present pressing needs and problems on one hand with both the weaknesses of much contemporary policymaking and the lack of help which contemporary social and decision sciences can contribute to policymaking, on the other hand. By all criteria -- short and long range, scholarly and applied -- policy sciences are urgently needed.

Our conclusion is that urgent action to build up policy sciences, based on a novel set of paradigms, should be taken.

---

[24]Such ideas and knowledge by themselves are often not sufficient; also necessary may be new forms of political will and novel social values, the satisfaction of which, as already noted, is outside the boundaries of policy sciences.

[25]Policy sciences themselves are also time-bound. With radical changes in human capacities (for instance, through intelligence-amplification and creativity-multiplication) and with changes in social policy problems and policymaking units (for instance, in materially saturated societies with "energy" a free good and with policymaking being controlled by many self-maintained communities supplied by versatile all-producing automatic machines), new types of policy-relevant knowledge and capacities will become available and necessary. But till humanity arrives at such or other radically new phases, policy sciences have to fulfill critical functions.

This conclusion in turn raises a large number of issues and problems concerning feasible and preferable modes for the accelerated development of policy sciences. For instance, the following interrelated problems need examination and action:

(a) Agenda and designs for policy sciences relevant research, including, for instance, as already mentioned, social experimentation, explications of experience, immersions in actual policymaking, "organized dreaming," and similar new tools -- in addition to more conventional ones.

(b) Programs and modes for teaching of policy sciences, directed at (1) developing a new generation of policy sciences scholars, free from the trained incapacities of contemporary normal social and decision sciences; and (2) preparing policy sciences professionals for applied work in the social guidance cluster.[26]

(c) Institutions for developing policy sciences. For instance, it may well be that the preferable location for the advancement of policy sciences are independent policy research organizations and not universities. Such a conclusion may have important implications for the kinds of support needed for policy sciences and for preferable teaching, research and application setups.

---

[26]For an effort in these directions, see Yehezkel Dror, "Teaching of Policy Sciences: Design for a Doctrinate University Program," Social Science Information (1971, forthcoming).

(d) Arrangements for policy sciences applications, including, for instance, the qualifications and roles of "policy sciences professionals"; the organization of policy sciences units and positions; the distribution of policy sciences applied studies; and the diffusion of policy sciences to present and future policymakers.

One of the characteristics of policy sciences is that its infrastructure and its applications are not left to spontaneous development (or misdevelopment), but are themselves subjects for explicit study and conscious shaping. But attention to the periphery must not overshadow the main and primary task on which all other aspects and activities depend: the advancement of the substance of policy sciences. This is a serious, hard and demanding task, in which extreme care must be taken not to regard the novelty of the policy sciences paradigms as a license for a relaxation of solid standards. Policy sciences should not be judged by the standards of normal sciences; but it must meet even more demanding tests of its own, to justify its far-reaching presumptions and aspirations.