The Forecasting of Plausible Alternative Future Histories: Methods, Results and Educational Policy Implications

By W. W. Harman, O.W. Markley, and Russell Rhyne

A Chapter in

LONG-RANGE POLICY PLANNING IN EDUCATION

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long-term planning as a basic commitment for the further development of their programmes in educational policy planning and this commitment is reflected in continuing OECD work in this field.

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III

THE FORECASTING OF PLAUSIBLE ALTERNATIVE FUTURE HISTORIES: METHODS, RESULTS, AND EDUCATIONAL POLICY IMPLICATIONS(1)

by

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I. INTRODUCTION

The purpose of this paper is to describe a newly developed and, in fact, still evolving approach to the derivation of comprehensive sets of alternative future histories, and to illustrate their application to educational policymaking and planning.

This is, in essence, a progress report on work being carried out at the Educational Policy Research Center, Stanford Research Institute. It describes the forecasting techniques being used, and presents some useful, although preliminary, results.

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(1) This paper is drawn from reports in draft at the Educational Policy Research Center, Stanford Research Institute, Menlo Park, California. The work reported here is the joint product of the staff of the Educational Policy Research Center and Johnson Research Associates, Santa Barbara, California, consulting to the EPRC.

The basic concept involved is that if a comprehensive set of alternative future histories for the nation can be constructed, they will serve to illuminate educational (and other) policies. Planning can only be done in a context. In the case of education where the inherent time lag between a decision to make a change and the major impact of that change may be of the order of decades, the context needs to involve long-term forecasting of alternative futures. In order that plans may be examined for suitability under different contingencies, it is most desirable that the set of plausible future histories be comprehensive - that is, that the probability be high that the actual future history, when it occurs, will be within the "region" defined by the constructed set. (These remarks may be made more intelligible by leafing ahead to Figures 12 and 13 for a preview of such a set.)

In the present chapter we will present a brief overview of the approach and the reasons for selecting it. It amounts to selecting appropriate external descriptors (economic, political, social) and internal descriptors (cultural values and beliefs) to describe the state of society, and projecting this description ahead in time to create a "future history" - and then doing this again and again until all alternatives have been described which are deemed feasible by criteria to be discussed.

Chapter II will explain the selection of the internal descriptors. Chapter III describes the selection of external descriptors and the way in which the projections were carried out. Tentative results are presented.

In Chapter IV these results are examined in some detail for educational policy implications. Of some 40 alternative future histories which emerge from the analysis, it turns out that about half reach the year 2000 with highly authoritarian forms of government and considerably reduced individual freedom as compared with the present. Only a very few manage to avoid some kind or another of extremely serious troubles between now and 2050. The consequent implications for policy, if education is to play a role in helping "choose" a desirable future, are somewhat unexpected, although reasonable with hindsight. If the projected histories are at all on the mark, the task ahead is great and time is short.

Overview of the Approach

Any method of deriving a set of plausibly attainable alternative futures must somehow perform the processes of description,

alternation, and projection. The selection of suitable descriptors represents a crucial choice. The description needs to provide adequate richness, yet it should not be too complex to handle. It may include both qualitative patterns and more quantitative parameters. In order to insure against bias in favour of that which is more easily quantified, we chose to restrict the basic descriptions used to qualitatively described patterns only.

Alternation refers to the generation of different combinations of the basic descriptors - that is, to possible alternative states of society. This can be done, in general, by morphological, extrapolative, or normative means. Morphological alternation (the principal method used here) considers all possible combinations of a given set of descriptors. Extrapolative techniques examine different possible extrapolations of current trends. Normative alternation considers different societal states which would be produced by actualization of differing values or goals.

Projection involves multiple prediction of plausible alternative courses of societal evolution. In other words it is the selection, out of a vast number of conceivable sequences of the possible states which result from the alternation process, of a minute fraction which are considered to be relatively likely. The criteria used in this selection process are a critical aspect of any method of alternative futures generation.

In the research being reported here we have found it convenient to describe the processes through which we forecast alternative descriptions of society by means of a symbolic state function.

$$\dot{\psi} = \psi \quad (\underline{Ex}, \underline{I}, \underline{p}, \underline{t})$$

where ψ is a qualitative description of society, a state variable. As with many other practitioners, we found it useful to distinguish between value-free and normative elements of description(1).

We have used descriptive and value-free elements as the organising framework for the generation of alternative futures, and normative or motivational elements to provide an interpretive framework. Thus, the elements of the above expression are,

(1) "Normative" and descriptive or "exploratory" methods of forecasting are discussed at some length by Erich Jantsch in Technological Forecasting in Perspective, OECD, Paris, 1967.

Ex, denoting external, social and value-free descriptive variables associated with exploratory forecasting;

I, denoting normative and motivational variables primarily referred to internal needs, values and beliefs of the individual; variables associated with more normative methods;

p denoting the processes and programmes of policy which relate and create limits of plausibility to otherwise self-consistent alternative descriptions of the future through scenario writing. At the present stage of development of our methods p creates sufficient, but not necessary conditions for existence of given alternative future histories;

t denoting time, making the functional description of the state of society time specific.

The "external, social, and value-free" types of variables designated by the above Ex were operationalized by a technique termed Field Anomaly Relaxation (FAR), described in detail in a later section. Six "sectors" of description of the United States society were chosen to comprise a minimal descriptive framework for a first iteration of the method. These were:

E: United States Economics
I: United States Internal Politics
S: Science and Technology
D: United States Demographic Patterns
H: World Population/Subsistence ("Hunger")
F: United States Foreign Relations

For each of these we selected from four to six alternative factors of description covering the likely range of variation. Thus an "external" description of the state of society comprised, in its skeletal form, a choice of one pattern in each of six aspects. (Sparse though such a description may seem, morphological listing leads to well over 20,000 possible combinations.) Thus, in terms of the above functional expression defining the symbolic state of society, the external value-free descriptive elements are operationalised as Ex = Ex(E, I, S, D, H, F).

The "normative and motivational" types of individual variables were operationalized by a somewhat different procedure. In an abstract version of stakeholder analysis, an heuristic typology

was derived which designates modal "coalitions" of needs, values, and beliefs, each of which represents a major motivational syndrome from which social goals can be derived.

These coalitions, for convenience termed "NVB-sets", thus operationalized the (I) in the symbolic expression for the state of society. They were used to (1) flesh out and to give a normative and ideological "flavour" to the externally defined societal configurations; (2) create normative "force vectors" which can lead more to preferred lines of evolution in the "tree" of alternative future histories; and (3) provide the principal basis on which to evaluate the "goodness of fit" of various alternative futures to divergent stakeholder groups. Taken together these analyses form the basis on which to generate plausible scenarios and to form a bracketing "planning space" delimiting the future histories considered plausible.

Thus, the complete functional expression describing the symbolic state of society in operational form translates from

$\psi = \psi$ (Ex, I, p, t) to $\psi = \psi$ [E, I, S, D, H, F, (NVB), p, t]

Three additional types of exploratory research supplemented the analysis of alternative futures:

(1) The kinds of futures were estimated that might result if each in turn of the derived NVB-sets were used as a basis on which to determine national policy. This analysis illuminated some important differences in policy terms of differences in needs, values and beliefs, as well as some unforeseen consequences of actualizing different values into public policy(1).

(2) The writings of Western utopian thinkers throughout history were analysed according to what premises they held regarding the nature of man. Implications regarding alternative conceptions of "good society" were drawn and related to the derived NVB typology(2).

(3) An analysis of revolutionary pressures currently existent in the United States were analysed and alternative resolutions compared. This analysis will be briefly summarized in a later section of this paper.

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(1) This work is presented in an EPRC working draft by Ely M. Brandes, "Needs-Values-Beliefs Alternative Futures", Stanford Research Institute, Menlo Park, California.

(2) This work is presented in EPRC Research Memorandum 6747-7 by Joan Lewis, "Utopias as Alternative Futures", Stanford Research Institute, Menlo Park, California.

A distinction is useful between plausible results and paradigmatic or exemplary ones. While plausible future histories are the raison d'être of the present exercise, various kinds of non-plausible societal descriptions are of heuristic usefulness, especially in the early stages of methodological exploration. Utopian thought demarks normative bench-marks with which to "map" the futures which are currently seen as plausible or feasible to strive for. Consideration of the NVB-based futures, on the other hand, not only is a convenient way to explore the vectors of future development implied by different sets of needs, values and beliefs; it also reveals some of the (often negative) unforeseen consequences of following a given "pure" set of preferences.

Methods which purport to satisfy the property of plausibility must satisfy a number of realistic constraints. If the alternative descriptions of future history are to be believable, they must satisfy the properties which we know "reality" to contain. Any society (in reality) is internally consistent in the sense that all of its aspects coexist simultaneously. It is furthermore sequentially consistent in the sense that all of its aspects "flow" from the past into the future, with no disjunction. (From an analytic standpoint catastrophic events are an important class of exceptions to this rule.) Satisfaction of these two properties are an important part of the reasons why iteration is a necessary feature of the method. The description of utopian societies, on the other hand, does not require sequential consistency, and the rapid (one generation) dissolution of the majority of utopian experiments suggests that lateral consistency may also have been lacking.

Methods productive of plausible alternative future histories must also model the constraining forces of cultural momentum and limited resources. As Arnold Toynbee noted, history records various resolutions to the tension between societal "necessity" and "opportunity". The opportunity for "willed change" leading to a desired complexion of society is more limited in the short range than in the long range. (The commonly observed "tree" or cone shape of attainable alternative futures reflects this property.)

A second distinction contrasts the swiftness or time-rate of changes which are allowed in the analysis. The work reported here assumes only incremental changes. Results of an analysis of contemporary revolutionary pressures indicate that this probably is

a good assumption since no penetratingly successful revolution could be seen as plausible in the next few decades. Many of the future histories as described implicitly assume the rapid emergence of certain technological and social developments. However, it should be noted that future histories with marked discontinuous change (such as nuclear holocaust, catastrophic epidemic, "real" revolution followed by anarchy, or massive geological disturbance) are not included.

II DERIVING NVB SETS

(NEEDS-VALUES-BELIEFS GROUPS)

Different goals, needs, values, operating styles, etc., of both individuals and institutions strongly affect the course of history. As we look forward to the future with an eye to its purposive invention, we must needs face the question, whose ideal future should be invented? Thus we are obliged to consider systematically normative constructs, in order to (1) describe alternative futures in terms of their cultural and normative climate; (2) evaluate alternative futures in terms of the degree to which they offer potential fulfillment to the desires of divergent stakeholder groups (one way to assess the "quality of life" of a society); and hence (3) roughly forecast the relative plausibility of various lines of evolution of the alternative future histories whose derivation is discussed in the next chapter.

Of the numerous types of motivational and normative constructs available, we chose to focus on needs, values, and beliefs. One of the principal reasons for this choice was the fact that needs, values, and beliefs tend to underlie more superficial goals, attitudes, and related variables, hence they are more stable and of more universal applicability to diverse societal descriptions, some of which may differ markedly from the present in both specific characteristics and overall "flavour".

We use the term "need" to designate the crucial physical, mental, and emotional resources that people require to attain a desired quality of life. Needs specify the core area of a person's concerns without giving the fulfillment of those needs any direction or style. "Values" are seen as the direction-giving element. Values point to those goals - both instrumental and terminal - which satisfy various needs. Beliefs, on the other hand, specify what for each individual is real. Beliefs in the context of policy analysis thus have much to do with what is considered possible, what is valid, and how one's values interact with the real world.

For our purposes, however, these distinctions are less important than the fact that systems of needs, values, and beliefs held by both individuals and institutions tend to be relatively coherent, and to interact in such a way that changes in dominant needs are often associated with changes in values and beliefs as well, and vice versa(1). Differences between sets of need-value-belief (NVB) "syndromes" were thus used as the basic way in which normative considerations were made explicit.

"Stakeholder" Types

Of the many taxonomies available in the social-science literature, twenty classifications representing different socio-economic, political, and psychological orientations were chosen as organising rubrics from which to derive a new taxonomy representing clusters of related needs, values, and beliefs. The principal characteristic aimed for in the derived taxonomy was ability to evaluatively discriminate between broad policy issues which are of significance to education in the larger sense.

The socio-economic classifications used were the traditional lower class, lower-middle class, middle class, upper-middle class, and upper class. The political set consisted of groups whose dominant ideology is radical, liberal, moderate, conservative, and reactionary.

Two psychologically oriented taxonomies were used. The first was the hierarchy of needs of Abraham Maslow(2) which classifies the population according to their dominant need concern. Survival needs, security needs, belonging needs, esteem needs, and self-actualization needs make up this set. The second psychologically oriented set consisted of six of Clare Graves'(3) "levels of existence" - termed for convenience: aggressive, ordered existence, materialistic, belonging, personalistic and being-motivated.

(1) Herbert Hyman, "Value Systems of Different Classes: A Socio-Psychological Contribution to the Analysis of Stratification", in S. Lipset and R. Bendix (eds.), Class Status and Power, Glencoe, Ill., Free Press, 1953, pp.488-499. Amitai Etzioni, "Basic Human Needs, Alienation and Inauthenticity", American Sociological Review, Dec. 1969, 33, No. 6, 870-885.

(2) Abraham H. Maslow, Toward a Psychology of Being, New York, Van Nostrand, 1962.

(3) Professor Graves' (of Union College, Schenectady, New York) work is best represented at present in a number of unpublished manuscripts. An easily obtained reference is "The Deterioration of Work Standards", Harvard Business Review, 44(5), 1966, 117-127.

The views of these twenty "stakeholder types" were simulated and then statistically analysed in order to synthesize a higher order set of NVB-groups. Figure 1 schematically depicts the relationship of the steps involved.

Selection of Specific Judgeable Items

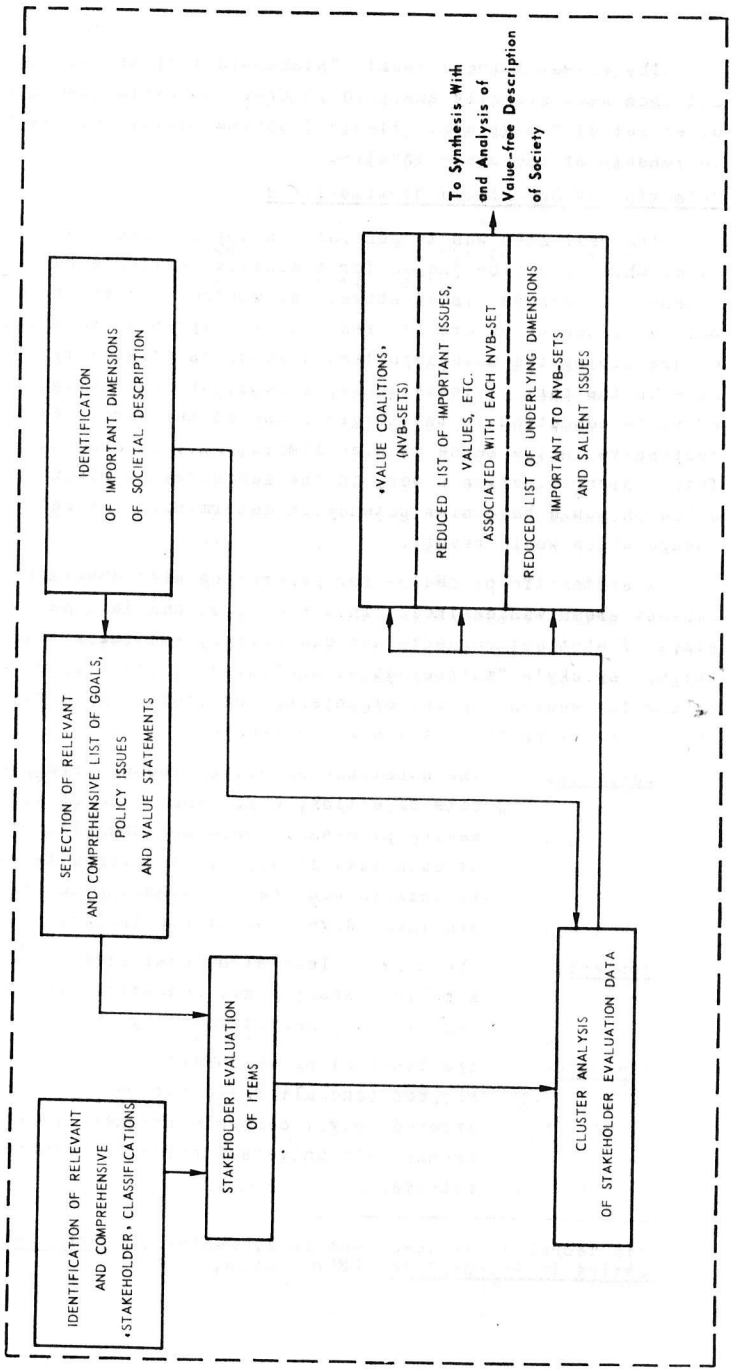
The next step was to generate an appropriate list of policy items which would be judged for evaluative salience by the various classes of persons listed above. We wanted to develop sets of policy issues which are (1) reasonably comprehensive in the sense of describing the more important dimensions of society; (2) actionable on the part of individuals, groups, or institutions; (3) relevant to education in the larger sense of the word; (4) NVB-responsive in the sense of high discrimination; and (5) of high future discrimination power, in the sense that a given issue, if acted on would have high potency in determining the nature of the future which would result.

A systematic procedure for generating wide coverage of issue-content areas was desired. This had to accommodate many different kinds of abstract concepts and dimensions, and their interrelationships. Zwicky's "morphological analysis"(1) provided a convenient scheme for generating and organising the items. An array was chosen involving three taxonomic dimensions:

concerns,	the substance of policy issues irrespective of site of action; e.g., what kind of decision-making process is used and the ultimate source of authority it appeals to; benefits/goals/beliefs/values; people changing technologies and their development; population; pollution.
content,	the more or less structural site of action of a policy issue; e.g., education, industry, the family and other socializing institutions.
dimension,	the bases along which different possible policy choices (and alternate future policies) can be arrayed; e.g., central-peripheral; personal-mechanical; universalistic-pluralistic; public-private.

(1) This technique is described in E. Jantsch, Technological Forecasting in Perspective, OECD, Paris, 1967.

Figure 1
SCHEMATIC DIAGRAM OF STEPS IN NVB SET DERIVATION



These three dimensions provided as nearly orthogonal a cut as we could discover for ordering the quite diverse collection of constructs, variables, trends, etc., which had been initially put together from previous analyses and the various literatures of future studies, sociology, social psychology and political science.

The three taxonomies thus constructed may be conceptualised as a three-dimensional matrix, each cell of which forms a gestalt from which an item may be generated. In fact, many cells were found to be of low relevance, while other cells were used to generate more than one item. From the matrix of over 3000 cells a final total of about 300 items were generated. Finally the list was checked for adequacy of coverage of content areas of known policy relevance.

Judging and Clustering of Judgments

Judges were then each assigned several of the stakeholder types whose frames of reference they were to take. Assuming, in turn, each of these roles (based on thorough study of stakeholder-type descriptions) they evaluatively judged the complete set of items on a five-point scale. Through overlapping assignments each stakeholder type was represented by two different judges. Where they differed, additional type evaluations were made. Each judge additionally rated the items according to how he personally felt, and these ratings were used in a special analysis for validity and reliability.

These simulated stakeholder evaluation data were then subjected to routine statistical factor analysis but with "stakeholder types" being treated as variables and evaluations of policy items for each group as replications. Orthogonal rotation of principal-axis factor structure yielded two kinds of data which were useful. (1) It generated a four-group taxonomy of NVB-type clusters based on the data from all the input "stakeholder types". Table 1 lists the specific types whose policy evaluations were most highly correlated with the four clusters thus derived. (2) It generated scaled "votes" (i.e., factor scores) for each of the "NVB-types" on each of the original policy items. These data, examples of which are given in Table 2, thus became part of the operational definition of the NVB-types.

The composition of the clusters (Table 1), the salient policy issues for each (illustrated in Table 2), and the underlying dimensions to the salient policy issues, were used to flesh out

paradigmatic descriptions of each of the four types which are summarized in Figures 2, 3, 4, and 5. These descriptions provide an explicit basis for inferring the response of NVB-types to the various alternative future histories whose derivation is described in the next chapter, and also for assessing the "goodness of fit" of various alternative futures to each of the NVB types.

It should be emphasized that the value and validity of these NVB typings lie primarily in their utility to the types of analysis being considered here. No claim is implied that they serve the more ontological purposes assumed by traditional social science(1).

(1) This point is explicated in detail by Crow and Noel's "The Valid Use of Simulation Results" (La Jolla, California, Western Behavioral Sciences Institute, 1965) which is reproduced in part in Raser, J.R., Simulation and Society: An Exploration of Scientific Gaming, Allyn & Bacon, Boston, 1969, p. 141.

Table 1 - "STAKEHOLDER TYPES" CORRELATING MOST HIGHLY WITH NVB-TYPE CLUSTERS

Cluster defining NVB-Type No. 1: "Materialistic"	Socio-economic level	:	Upper-Upper
	Political	:	Conservative, Moderate
	Maslow	:	Esteem
	Graves	:	Materialist
Cluster defining NVB-Type No. 2: "Person-centred"	Socio-economic level	:	None
	Political	:	Liberal, Radical
	Maslow	:	Self-actualizing
	Graves	:	Personalistic, Being-motivated
Cluster defining NVB-Type No. 3: "Status-quo oriented"	Socio-economic level	:	Middle
	Political	:	Moderate, Conservative, Reactionary
	Maslow	:	Belonging
	Graves	:	Belonging, Ordered Existence
Cluster defining NVB-Type No. 4: "Poor"	Socio-economic level	:	Middle and Lower
	Political	:	None
	Maslow	:	Survival and Security
	Graves	:	None

Table 2 - NVB-TYPE "VOTES" ON EXEMPLARY ISSUES(1)

Issues Stated in Condensed Form	Materialistic	Person-centred	Status quo	"Poor"
	Type Number			
	1	2	3	4
UN should be run, 1 man, 1 vote, not 1 country, 1 vote	-1.82	-0.83	-0.04	-0.47
Air pollution laws should be strict enough to reduce pollution to 1940 levels	-2.09	.17	.91	-0.37
Level of taxation should be greatly reduced to encourage development of private venture capital	2.14	-0.06	-0.23	-1.18
Society is better off if people are concerned with immediate practical things than with universal value issues	2.08	-1.44	.83	1.07
To excel an individual must stand alone	2.52	-0.63	-2.33	-0.18
Individual initiative not government action is most effective in solving social problems	2.25	.61	-0.67	-0.41
Capitalism is most economic productive system invented by man	2.02	-0.73	.86	.73
Police action should be oriented toward maintaining order rather than enforcing laws, rights of individual	-0.50	-1.99	.87	-0.56
Technical advances can solve most of the serious problems of the human race	.75	-1.79	-0.52	.22
Education should train individuals to deal with specific, practical problems rather than broad understanding of arts, letters and sciences	1.34	-1.94	-0.05	1.71
We should not trust intuitive knowledge unless conclusions can be empirically confirmed	.53	-1.81	1.01	0
United States should never give up sovereignty to supra-national world institution	1.18	-1.94	.19	.51
Public policy should be based on assumption that most people cannot be trusted very far	1.20	-1.89	.15	1.22
A child should be taught to place the needs of society above his own	-0.23	-1.37	1.74	-0.81
Although one can work legally to change laws, one should always obey laws on the books at the time	.49	-0.55	1.75	-1.31
The basic organisation of our society should be fundamentally changed	-1.59	.14	-2.14	.29
Legal training should be part of high school curriculum so all people can defend themselves	.32	.19	.15	1.97
Health care should be reorganised to assure even distribution of personnel and facilities in population	.18	1.16	.30	2.01
We should establish guaranteed annual income for all citizens	-0.98	.56	.16	1.73
Unions should think of national effect of their actions rather than interests of members	.82	.04	.56	-2.17

(1) The "votes" are constructed to be normally distributed in each group with a mean of zero and a variance of unity.

Figure 2 - PARADIGMATIC DESCRIPTION OF THE "MATERIALISTIC" NVB TYPE

The principal need is for the esteem of others. Avenues of fulfillment in the Western World of today include materialistic acquisition, status, fame, wealth, control and conspicuous consumption, although often altruistic avenues are pursued as well. Strong values include independence, freedom, sense of accomplishment, social recognition, and national security and "challenges".

The preferred form of government is capitalistic, tending toward laissez-faire. The preferred type of educational system is technologically progressive, but highly structured - emphasising individualized instruction for the gifted.

Dominant beliefs relate to visible, measurable "external" factors. Knowledge is most usefully acquired through the physical senses; ultimate explanations are in terms of quantitative relationships among elementary events. Motivations typically are extrinsic.

Figure 3 - PARADIGMATIC DESCRIPTION OF THE "PERSON-CENTRED" NVB TYPE

The principal need is to live up to one's inwardly felt potential. Thus the unfolding of the individual, of living so as to fulfill one's ideals of what is meaningful is the goal of life. Avenues of fulfillment in the Western World of today include a wide range of activities, but often centre on the "helping" professions, aesthetic pursuits, and philosophic inquiry - both intellectual and intuitive. Strong values include freedom, inner harmony, wisdom, a world at peace, and "mature love".

The preferred form of government is pluralistic in nature, whatever the "external" structural properties or labels it may have, but tending toward participatory democracy. The preferred form of educational system is open and pluralistic, with divergent institutions and processes to meet varied human need-concerns.

Dominant beliefs related to the "meaning" of human existence. Knowledge is thought to be usefully acquired by looking within as well as without; ultimate explanations are to be found in the processes of human conceptualisation; man's fundamental motivation is his drive toward inner growth.

Figure 4 - PARADIGMATIC DESCRIPTION OF THE "STATUS-QUO" NVB TYPE

The principal need is to preserve the position to which one has attained. Tradition-oriented, the status-quo oriented seek to insure stability by maintenance on rigid structures, preservation of that which "works". Avenues of fulfillment in the Western World of today include the whole range of possible classifications, but focus in tradition-directed roles - both professional and personal. Strong values include a comfortable life, security, friendship of peers, and "happiness".

The preferred form of government is whatever is in power (as long as dominant social classes and processes are sufficiently stabilised). The preferred form of educational system is basically conservative, passing on the ideals of the past and socializing youth to accept the skills, institutions, and the norms of the present.

Dominant beliefs relate to concepts and processes legitimated by established institutions to which they belong. Knowledge is seen in terms of what was required for them to get to where they are - other types often being viewed with suspicion or dismissal. Ultimate explanations are in terms of traditional or institutional definitions. Motivations typically are conservative in nature.

Figure 5 - PARADIGMATIC DESCRIPTION OF THE "POOR" NVB TYPE

Core needs of this group revolve around survival and security. Life resembles a perpetual, unresolvable clash between the individual and society. Thus the goal of life is either to eke out subsistence (psychologically as well as physically) or (in the case where the subsistence level has risen sufficiently to create radically rising expectations) to force society into a position where it must (for moral or other reasons) equalize the distribution of goods and services in a more equal manner. Strong values include a comfortable life and equality.

The preferred form of government is socialist, emphasizing protectionism. The preferred educational system emphasizes effective teaching of relevant cognitive skills which will facilitate obtaining satisfactory employment and access to the mainstream of society.

Dominant ideologies are varied. Knowledge is seen as what the rich use to keep the poor down. Ultimate explanations sometimes seen as irrelevant.

III. ALTERNATIVE FUTURES FOR THE UNITED STATES 1970-2000

The method used to construct alternative future histories derives from an approach originated by Johnson Research Associates(1), in the course of several years' research into alternative world futures. In underlying philosophy the procedure is similar to the powerful relaxation methods of mathematical physics. Its ultimate power lies in the possibility of continued refinement, through systematic iterations, of a field of feasible future histories, considered as a whole.

The antecedent work involved a historical base study which culminated in a number of plausible, skeletal patterns among key variables on the international scene - conditions within the United States, the U.S.S.R., Europe, China, etc. Such primary patterns were then fleshed out, and further tested for chronological plausibility by constructing scenarios leading from the present to each projection, remaining mindful of trends and inertias evidenced since 1945.

Projection of comparable future situations within the United States required that the method be adjusted and extended, since so many different elements within the internal situation seem comparably important. That is, the meld of political and economic (and other) factors does not provide an obvious set of evidently dominant factors comparable to the great powers and major regions which had served handily in the earlier international projections. This difficulty was overcome through development of an intermediate set of factors, lying between a large number of individual descriptors on the one hand and alternate future patterns on the other.

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(1) This adaptation of the earlier work on "Projected World Patterns" is described in Johnson Research Associates' RM 69-3, Contingent United States Patterns, 1970 to 2000, Santa Barbara, California, November 1969.

Preliminary Stages of Analysis Leading to a "Tree" of Alternative Futures

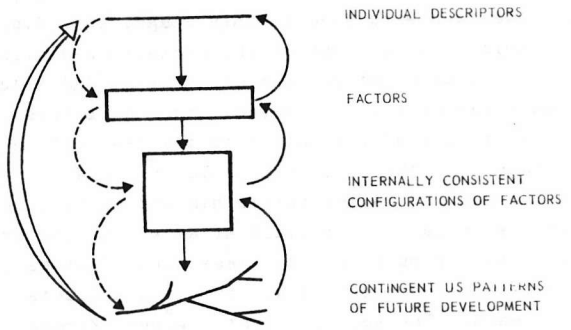
Perhaps the most important single characteristic of the procedure to be described is that it permits multiple iterations and a steady intervention of common sense. The overall approach is shown schematically in Figure 1. There are four discernibly different layers of analysis: (1) selection of a large number of descriptors, in this case about a hundred; (2) development of factors which combine such descriptors into a few distinctive sets, of which 33 were found potentially useful here; (3) development of a modest number (about 40) combinations of such factors into skeletal configurations of internally consistent future patterns; and (4) use of such snap-shots of the future in laying out a "tree" of plausible lines of future development.

As indicated by the loops on the diagram, initial designations at each level must be made with an eye to subsequent uses at the next (the dotted lines). Having arrived at a preliminary set at, for instance, the factor level, it becomes possible to develop the alternative configurations at the next level, but almost at once it proves necessary to loop back into the factor level in an iteration step. The configurations themselves are only an intermediate step in the chain; they too must be picked with an eye ahead to the description and analysis of contingent lines of future development. Then, as suggested by the longer arrow, it is necessary to cycle back to refine the original work in view of the explicit findings and implicit understandings gained during the early, more exploratory analysis.

The process has been effectively compared by Kurt Lewin (in a description applied to his own methodological explorations but equally applicable to any field-theoretic exploration) to the design of a road net for an area that can only be surveyed from roads already built. As he points out, the wise designer (or analyst) in such a situation starts with trails leading among the main landmarks and vantage points, keeping in mind from the start the character of the eventual system of super-highways that is to be built but relocating his trails and revising his preconvictions as enroute results permit an improved understanding of the whole.

Figure 6

ITERATION DIAGRAM



Nothing magical is being offered or claimed here. The method does indeed make it relatively easy to order the contributions from members of a research group and to profit from informed criticism, but the analysis depends more at every stage upon practical good sense than upon esoteric analytic techniques. Inputs from "hard" scientists, operations analysts, and behavioural scientists all may be incorporated, but the fundamental approach is one of ordering component analyses and estimates within a qualitative model, exposing sections of such analysis to critical inspection, and synthesizing the results.

Brief descriptions of the main stages of analysis follow.

1. Descriptors

Initial efforts to lay out sufficient rosters of items descriptive of such separate sectors of any United States pattern as foreign relations, internal political structures, technology, etc. showed almost at once that several hundred comparably significant descriptions would be needed, a number far too large to be dealt with effectively. These relatively minute descriptors clearly had to be condensed into a much shorter list of more inclusive descriptions.

2. Factors

Therefore a kind of qualitative factor analysis was undertaken, leading to the designation of four to seven alternative patterns or "factors" within each of six(1) main sectors of United States life. Each factor combines a number of descriptors. Several heuristic devices were used at this stage, including square interaction matrices(2) for each of the sectors considered, in which the plausible association of every pair of individual descriptors of each sector was considered. Such exercises do not lead by any direct line of derivation to the designation of more inclusive factors, but they are invaluable in acquainting each analyst with the subject matter before him and in helping to focus group discussions on particular small areas within the broader field of analysis. By such methods, reasonable degrees of individual familiarity with each sector was attained and sets of factors designated for each. The sectors treated were: Foreign Relations of the United States; conditions of Population and Subsistence in the developing nations of the world (included because of its probable interaction with internal United States politics); United States Demography; United States Internal Politics; United States Economics; and United States Technology.

It had initially been intended that another sector, namely that of socio-cultural characteristics, should be included, but tentative efforts to do so were unsatisfactory. The reasons for

(1) The number of sectors and alternative patterns was selected merely out of a sense of what was comfortable, but it has since been pointed out that the number is approximately equal to the number of "chunks" of information that most people can hold easily in mind.

(2) Such matrices offer the kind of pair by pair comparisons that might tempt an analyst into efforts to derive statistically orthogonal factors. That course was avoided here for two reasons. First, the significance of nominally similar evaluations (such as "Yes Yes, these two factors really go together") vary widely and in poorly understood ways across any such matrix, and for this and other reasons a numerical treatment would imply a greater precision than exists. Second, the use of composed factors of the sort flowing from statistical manipulations cuts into the richness of the communications. Since common sense iteration is of the essence in the method being explored here, it is important that access to such relatively subtle kinds of discrimination and assessment not be interdicted. The qualitative treatment of easily recognizable factors seemed to avoid such interdiction better than did our few exploratory ventures at rigorous factor analysis.

such failure were not immediately clear, but it seemed probable that it was due to the normative elements that must enter into any such description. An effort was made throughout this first iteration to keep the process descriptive and structural, and to leave normative considerations until a later stage in the analysis. Treatment of social groupings and such elements as enculturation and acculturation seemed to conflict with that resolve. Thus the decision was made to treat cultural factors as a kind of overlay on the future histories derived from the six sectors chosen.

For each of the six sectors listed above, a matrix was developed showing how each selected factor was composed of the individual descriptors for that sector. Figure 7 is presented as an example(1) here, showing the factors selected for the "Internal Politics" sector of the American scene. This example illustrates a number of the more important powers and weaknesses of this stage of the analysis.

Subjective selection and rejection are essential in picking and rechecking the selection of the factors. There is, for instance, the problem of how fanciful one should allow himself to become. The rule followed here has been to reject the very "far out" options (as, for instance, the technically feasible idea of having instant plebiscites using computers and substituting sampling techniques for representative democracy) while keeping at least at this stage those cases that only seem peculiar (such as extensions of current impulses toward direct democracy in a variety of less spectacular ways). An effort was made in the designation of factors to introduce ones that could serve to describe the better known projections in futuristic literature. Orwell's "1984", for instance, must be represented somehow in the final roster of alternative futures; thus factors to describe it and its origins must be "planted" during this stage of analysis.

There are two important reasons why such subjective processes should not be expected merely to reproduce the prejudices that the researcher brings with him to his work. Logical analysis can

(1) The individual factors are listed horizontally at the top, while the separate descriptors are shown vertically. A check mark (√) opposite a descriptor indicates that it applies to the factor in question, and where such a check mark is circled it means that that descriptor is an almost essential part of the factor. A cross (X) reflects a belief that that descriptor hardly could be an element of the factor in question. Blanks, of course, are noncommittal.

Figure 7

FACTORS IN INTERNAL POLITICS SECTOR

	DESCRIPTORS	FACTORS: STATUS QUO (I_1)	INCREASED FEDERAL POWER (I_2)	POWER LOCUS STATE/LOCAL LEVELS (I_3)	SINGLE PARTY (I_4)	DIRECT DEMOCRACY, MULTI-PARTY (I_5)	CYBERNETIC BUREAUCRACY (I_6)
1	DEGREE OF DEMOCRACY						
2		✓	✓	✓		✓	
3					⊘		✓
4	DIRECTNESS OF DEMOCRACY			✓		⊘	
5		✓	✓		✓		✓
6							
7	AMOUNT OF GOVERNMENT		⊘		⊘		⊘
8		✓				✓	
9							
10	CENTRALIZATION		⊘		⊘	✓	⊘
11		✓					
12				⊘			
13	SOCIAL ENGINEERING		⊘			✓	✓
14		✓			✓		
15				✓			
16	IMPULSE TOWARD CHANGE		✓			✓	⊘
17		✓			✓		
18				⊘			
19	IDEOLOGICAL POWER				⊘	⊘	
20		✓	✓				
21				✓			✓
22	PARTY PROLIF. n > 3					⊘	
23	n = 2,3	✓	✓	✓			✓
24	n = 1				⊘		
25	SOCIAL JUSTICE		✓	M			
26		✓			✓	✓	✓
27				M			
28	POLITICIZED CRIME					⊘	
29		✓	✓	✓	✓		
30							✓
31	EMPHASIS ON LAW ENFORC.			✓	✓		⊘
32		✓	✓			✓	
33							

produce unanticipated results just as can numerical analysis. One who seriously and responsibly uses the heuristic matrices described earlier, and searches for distinctive and relevant factors, will be surprised time and again into rejecting some of his initial impressions and forming others. Also, such matrices provide an especially effective strainer of individual quirks when, as in the present case, the working group contains members of widely varied political and social persuasions. At the same time, however, it will be recognized that such lists of factors cannot be considered closed. Our results with this first set of factors already have shown that some factors may have to be added, and others modified or withdrawn, in the next iteration. The risks of subjectivity are reduced in this method by repeated iteration - a process of successive relaxation of anomalies within a field that is treated at all times as a complex whole.

These characteristics of the method will, unless one has an exaggerated view of the powers of explicit, rigorous analytic techniques, be recognized as appropriate to the nature of the problem attacked. The process of iteration toward successively refined but forever imprecise answers describes the basic empiricist concept of scientific method, while the idea of accepting the relevance of the whole even while its parts are being analysed matches all of the main findings of psychology and the behavioural sciences, systems analysis, and common human experience.

Another problem is exposed in Figure 7, namely the concurrent usefulness and danger of using short-hand labels for the factors. One needs some kind of "handle" by which to identify each factor both during analysis and subsequently in the presentation of results. However, each factor is truly complex, and there is a risk that the nicknames given the factors may be treated as though they were the kind of definitions that permit strict deduction of other attributes. Even analysts who understand the limitations of these abbreviations find themselves acting as though the names assigned to factors were definitive. In fact, even the pattern of check marks displayed for each factor on the factor analysis matrix is only a highly schematic set of hints as to the factor itself.

Following tentative settling on the relations among factors and descriptors for each sector of the whole field, narrative descriptions (about a page long) were prepared for each factor. As indicated in the example presented as Figure 7, each seeks to elaborate on the sort of relationships that cannot readily be

displayed in matrix form. These help to reduce the likelihood that a given factor is interpreted very differently by different analysts and, later, by potential users of the results.

3. Internally Consistent Configurations of Factors

With a list of tentatively described factors in hand (see Figure 9), the next steps of analysis became possible. A large, square matrix was formed using all of the 33 factors, and each square of that matrix, (i.e., each pair of factors) was scored as to the degree of "fit" of the two factors in question. If it were easy to visualize a condition in which a given pair of factors might co-exist, the letter, Y, was entered in that square. If the pair were very strongly associated, so that one would expect to find the second in any world containing the first, a double yes, YY, was entered. If the existence of the pair seemed generally counterindicated, the letter, N, was entered, and if the two seemed mutually incompatible, the entry was, NN.

The square factor matrix was filled out in preliminary form without explicit reference to the NVB clusters. A given score (the letter, Y, for instance) might mean different things on different points on the display. Factor A might be judged to be compatible with factor B (with one embracing context in mind) and with factor C (within some other context); the factors A, B, and C therefore might or might not all be plausible members of some one overall pattern. A collection of all of the combinations of factors in which only affirmative or neutral assessments were represented should, however, contain all of the internally consistent sets.

Figure 8 illustrates this stage of analysis, consisting of a blow-up of one portion of the broader matrix. In this illustration, factors descriptive of the two sectors, Economics and Internal Politics, are played against each other. Considering only the top line of that sub-matrix, it will be noted that factors I_1 and I_2 were assessed as being positively associated with E_1. The pairs, E_1 I_3 and E_1 I_5 were labelled, "M" for "maybe", and the remaining two pairs were assessed to be counter-indicated. In words, and working just with factor nicknames rather than full descriptions, for example, the uncertainty concerning the pair E_3 I_1 suggests that the United States might conceivably be subjected to another major depression without serious modifications of its internal political structure, but sweeping political changes also would be plausible.

Figure 8 - A SAMPLE FACTOR FROM THE INTERNAL POLITICS SECTOR: I_4, SINGLE-PARTY GOVERNMENT

Such a pattern of government in the United States almost certainly would be associated with increased centralization and with increased penetration of government into each citizen's life. The degree of democracy would drop sharply, but that which remained might be relatively direct and there probably would be intensified emphasis on law enforcement whether the ruling clique were of the left or right. Ideological fervour would tend to be high.

Explicit dictatorship, with its effective abolition of elections would be one possible condition here and would be especially probable if the pattern were to persist long enough to undergo much internal evolution. The pattern might well start as a sort of Caesarism, however, with the electorate voting itself into the hands of a tyrant (in the relatively non-invidious usage of ancient Greece) in order to allow the government to try to cope with pressing problems without being burdened at each step by a carping opposition. Under such a condition, election might be continued, with voter selection limited to those candidates approved by the government. Politicized crime might remain at moderate levels, but a more likely result in a country as accustomed as this one to actual choices would be one in which goon squads in the service of "Caesar" would try to seek out and quiet potential dissidents before their protests might surface in embarrassing ways.

Figure 9 - FACTOR ROSTER

United States Economics

E_1: Prosperous, expanding-free enterprise
E_2: Slow growth, stagnant-free enterprise
E_3: Depression - start under free enterprise
E_4: Prosperous, expanding - strong government control
E_5: Unsuccessful government control
E_6: A non-expanding, successful economy
E_7: Communalism

United States Internal Politics

I_1: Status quo
I_2: Increased federal power
I_3: Shift of power locus to state/local
I_4: Single-party government
I_5: Direct democracy, multi-party
I_6: Cybernetic bureaucracy

Science & Technology

S_1: Rapidly expanding technology
S_2: Stasis; elite security
S_3: Stasis; little advance, much application
S_4: Active science; shift to behavioural science
S_5: Active science/technology; anti-pollution forces

United States Demographic Patterns

D_1: Status quo, 300 million by 2000
D_2: Extreme urbanization
D_3: Population dispersion, pastoral
D_4: Like D_1, but technological and connective

World Population/Subsistence

H_1: Optimistic, "Green Revolution" a success
H_2: Like H_1, but technical failure of G. R.
H_3: Like H , but G. R. negated by violence
H_4: Reductions in help to developing nations
H_5: Population stabilization without G. R. success

United States Foreign Relations

F_1: Status quo
F_2: Only AID involvement in underdeveloped world
F_3: Selective AID/Military involvement in underdeveloped world
F_4: Isolation re underdeveloped world; involvement with developed nations
F_5: General isolationism
F_6: "Manifest Destiny"

Figure 10 - AN ILLUSTRATIVE PORTION OF THE FACTOR MATRIX - THE ECONOMICS VS INTERNAL POLITICS SUB-MATRIX

Economics \ Internal Politics	I_1: Status quo	I_2: Increased federal power	I_3: State/local power	I_4: Single party government	I_5: Direct democracy, multi-party	I_6: Cybernetic bureaucracy
E_1: Free enterprise prosperity	Y	Y	M	N	M	N
E_2: Slow growth, stagnant - free enterprise	M	Y	Y	N	M	M
E_3: Depression, free enterprise	M	Y	N	M	N	M
E_4: Prosperous, expanding - government control	NN	Y	Y	M	N	M
E_5: Unsuccessful government control	NN	NN	NN	Y	N	M
E_6: Non-expanding, successful economy	Y	N	Y	M	N	M
E_7: Economic communalism	N	NN	Y	N	Y	M

The next step was to collect six-letter sets such that no "N" or "NN" entries were present. For example, the set ($E_1I_1S_1D_1H_1F_1$) has a "Y" or "YY" in each of the relevant squares on the matrix. It is not sufficient, however, merely to look at one line of the full matrix when selecting the sets that go together. For instance, the matrix shows Y assessments for E_1I_1, E_1S_3, and E_1F_6; this would suggest that $E_1I_1S_3F_6$ might be members of one internally consistent pattern. However, that conclusion is ruled out by an "N" assessment for the pair S_3F_6. Pursuit of this process yielded about 300 nominally self-consistent configurations out of the total of over 20,000.

Nearly three-fourths of the sets in this list of 300 were descarded on the ground that while individual pairs of factors might fit together somehow they often did not do so in the same

overall set of six. As an example, the factor matrix indicates that all of the members of the configuration, $E_4I_2S_1H_1F_6D_1$ should be mutually compatible, but the first two factors of that set imply a highly stressed internal condition (substitution of government control for a profit-oriented free enterprise economy within an intensely federalised political pattern) that seems ill-fitted to the extra-exuberant foreign policy implied by F_6.

At the same time as this review of configurations sharply reduced the number of factor sets to be considered, it also brought to light several new sets of factors which clearly seemed to deserve attention even though they had not emerged from the initial, mechanical treatment of the factor matrix. Review of the matrix showed that this usually was caused by a dubious assessment of non-fit between two factors. This experience supports the contention that recycling of each of the steps of analysis should be a normal part of the method.

After many eliminations and a few additions, approximately 40 alternative configurations were left. A selected few of these are presented in Figure 11.

It should be noted here that one of the salient results of pursuing the method outlined here is the development of powerful language in terms of which to discuss the problems involved. Each of the four steps shown in Figure 6 moves another notch toward holistic description and conceptual power. The selection of the initial descriptors is the first such step. The factors place such descriptors into convenient patterns and the analyst finds himself talking to his associates on the project in terms of such things as "E_2I_1" situations. The subsequent combinations of such factors into complete configurations gives a still broader and more useful terminology, since each such configuration represents and schematically identifies a whole future condition that is internally self-consistent, distinctively different from other configurations, and potentially relevant to the interests of policy-makers. With an agreed and thoroughly understood set of configurations to work with, a group can swiftly identify its agreements and disagreements in the tracing out of the alternative lines of future evolution which comprise the next step.

4. A "Tree" of Alternative Lines of Future Evolution

The roster of acceptable configurations were next inspected to see, on a preliminary basis, which ones seemed like candidates

Figure 11 - SAMPLE CONFIGURATION DESCRIPTORS

100 $E_1I_1S_1D_1H_1F_1$. (Status Quo Ante, extended). This is a relatively bouncy exuberant United States pattern similar to that of the 1955 to 1965 decade. It is characterized by a high degree of confidence in the economy and the political system, a United States ability to project its influence throughout the world, an actively questing science, and an expanding technology. The Green Revolution and concomitant administrative and social adjustments avoid wide-spread famine without recourse to compulsory population controls.

101 $E_1I_1S_1D_1H_1F_3$. This is basically the same as No.100 above, but different in the decision on the part of the United States government to make AID and military commitments to selected recipients in the Under-Developed World. This case is one of the possible descriptions of the 1969-1970 world.

106 $E_1I_1S_1D_4H_1F_1$. (An example of "Exuberant Democracy"). This is a later variant of the No.100 and No.101 cases, the main difference lying in the use of available technology to allow the United States population to live in a dispersed manner.

110 $E_1I_1S_3D_1H_1F_2$. (This, like case No.101, is one of the possible ways of describing the present world situation.) The United States has shifted to an AID-only support of the under-developed world while science and technology in the United States have shifted to an emphasis on application of present technology. It is a mild new-left position.

212 $E_6I_1S_3D_1H_5F_4$. (An example of "Satisfied Plenty"). This is a later case of a free enterprise declaration of plenty supported by a much expanded, successful, affluent United States economy. Science and technology generally curtail advance in favour of application. The under-developed world has "solved" its subsistence problems without reliance on a successful Green Revolution, and the United States is partly isolationist.

221 $E_5I_4S_3D_1H_4F_4$. (This case is an endemic welfare stultification). The single party government (perhaps of a caesarist type, or a centrist coalition) but keeping its position in spite of marginal economic success by providing increased welfare services. This is supported by a non-expanding science and technology which devote their energies toward application rather than discovery. Lack of a margin of productive growth curtails United States help to developing nations, thus undercutting the success of the Green Revolution and bringing on chaotic conditions.

234 $E_5I_4S_2D_2H_4F_4$. (A "Garrison State"). This case might be one in which an authoritarian, economic elite controlled the United States, tied by international business connections to the Atlantic community. It might look much the same as Franco's Spain or Salazar's Portugal, as far as internal politics were concerned, with a "law and order" lid put on dissent and science and technology applied to élite security.

for the year 2000 and, more generally, to assign plausible time frames to each configuration. This resulted in about thirty items being tentatively assigned to the 1990-2000 decade, nearly twenty five (including of course some of the first thirty) for the 1980-1990 interval, and about ten for the period between 1970 and 1980. That initial sorting was modified considerably in the course of succeeding steps.

Next, an effort was made to construct individual traces or sequences of evolution linking each individual configuration or "snap shot" of some future condition to the others from which it might plausibly emerge and into which it might change. This was done in two ways. First, a number of the more striking year-2000 configurations were chosen and chains of evolution (defined by intermediate configurations) were visualized leading from the present to each such end point. This approach led to a number of chains of configurations that tended to be broad and multi-valued in the intermediate decade, since each started from a preselected end point and worked back toward one of the few starting points covered by uncertainty as to just where we are at present. Second, alternative near-future configurations were selected and traced into the future by seeing which configurations were plausible outgrowths of each and then working from those new alternatives in a continually widening set of alternatives. The task was finished by seeing which configurations from the set assigned to the 1980-1990 period had not been used at all, and then building traces both forward and backward from those neglected items so as to make connections with traces already laid out.

The culmination of the foregoing steps was a master chart showing all of the several hundred alternative traces (leading from the ill-defined present to a far less specified future) that were considered to be plausible. That master chart was, naturally, very complex, and the final step to be performed at this stage (of construction of a future "tree") was one of synthesis. It called for the gathering together of the thirty end-point configurations into a workable number of sets of similar items, followed by the simplification of the wildly interlacing set of traces of possible sequencing of configurations.

The results of these efforts are shown in Figure 12, where the cases were clustered and then displayed along a continuum running from extreme Faustian competence at the far right to self-defensive ineptitude in the control of external events on the left.

The ordering, in Figure 12, of the nine end points for the year 2000 from left to right is somewhat arbitrary, and their spacing is almost entirely so. It was initially felt, for instance, that the "Socialist Success" set probably should lie to the right of that of "Satisfied Plenty" but when this was tried the resulting figure was more complex than that shown in Figure 12 with more intertwining of limbs. More careful inspection of the factors and configurations involved showed that there was indeed a reason implied in the simpler arrangement of Figure 12: the configurations clustered under "Satisfied Plenty" usually showed a high degree of competence and attention to management, in order that both the satisfaction and the plenty might be present.

Inspection of the individual traces linking the various configurations to these nine end points showed two seemingly important mid-term fields in which several transient configurations might interrelate in numerous ways and from which many alternative lines of evolution seemed plausible. One was a field of recession, confusion, and/or improvidence from which a few paths reached toward the right half of the figure and most led to the left, including some of the especially dismal future configurations. This field cannot be closely located in time, but it could emerge rather soon; it might well last for a decade or more, and some of the configurations within it could lock in and maintain themselves until the end of the century.

The other field was different in character, containing a number of configurations that suggested a very vigorous national effort in the general field of improvement of imbalances in the human and physical ecology (e.g., such things as urban festers and atmospheric contamination). This led to the tentative prediction that some such intense national effort, comparable to that during World War II, would almost have to intervene between the 1969 pattern and most of the year-2000 options shown to the right on Figure 12, and that such an effort might appropriately be addressed to ecological problems.

The weight of the lines in Figure 12 is intended to reflect, grossly, the relative plausibility of the various branches, as perceived at this stage of analysis. With later injections of NVB considerations into detailed scenarios, such estimates of relative plausibility can be somewhat refined. The assignments of times to the forks and to the dates of maturation of various configurations, that are either explicit or implicit in Figure 12, are grossly

Table 2 - NVB-TYPE "VOTES" ON EXEMPLARY ISSUES(1)

Issues Stated in Condensed Form	Materialistic	Person-centred	Status quo	"Poor"
	Type Number			
	1	2	3	4
UN should be run, 1 man, 1 vote, not 1 country, 1 vote	-1.82	-0.83	-0.04	-0.47
Air pollution laws should be strict enough to reduce pollution to 1940 levels	-2.09	.17	.91	-0.37
Level of taxation should be greatly reduced to encourage development of private venture capital	2.14	-0.06	-0.23	-1.18
Society is better off if people are concerned with immediate practical things than with universal value issues	2.08	-1.44	.83	1.07
To excel an individual must stand alone	2.52	-0.63	-2.33	-0.18
Individual initiative not government action is most effective in solving social problems	2.25	.61	-0.67	-0.41
Capitalism is most economic productive system invented by man	2.02	-0.73	.86	.73
Police action should be oriented toward maintaining order rather than enforcing laws, rights of individual	-0.50	-1.99	.87	-0.56
Technical advances can solve most of the serious problems of the human race	.75	-1.79	-0.52	.22
Education should train individuals to deal with specific, practical problems rather than broad understanding of arts, letters and sciences	1.34	-1.94	-0.05	1.71
We should not trust intuitive knowledge unless conclusions can be empirically confirmed	.53	-1.81	1.01	0
United States should never give up sovereignty to supra-national world institution	1.18	-1.94	.19	.51
Public policy should be based on assumption that most people cannot be trusted very far	1.20	-1.89	.15	1.22
A child should be taught to place the needs of society above his own	-0.23	-1.37	1.74	-0.81
Although one can work legally to change laws, one should always obey laws on the books at the time	.49	-0.55	1.75	-1.31
The basic organisation of our society should be fundamentally changed	-1.59	.14	-2.14	.29
Legal training should be part of high school curriculum so all people can defend themselves	.32	.19	.15	1.97
Health care should be reorganised to assure even distribution of personnel and facilities in population	.18	1.16	.30	2.01
We should establish guaranteed annual income for all citizens	-0.98	.56	.16	1.73
Unions should think of national effect of their actions rather than interests of members	.82	.04	.56	-2.17

(1) The "votes" are constructed to be normally distributed in each group with a mean of zero and a variance of unity.

Figure 2 - PARADIGMATIC DESCRIPTION OF THE "MATERIALISTIC" NVB TYPE

The principal need is for the esteem of others. Avenues of fulfillment in the Western World of today include materialistic acquisition, status, fame, wealth, control and conspicuous consumption, although often altruistic avenues are pursued as well. Strong values include independence, freedom, sense of accomplishment, social recognition, and national security and "challenges".

The preferred form of government is capitalistic, tending toward laissez-faire. The preferred type of educational system is technologically progressive, but highly structured - emphasising individualized instruction for the gifted.

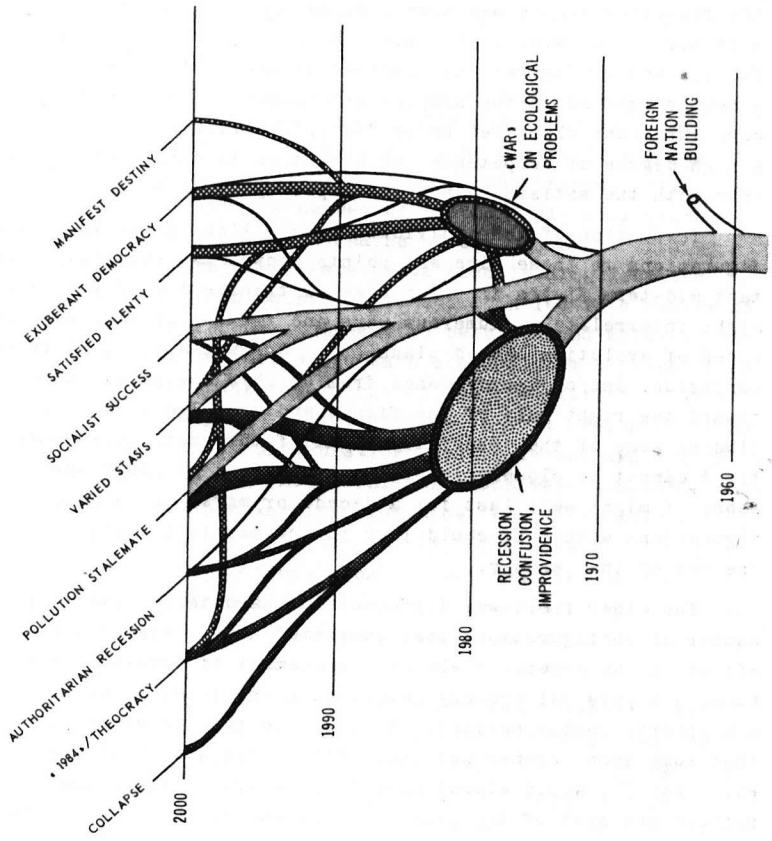
Dominant beliefs relate to visible, measurable "external" factors. Knowledge is most usefully acquired through the physical senses; ultimate explanations are in terms of quantitative relationships among elementary events. Motivations typically are extrinsic.

Figure 3 - PARADIGMATIC DESCRIPTION OF THE "PERSON-CENTRED" NVB TYPE

The principal need is to live up to one's inwardly felt potential. Thus the unfolding of the individual, of living so as to fulfill one's ideals of what is meaningful is the goal of life. Avenues of fulfillment in the Western World of today include a wide range of activities, but often centre on the "helping" professions, aesthetic pursuits, and philosophic inquiry - both intellectual and intuitive. Strong values include freedom, inner harmony, wisdom, a world at peace, and "mature love".

The preferred form of government is pluralistic in nature, whatever the "external" structural properties or labels it may have, but tending toward participatory democracy. The preferred form of educational system is open and pluralistic, with divergent institutions and processes to meet varied human need-concerns.

Dominant beliefs related to the "meaning" of human existence. Knowledge is thought to be usefully acquired by looking within as well as without; ultimate explanations are to be found in the processes of human conceptualisation; man's fundamental motivation is his drive toward inner growth.



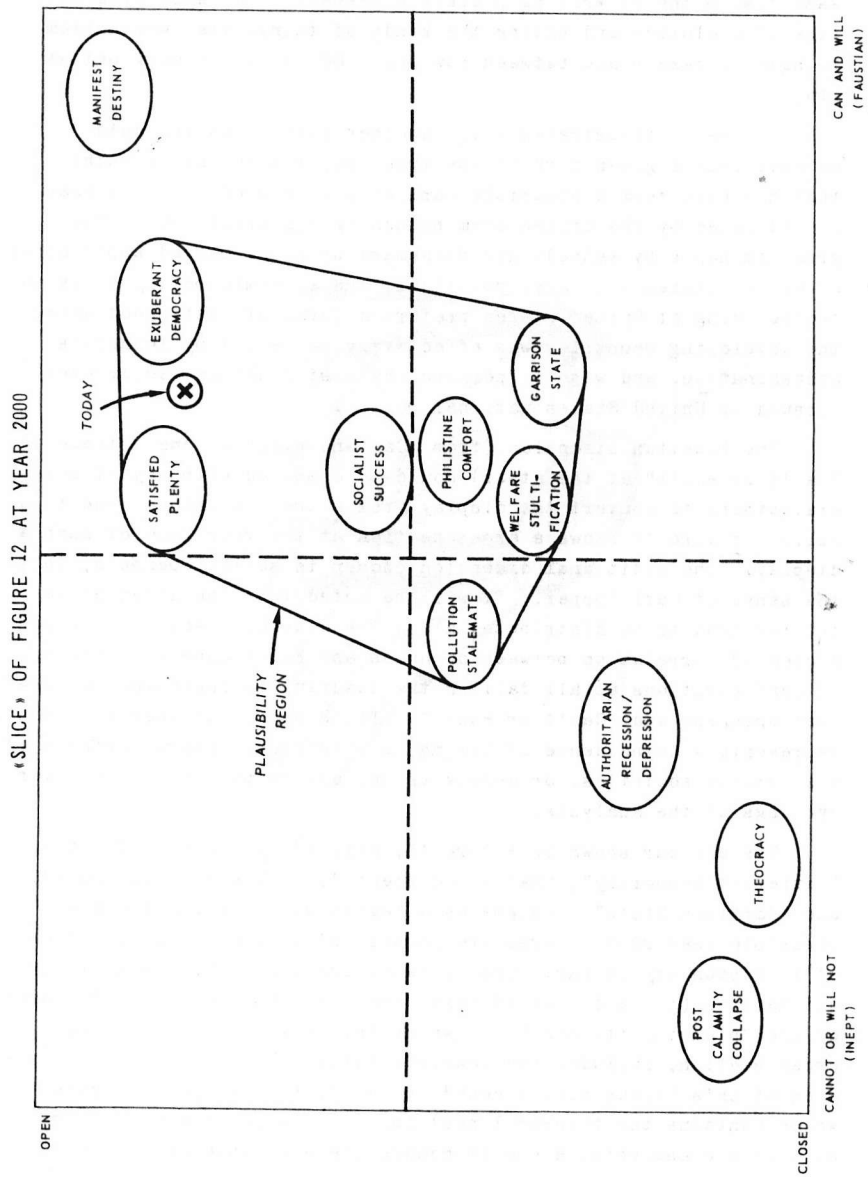
«TREE» OF ALTERNATIVE FUTURE HISTORIES

approximate at this point. They too can be improved upon by the same discipline of writing plausible scenarios for each alternative line of evolution and noting the kinds of things that would seem to have to take place between now and 2000 for it to work out as projected.

Figure 12 illustrates still another point. As the date marches past a given fork in the tree, major alternative paths that may have seemed plausible earlier are dropped. Such a case is indicated by the broken stem branching off about 1960. The great emphasis by Kennedy and MacNamara upon the merged application of United States military, political, and economic policy tools to the building of United States preferred forms of nationhood among the developing countries was effectively cancelled by Kennedy's assassination, and with it perhaps the most Faustian vector ever pursued by United States national policy.

The Faustian dimension (from "Can and Will" at one extreme to "Can't or Won't" at the other) could be combined with any of several others to convert the display from a two-dimensional one to a solid. Figure 13 shows a cross section at the year 2000 of such a display. The additional dimension chosen is social openness, in the sense of Carl Popper. It will be noted that the alternative futures tend to be distributed along the diagonal, showing a high degree of correlation between openness and Faustianness. Indeed, no configurations at all fall in the quadrant representing concurrent openness and "Can't or Won't". It is not clear whether this represents a coincidence of timing, a significant characteristic of most stable societies, or merely an anomaly to be removed in later cyclings of the analysis.

The contour shown in Figure 13, defined by the four futures, "Exuberant Democracy", "Satisfied Plenty", "Pollution Stalemate", and "Garrison State", designates a region within which the most plausible year-2000 futures are considered to lie. (The location of this boundary is particularly tentative since the plausibility estimations (to be discussed next) are not complete.) The "volume" of the "plausibility cone", of which this region is a year-2000 cross-section, includes the feasible future histories. The definition of this "plausibility cone" (roughly, the region in Figure 12 which contains the thicker lines) is, in a sense, the central result of the analysis, since it bounds the available options and identifies key choices.



The concept is vital to the overall method, however. As was emphasized at the start, prediction is impossible and will remain so. The only claim that can legitimately be made is to aid the planner by developing a set of projections such that the actual future may be expected to be contained among them. To suggest that one of a small set of alternatives will emerge would be only slightly less arrogant than to say that one particular one will do so. The contention here is that the future seems more likely than not to lie within the plausibility cone whose intercept with the year 2000 is shown in Figure 13.

The Merger of Normative and Non-Normative Projections - Plausibility, Temporal Continuity, and "Flavour": Sample Scenario

This work is not complete. In generating the "tree" of Figure 12 attention was paid to the "flavour" of the various conditions reflected by individual future configurations and to evolutionary (or revolutionary) transition between such configurations, since without such considerations it would have been impossible either to assess the internal self-consistency of individual configurations or even the gross plausibility of alternative lines of evolution. Such efforts have so far, however, been largely implicit rather than explicit and iterative.

Temporal continuity and internal consistency within a field stretching along each projected line of future evolution are just as stringent requirements as lateral self-consistency within such a field at any given time. It is especially important to realize that a mixture of different social forces represented by the NVB sets will characterize each moment along such a line and that changes in the distributions of numbers and social influence among such groups must be explicable if they are to be considered plausible. In other words, the tale representative of each scenario must be a good story line in human terms. When it is suggested that a "fork" appears somewhere on the "tree", the impulse toward some make-or-break decision within society must be reflected in NVB-group relationships, and taking one branch or the other implies an assumption as to the resolution of that issue - a resolution that will form a part of the history of that scenario and will contribute to the nature of all subsequent NVB interactions.

Indeed, the most satisfactory (in the sense of providing bases for meeting criticism) way employed so far for checking on temporal continuity and relative plausibility of alternative projections has

been to undergo the discipline of trying to tell a plausible story linking the described conditions along such a line. It frequently occurs, when one undertakes such a task, that along one line it is very easy to imagine several seemingly plausible explanations for projected changes, while another path may require imagining a whole succession of developments each of which seems hard to believe - the sequence of such events being even less believable. The estimates of the dates at which various conditions might emerge correspondingly depend upon such scenario-based analysis, since only after a detailed sequence of events has been laid out can one fairly apply his common sense or historical knowledge to the job of estimating how long each change might plausibly be expected to take.

The estimates of relative plausibility and dates of occurrence reflected in Figures 12 and 13 were derived in this way, from scenarios even more sketchy than the one offered below as an example.

Sample Scenario

Case I: An outline scenario running from the present through a national effort against ecological imbalances in the United States and thence toward a confident, Faustian form of democracy late in the century.

Figure 14 shows a schematic of the events and the sequence of societal configurations to be considered here, together with the assumed timing of such occurrences. The dotted lines refer to lines of development and alternative configurations that appear to be plausible possibilities but which are not pursued in detail here. The numbers refer to those configurations offered as a sample in Figure 11; other such configurations were dealt with as explicitly in the original analysis, but such detail would be out of place here.

As a start, it is assumed that the condition of the United States in 1970 might best be described by a configuration in which it had proved that President Nixon's 1969 estimates as to the views

and strength of a "silent majority" were correct(1), as attested by electoral results in 1970. The distribution of the population corresponding to the four NVB sets, both as regards numbers and national influence is not substantially different from that which was obtained in about 1966. Events of the late 1960s have, however, led to a heightened sense of differences among various groups, and associated differences in ideology have taken on a greater significance in United States politics than has been the case through most of the country's recent history.

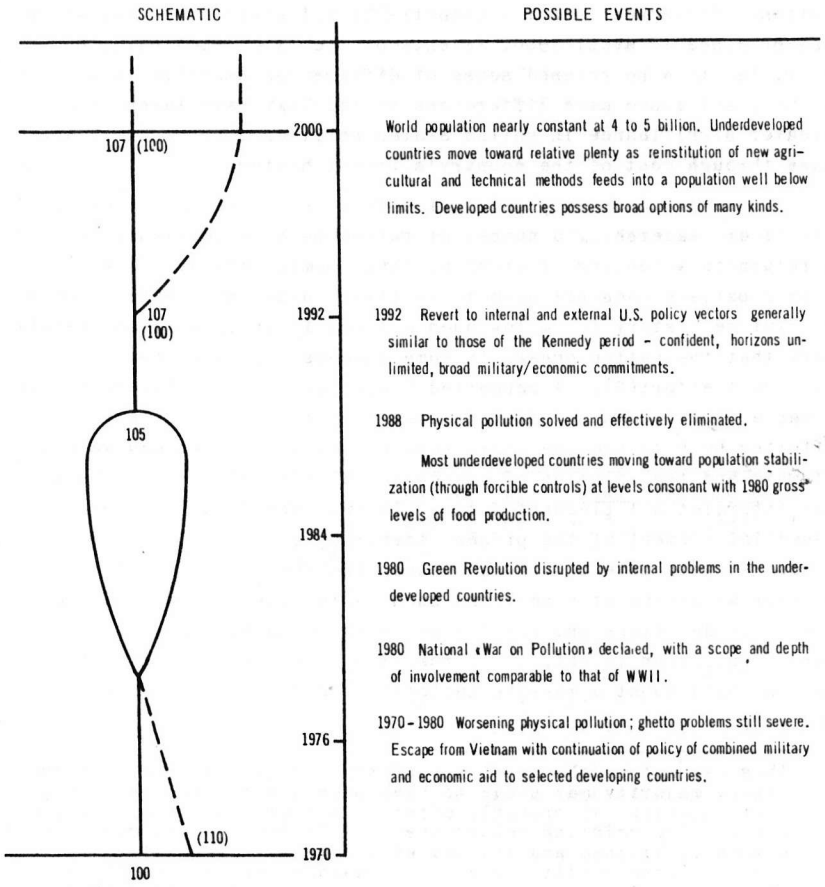
If no distinctively national effort is called for by external events or leadership, a number of future paths seem plausible, but a return to a feeling of proud national competency within a democratic pattern does not seem to be likely under such circumstances. For future history to follow such a line, it appears almost necessary that the nation engage in some successful, comprehensive, difficult effort(2). A concerted "total war" on imbalances in the human ecology seems to offer the possibility of such an effort, offering both to provide what James called the "moral equivalent of war" and the solution of ecological difficulties that otherwise may interdict all pleasant future alternatives. Such effort is an essential element of the present scenario, and it is assumed to be conducted with patent success between the years 1980 and 1988, with a prior worsening of conditions such as to make both the initial executive decisions and popular response plausible in 1980. A war on pollution is not, of course, the only arena in which this nation could mount a massive national effort but it suffices for the purpose of this scenario.

(1) This may not be the case, since it is quite possible that the silent majority may prove to have been a myth; in that case, configuration 110 probably offers a better picture of the present. Also pointing toward the 110 alternative, it may be that events in Vietnam and the United States withdrawal from there under adverse conditions could so damage the credibility of this country's foreign pledges that mutual security arrangements with us will be avoided by others whether or not we desire to so commit ourselves to them. If such is the case, it seems likely that NVB Group 2 has taken on considerably greater influence than it had in the past.

(2) This is so because many material and social prerequisites, the lack of which imposes "necessity" upon those who would prefer to choose freely, are unlikely to be provided unless the nation can function as an entity, and that degree of coherence is unlikely (given current divisions) unless people are drawn together by a common activity.

Figure 14

SAMPLE SCENARIO - A COURSE OF EVENTS
LEADING TO «EXUBERANT DEMOCRACY» LATE IN THIS CENTURY



Conditions in this country never can be fully defined wholly in terms of internal relations, however, and any adequately inclusive scenario must treat with selected happenings abroad. The course of the race between population and food production and distribution in the underdeveloped countries especially promises to have very heavy impacts upon the flavour of life in the United States of America. Along the line of evolution selected for illustration here, it has been assumed that the promises of the Green Revolution have been largely negated by disorders of various kinds within the potentially hungry areas(1) by about 1980. In this scenario, it also is assumed that most such countries react to such developments by moving toward totalitarian forms of government(2) and instituting compulsory forms of population control that promise to result in stabilized world population at the four to five billion level by the year 2000(3).

The eight-year period of 1980-1988 is of great importance in terms of evolving NVB dynamics. Whether the entry into the effort were from a value pattern similar to that of the period of 1955 to 1965 (as assumed here - largely that represented by the "Materialistic NVB-type") or out of the mild New Left position defined by configuration No. 110 (closer to that represented by the "Person-centred NVB-type"), it seems likely that a large variety of solutions would be attempted. Problems stemming from ecological imbalances of both physical and human types (e.g., pollution and racism) will demand attention and it is expected that both will be attacked regardless of which type of NVB-climate was dominant. For

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(1) This is, of course, not the only assumption that could be made here. An alternative involving an optimistic course for the Green Revolution is considered briefly later.

(2) This course of events is suggested by Heilbruner and others, whether or not the promises of the new agriculture prove illusory.

(3) Such a pattern may not be among the most probable, but without such "boot straps" solution of the hunger problem a devolution into chaos would probably result that would, in turn, make a growing mood of confident exuberance in the United States seem very unlikely. There undoubtedly would be repercussions within this country, but existing tendencies toward national introspection would probably have been intensified by American preoccupation with its own "housekeeping"; the feed back from dictatorship abroad seems unlikely to be so severe as to make the overall pattern very unstable.

both types it seems reasonable to expect that the values of the populace will be impelled by the mood of national involvement more toward public service than toward private enrichment. "Achievement" then would be interpreted more in social than in personal terms. Something of this sort happened during World War II.

Successful solutions to the problems of physical pollution will be recognized and will tend to stabilize, being only secondarily dependent on the relationship between the values inherent in the solutions and those dominant in society. The problems of urban ghettos, on the other hand, would be more sensitive to the distribution of values both at the outset of the effort and later on. Due to the socio-emotional aspects of the human problems, solutions will not be as easy to discover or promulgate, will take longer to effect, and will probably not be as stable. Also it must be assumed that the need for cultural changes (which usually tend to be slow if they are not to end in chaotic conditions of a sort incompatible with the line of evolution selected here for illustration), the impossibility of "giving" prosperous self-confidence to any group, and the grave uncertainties that still exist among social engineers as to the tools and procedures to be used in solving ghetto problems, will effectively preclude comprehensive solution within an eight-year period. Efforts on this part of the problem almost certainly would have to carry over into the last decade of this century, but definitive solution of problems of physical pollution should leave both excess resources and a national confidence capable of pursuing a solution to the more demanding problem of social imbalances.

This scenario, then, envisages a transition to economic forms, foreign policies, and political structures reminiscent of those at about the time of President Kennedy. Science and technology would have established strong momenta both in the physical and behavioural sectors and would be confidently expansive on most fronts. The assumption of this or any other "successful" line of evolution calls for the parallel assumption that there is not a thermonuclear war between major powers, but there seems no reason to suppose that competition between the United States and the USSR has been signally reduced, and some form of the Cold War is assumed to exist. This transition might well be accomplished during about

the four years after success in the war against pollution, leading to a configuration such as No. 107 by about 1992(1).

The pattern during the last years of the century might remain essentially unchanged from configuration No. 107, since that seems to be a relatively stable alternative, with a combination of resources, internal and foreign commitments, and inherited sets of needs, values, and beliefs that all fit together reasonably well. It would seem more likely that this condition would persist if the "Materialistic" and "Status quo" NVB type values were salient; the relative proportion of the "Poor" might be relatively small within the pattern of over-all plenty, and opportunities for transition into a life style associated with the "Person-centred" type concerns would be relatively open. In terms of future alternatives already richly described in science fiction, this pattern might look like that in Heinlein's Door into Summer.

Or, if the "Person-centred" NVB type values already were dominant by the time the war on pollution had been won, there might be only a brief lingering in some configuration such as No. 107, followed by a transition toward one of the versions of "Satisfied Plenty", featuring in its matured form an economic pattern in which most material wants were satisfied and material production would cease to expand due to a satiation of demand(2).

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(1) If this stage of development were to be reached through a line of development in which there had been no effective stabilization of world population but in which the success of the Green Revolution had permitted the feeding of six or seven billion people who seem likely in that case to exist at the end of the century, the corresponding configuration in about 1992 could be No. 100. There is also the chance that the assumed national effort against pollution and ghetto problems could fail; the attempt might start too late, it might be vitiated through internal conflict, or effective solution may already be beyond reach. Such failure would drive the scenario far away from exuberant confidence into one of the more dismal, unsuccessful future conditions.

(2) It should be noted that there are some NVB anomalies to be considered here. The pattern (107) of technical competency at home and a dictatorially arranged margin between population and resources abroad seems less consonant with the flavour of the "Person-centred" values than with the "Materialist", but it is in this pattern that the material base for a transition into satisfied plenty is most likely to exist. If the line of evolution featured continuing success of the Green Revolution and no positive controls over population, the result would be a fragil sort of human ecology in which the wolf was barely being kept from the door in most parts of the world; the evolution of that pattern seems more nearly consonant with a long period of strong influence from "Person-centred" leadership, but evolution toward a slackening of material production would be improbable.

Fits and Misfits

One of the important aspects of such a scenario is the degree of "fit" or "misfit" of the state of society to the desires of the various NVB types. The word "fit" can mean at least two quite different things in this context. For one thing, there is the question just of internal consistency: "Given this six-letter configuration, what kinds of NVB climate would seem most plausible?" As another quite different question, one might ask "To what degree would this configuration tend to fulfill the needs of different NVB types?" A future may be "poor" but that does not mean that the poor would want to live there. The climate can not adequately be established without considering the ways in which the situation in question might have evolved, although it of course is possible for one group to inherit a situation that was created under other auspices. Two approaches to assessing "fit" are briefly described below. These have no empirical foundation, being based solely on judges' opinions. Their value is essentially as convenient means of meaningfully combining judgments on component ratings.

The first of these is illustrated in Figure 15. Each of a group of judges looks at the detailed description of a postulated configuration and at the descriptions of the four NVB-sets and considers which of those sets, if followed, might be most likely to have brought the condition in question into existence or what type of person might be best fitted to exist within it. A close fit between a particular NVB-set and a given configuration (the same sample set presented in Figure 11) is scored with a double asterisk (**), a less evident association is scored (*), and an apparent non-fit is left blank.

The following paragraph shows, in abbreviated form, the treatment of a typical line item:

> "Satisfied Plenty", Configuration 212: This is a case in which demand within the United States has been partly satiated, so that expansion of the GNP has been greatly slowed down without the implications of non-success that are now implicit in such a levelling. The application of compulsory kinds of control by the underdeveloped countries themselves has stabilized their population at levels such that they can avoid famine without attention from the developed world. This may be a prerequisite to the achievement of a sense of comfortable plenty in the United States during this century, since otherwise the feeding of the world's people may call for a steady increase in productive capacities elsewhere. Physical pollution had

Figure 15 - NVB "CLIMATES" ASSOCIATED WITH PRESENT AND SELECTED ALTERNATIVE FUTURES

General Character Configuration			NVB Climate: Materialist 1	NVB Climate: Person-centred 2	NVB Climate: Status quo 3	NVB Climate: Poor 4
Present						
"Silent Majority"	101	$E_1I_1S_1D_1H_1F_3$	**	*	*	
"Mild New Left"	110	$E_1I_1S_3D_1H_1F_2$	*	**		
Year 2000 - Self-Consistent Futures						
"Exuberant Democracy"	106	$E_1I_1S_1D_4H_1F_1$	**	*		
"Satisfied Plenty"	212	$E_6I_1S_3D_1H_5F_4$		**	*	
"Welfare Stultification"	221	$E_5I_4S_3D_1H_4F_4$			**	*
"Garrison State"	234	$E_5I_4S_2D_2H_4F_4$	**		*	

been cured earlier, through a national effort on that problem which was previously described. It seems probable that this pattern would fit most easily with a climate such as that exemplified by the "person-centred" NVB-set, but it also could match with a pervasive conservatism looking to the preservation of the newly achieved and comfortable status quo if exuberant growth toward non-material goals were not pursued. This is one of the very few futures which is optimistic from the standpoint of the "poor".

The second method of assessing the degree of fit is somewhat more elaborate, and since the judgments called for are more elemental, may have an advantage in reliability. In this scheme the four NVB-sets, a number of the alternative configurations representative of possible futures, and the three "utopias" investigated, all were scored in terms of seven dimensions of comparison that the statistical investigations showed to be most discriminative of the NVB-sets. Those dimensions are expressed in terms of dichotomous poles. The items scored were "located" in terms of the nearness to one or the other of the poles in each case. The seven were: (1) individualistic vs communal, (2) institutional vs personal, (3) elitist vs egalitarian, (4) personal-rights vs government-constraints, (5) peripheral vs centralized, (6) utilitarian vs aesthetic, and (7) apollonian vs dionysian.

Figure 16 offers an example. Here the estimated tolerance range of a given configuration ("Satisfied Plenty" in this case) is scored laterally along an arbitrary scale of seven between each of the dichotomous poles (shaded area in the figure). Characteristics of the four NVB types are indicated by the zigzag lines. Comparison of the shaded area with the NVB-set lines yields a rough measure of the fits and misfits between NVB-sets and the futures.

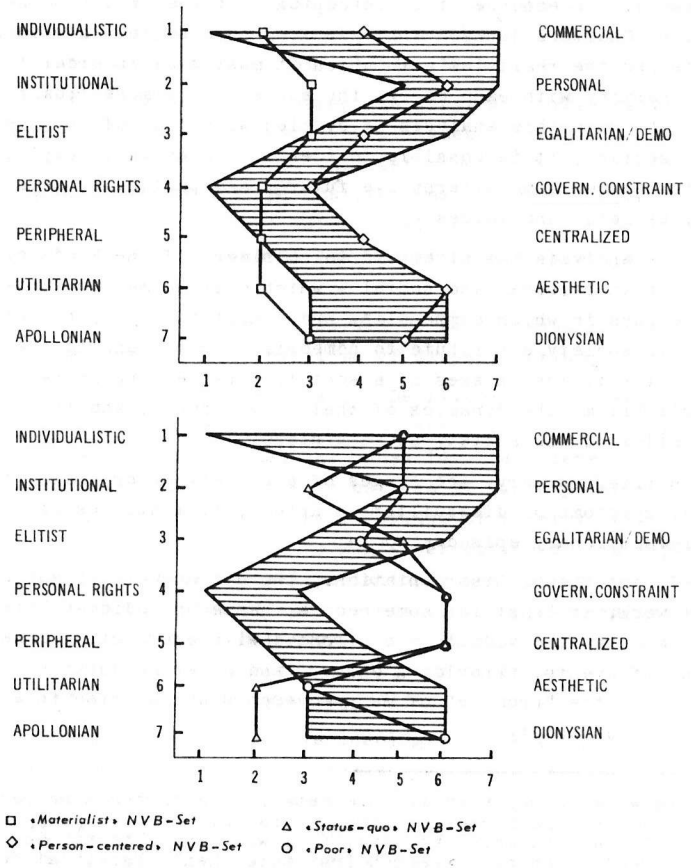
In this example, the shaded area reflecting the characteristics of the "Satisfied Plenty" future clearly accommodates the "Person-centred" type well, and the "Materialist" type somewhat less so. It has a rather poor match with the other two types. The lack of apparent fit of the "poor" NVB-set as judged by the underlying dimensions is somewhat at odds with the prior observation that this is one of the few good futures from the standpoint of the poor.

Analysis of Revolutionary Potentials

The alternative-futures analysis previously described was constrained by an assumption of gradual and non-discontinuous

Figure 16

EXEMPLARY DIMENSIONAL FIT ASSESSMENT



changes in societal functioning and prevailing values. As there is ample evidence of revolutionary fervor in contemporary United States society, the possibilities for discontinuous social change due to attempted revolution were examined in a separate analysis(1). The framework used is a synthesis of treatments by a number of writers(2). In essence it is conceptually based on a hypothesis stated by Chalmers Johnson that "so long as a society's values and beliefs and the realities with which it must deal in order to exist are in harmony with each other, the society is immune from revolution(3)." When this analysis is coupled with that of the preceding section, it is possible to identify potentially explosive misfits between some alternative futures and particular sets of needs, beliefs, and values.

This analysis has attempted to consider 1) the kinds of needs - both personal and social - which must be met by society; 2) the ways in which commonality and compatibility of beliefs and values in society contribute to homeostatic reactions to change; and 3) the typical stages of a society experiencing increasing disequilibrium, the dynamics of their development, and the characteristics of the society at each stage.

In brief summary, the stages of a society experiencing the initial symptoms of disequilibrium appear, from studies of historical revolutionary episodes, to be:

(1) Individual Disorientation. The old answers of society no longer work, at least for some people; hence unpredictability results, and the individual is confronted with conflicting interpretations of events. Providing answers and offering durable ideas are part of the "promise" of many movements which arise in a disequilibrated society.

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(1) This work is reported in more detail in a forthcoming report by Norman McEachron and Connell Persico, "Revolutionary Forces and Social Change: Conceptual Framework and Alternative Futures", Stanford Research Institute, Menlo Park, California.

(2) Chalmers Johnson, Revolutionary Change (Boston, Little, Brown & Co., 1966); T.R.Gurr, Why Men Rebel (Princeton, N.J., Princeton University Press, 1970); Neil J. Smelser, Essays in Sociological Explanation (Englewood Cliffs, N.J., Prentice-Hall, 1968, especially Chapter 10); and Martin Oppenheimer, The Urban Guerrilla, Quadrangle Books, Chicago, 1968.

(3) Chalmers Johnson, op cit, p. 60.

(2) Increasing Individual Deviancy and Normative Dissensus. The personal tensions of social actors experiencing disorientation lead them to deviant behaviour as a means of release. As a result, the norms of the social system are challenged and broken by persons who are neither sick nor criminal. Consequently, laws attain much higher saliency, and it becomes hard for the system to distinguish between dysfunction-inspired protest and behaviour that represents the now-disguised deviancy of criminality or ill health.

(3) Proliferation of Corrective Norms and Organisations (Advanced Complex Societies). In piecemeal attempts to deal with dissynchronizing conditions, increasing reliance is placed by society on governmental and institutional interventions to perform patchwork correctives, including legal sanctions and incentive systems to take the place of now inappropriate values and standards.

As these attempts are observed to be inadequate, society may experience more advanced symptoms of disequilibrium:

(4) Consciousness of Relative Deprivation and Resulting Protest. As personal tensions continue and increase, various social actors come to believe that the cause for these tensions lies not with themselves but with the injustices of society perpetrated on them. This corresponds to the emergence of relative deprivation. Relative deprivation refers to man's perception of discrepancy between his legitimate "want-expectations" and society's willingness to fulfill them. ("Want" here refers to normative desires arising from needs, values and beliefs.) Once an actor comes to feel relative deprivation, he is much more likely to engage self-consciously in protest against perceived injustices.

(5) Emergence of Multiple Ideologies, Politicized Protest and Societel Fragmentation. The need to legitimize protest behaviour and collective reflection leads to ideologies which changes a protester's perception of his situation and which provides him with new norms of behaviour. Alternative value structures are created, many in competition - both with themselves and with the older prevailing system. Mature ideologies have both a goal for societal change and a set of tactics for bringing about the ideal. As a result, ideological protest behaviour has a decidedly political flavour.

(6) Power Deflation. When the trust and confidence which has been supported by shared values breaks down, a process accelerated

by the emergence of competing ideologies, the normal procedures of inducing appropriate behaviour also break down. As a result, the exercise of control by societal authorities comes to rely increasingly on the use of force, and power begins to replace consensual authority.

(7) Crisis in Authority. Power deflation leads directly to challenges of the central social authority's right to maintain a monopoly over the use of force. If the system is unable to develop policies which will maintain the confidence of non-deviant actors in the system and its capacity to move toward resynchronisation of values, a loss of authority will ensue. A police state may maintain "Law and Order" in such a circumstance, but normal social process will continue to break down and the society will begin to decline in viability.

Alternative Future Resolutions to the Current Revolutionary otential in the United States

It appears that the United States has entered in the last several years a stage of incipient power deflation, but has by no means yet approached a loss of authority. Hence, a number of options remain open to the nation during the next several decades, as Figure 17 depicts.

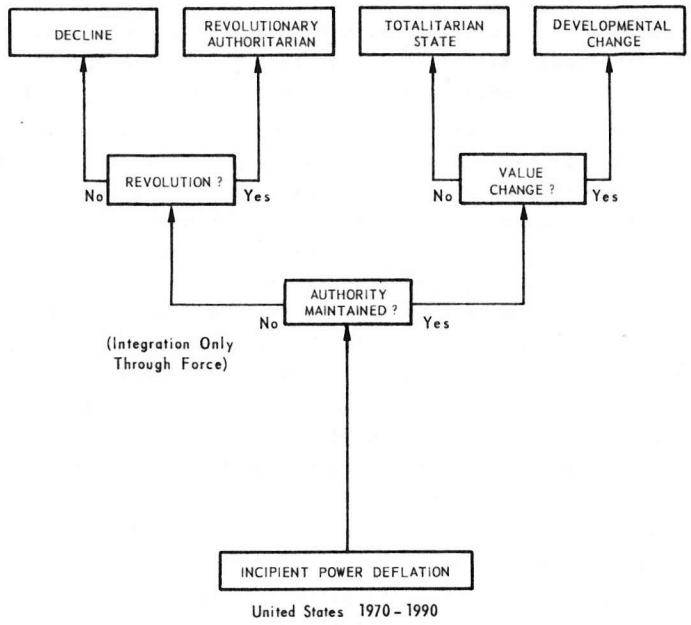
The first branching point reflects the possibility that authority may or may not be maintained. If it is lost, as described above, the integration of society will come to rest strictly on the application of force. Thereafter, if revolutionaries can mobilize the population and the regime's armed forces can somehow be neutralized, a revolution can be launched. This action, if successful, will place upon the government the task of resynchronising values and environment (usually through authoritarian measures). Otherwise, society will undergo a period of relative chaos, perhaps convulsed by revolutionary activity which, however, fails to mobilize the population toward resynchronisation of values. Eventually a "Caesarian" authority is maintained. On the other branch, if societal leaders perceive the societal situation as basically one of disequilibrium and respond with effective policies to achieve resynchronisation, then values will be changed radically, but developmentally rather than through a revolution. In contrast, if societal leaders attempt to maintain authority through fear and totalitarian control, their efforts may be temporarily successful without policies to resynchronise. In the long run, however, this

branch is unstable: either policies to achieve developmental change will be launched, or authority will eventually be lost.

The results of this analysis of revolutionary pressures correspond almost exactly to the previously described alternative future histories. The right-most branch of Figure 17 (assuming attainment of resynchronisation through maintenance of authority and appropriate value change) leads directly to the more desirable futures depicted in Figure 12 such as "Exuberant Democracy", "Satisfied Plenty", etc. Less happy ways of dealing with the revolutionary pressures appear on the left of both Figures 12 and 17.

Figure 17

SHORT-TERM ALTERNATIVE RESOLUTION OF REVOLUTIONARY FORCES



IV. IMPLICATIONS FOR EDUCATIONAL POLICY

In this chapter we want to suggest some of the educational policy implications which seem to emerge from the tentative set of alternative future histories. First, however, let us comment briefly on major uses to which such a set can be put.

Uses of a Set of Alternative Future Histories

In general, there are four such types of use:

1. ALTERNATIVE CONTEXTS FOR PLANNING

In the first place, alternative contexts are delineated against which to test proposed policy and within which to develop plans. That is to say, if one had clairvoyant knowledge of the future he certainly would be interested in knowing how present policy choices would look from the vantage point of 10 or 20 years hence. In the absence of that knowledge he can reasonably check with regard to representative plausible alternatives.

For example, as previously noted in the discussion of Figure 12, through 1985 there appears to be three main clusters of alternative paths. One goes through a "slough of despond" characterized by loss of confidence and national will, accompanied by economic depression or dithering improvidence. A second is a projection, more or less, of present trends, with impulses toward economic and cultural growth somewhat predominating over those tending toward chaos or stultification. A third is dominated by an all-out determination to solve the major problems of the ecosystem. An educational planner would be wise to try to live imaginatively in all three of these alternative futures. If his plans seem reasonable in all three, well and good. If they don't fit one, he will be particularly watchful for signs that history might be taking that path.

Each alternative line of future evolution implies distinctive kinds of opportunities and constraints. For example, if the "war on ecological imbalances" stem were to emerge as the actual future, the evolving educational system would probably emphasize national

coherence, skills training for the national effort, and a holistic, ecosystem view of the biosphere. It would be embedded in a prosperous economy, and while the needs of the overarching national commitment would come first, the per capita resources for school and educational personnel would probably be as great as, or greater than, at present. Either a technological or a person-centred emphasis might conceivably dominate the early years of the national effort; in the end a balance between the two would probably emerge.

If, on the other hand, the future history turned out to be one of those passing through the "slough of despond", the educational system would have much different forces operating upon it. This condition might be brought about by any of a number of circumstances - by a stubborn adherence to antique economic principles, or by an impatient grasp for piecemeal ecological solutions, or by attempted forms of cultural pluralism for which the populace were not yet prepared, or by a pattern of affluence for which the needed technical productivity had not yet developed. In any event the condition would be one of scarce resources, and high anxiety levels as regards self protection and self support. In a world of hardship and chaos there would be little sympathy for educational approaches more suitable to affluent order.

2. ISOLATION OF PROBLEM AREAS OF THE FUTURE

A related, but conceptually different use of a "tree" of alternative future histories is the identification of probable problem areas of the future. Some problem areas, such as the "world macroproblem" to be discussed below, are sweeping and seem to occur in all alternative future states. Some problem areas such as a rise in authoritarianism, on the other hand, occur only in limited regions of the "planning cone".

The differentiation of sweeping problem areas from those of more limited scope is of greatest importance for long-term planning. The problems which are specific to a given type of future can be avoided by avoiding that future. The problems which are specific to <u>all</u> plausible futures, however, will have to be encountered regardless of what future is attained.

Some such problem areas, including ecological imbalance, United States isolationism and population/subsistence abroad, authoritarianism, and internal violence, will be discussed later in this chapter.

3. IMPROVEMENT IN PLANNED INTERVENTION

An obvious use of the analysis of alternatives - and one which depends on the proceeding two applications - is in the design and execution of policy aimed at increasing the likelihood of avoiding undesirable future histories and of bringing into being a desirable one. For example, we have previously observed in the discussion of Figure 12 that each of the very few paths leading to attractive futures somehow must involve solving at least the most pressing aspects of the "world macroproblem", and also requires a renewed sense of unified national purpose. A "total war" on ecosystemic imbalance provides one of the more promising ways to achieve these two objectives.

Figure 12 graphically illustrates how plausible alternatives become more numerous and diverse as one moves out in time. Hence long-term plans should, insofar as practical constraints permit, be adaptive and contingent rather than specific. A dependable futures "tree" is extremely useful in suggesting hedges of investments which a prudent planner might make. Even a relatively crude and imperfect "tree" may offer significant insight into the need for hedging of some kind. Short-term plans must be specific, but policy choices and plans which are expected to have lifespans of one or more decades must be more general and should insofar as possible be set up so as to facilitate later improvisation.

It is clear that for coordinated planning, the different agencies involved in major policy decisions should use the same "tree" of alternative future histories. (It would be advantageous, for instance, for educational planning in individual OECD nations to be assessed in terms of one common "tree" of world-wide alternatives.)

4. SHORT-TERM SOCIAL INDICATORS

Much attention has been given lately to social indicators. Possession of a futures "tree" permits much crisper definition in this field. In the long run it should prove extremely useful in the choice of a policy-relevant hierarchy of general social indicators.

In the short term the futures "tree" has particular value, since it suggests the high utility of certain special-purpose "early warning" indicators. From Figure 12 it is apparent that an accurate indication of the similarity between the present state and each of the three main stems designated for the 1970-72 period

would be of inestimable value. If it were well established, for instance, that the United States actually were tending to move into a semi-permanent condition of recession, confusion, and improvidence, that would radically affect every aspect of educational planning from preferred curricula to projected student loads and available revenue. The holistic descriptions corresponding to these three stems furnish the basis for design of such "early warning" indicators. They would allow much more satisfactory planning than fragmentary indicators of diverse variables.

The World Macroproblem

- Significant overall conclusion

Because so many decisions in educational planning are associated with decade-long time lags, analysis of future alternatives is especially important. Realistic plans must be laid in relation to an embracing context which is representative of the conditions that may exist after the plan is in operation. "Relevance" in 1985 will be determined by the match between education and the ambient circumstances then.

Projection of future problems and areas of concern allows delineation of present issues, of decisions among currently feasible courses of action. Some of these issues have to do with planning and monitoring processes; others with substantive choices affected by perceived future problems.

In examining the alternative future histories for anticipated problem areas we found that a startling conclusion emerged. It appears that of the some two score feasible future histories there are very few that manage to avoid one or another kind of time of extremely serious troubles between now and 2050. The few that do require a dramatic shift of values and perceptions in order to deal satisfactorily with what we came to term the "world macroproblem".

This macroproblem will be the predominant concern of the foreseeable future, for all the alternative paths. It is the composite of all the problems which have been brought about by a combination of proliferating knowledge, industrial development unmoderated by social responsibility, and the high population levels which are at once the cause and consequence of increasing human control over the human condition.

(1) Problems of the ecosystem (ecological imbalances, fouling of the environment, resource depletion; overpopulation and consequent famine and plague in underdeveloped regions)

(2) Expanding have/have-not gap (domestically and between nations, with resulting internal and external dissention)

(3) Technological threats (weapons of mass destruction, vulnerability of a complex society to sabotage; new powers to "engineer" the human body, mind, foetus, and genetic transmission; threats to privacy and individual rights; mental stress of complex living)

(4) A crisis in enculturation, threatening the minimal intergenerational transmission of culture that is essential to social continuity.

Of critical importance is the type of response society makes to these problems. Although terms like "environment" and "ecology" have entered the political rhetoric, we have not yet begun to take this world macroproblem seriously. Even among the informed public there is a pronounced tendency to believe that:

(1) New technological breakthroughs will be achieved which will enable us to control pollution.

(2) The "Green Revolution" in agriculture will solve the world food problem.

(3) Technological breakthroughs in contraception will take care of the population explosion.

(4) The deterrence policy will continue to preserve the world from the horrors of nuclear warfare.

(5) International controls will adequately protect against small-nation development and use of biological weapons.

(6) The right programs for urban problems will begin to reduce the severity of the problems of racism in the nation.

(7) The drastically fallen world image of America, from the hope of the oppressed to imperialist oppressor, is a regrettable consequence of our involvement in the Vietnamese conflict, and can be righted by our finding a satisfactory way to extricate ourselves from that situation.

(8) As soon as the Vietnam war is over, we will begin to make steady progress on the serious social and environmental problems which beset us.

(9) When our resources are freed by the end of the Vietnamese war, by supplying capital and American knowhow to the underdeveloped nations, we will begin to close the have/have-not gap which poses a continuing threat to world peace.

(10) As available supplies of physical resources - fresh water, fossil fuels, minerals, etc. - are used up, technological breakthroughs will provide substitutes.

(11) As per capita energy usage continues to rise and conventional power sources (hydroelectric, fossil fuels) to approach limits, technological breakthroughs will result in new energy sources (efficient solar cells, nuclear fusion processes with no side radioactive contaminants) which will fill the demands.

As our work progressed these expectations looked less and less credible. Rather, the various aspects of the world macroproblem looked more and more like surface manifestations of a pathogenic condition much more fundamental. This showed up in the projections of alternative futures, wherein it appeared that desirable "future histories" were hard to come by, and involved significant changes in operative values. It appeared again as we attempted to analyse how the world had got to its present state and began to suspect that it was implicit in the premises of present forms of the technological-industrial state, awaiting only suitable levels of population and technological application to become intolerable. It showed up once again as we grappled with the significance of contemporary revolutionary forces and found that the crucial gap is not that between generation, nor between liberals and conservatives, but between those who anticipate a continuation of present trends and those who insist that a drastic change is absolutely necessary.

Pathogenic Premises

Admittedly the concept of pathogenic premises is a loose one. It is meant to connote that certain aspects of the prevailing (whether explicit or implicit) premises are problem-generating; in other ways they may produce useful consequences. For example, at one time the premise that black persons are subhuman contributed significantly to a thriving agricultural economy in the South. Few

today, however, would doubt that it was also pathogenic. Similarly, premises which contributed significantly to our present industrial and technological accomplishments may have pathogenic aspects with present population levels and technological powers. Among these might be listed:

(1) The premise that the pride of families, the power of nations, and the survival of the human species all are to be furthered in the future (as they usually have been in the past) by population increase.

(2) The "technological imperative", that any technology that can be developed, and any knowledge that can be applied, should be.

(3) The premise that the summed knowledge of experts constitutes wisdom, that the integrative arts and sciences are of only secondary importance.

(4) The premise that affluence has arrived, continued access to the many rights accessible to Americans is assured, and the productive establishment is infinitely resiliant.

(5) The reductionist view of man, a premise associated with the development of contemporary science and which lends sanction to dehumanizing ways of thinking about and treating men.

(6) The premise that men are essentially separate, so that little intrinsic responsibility is felt for the effects of present actions on remote individuals or future generations.

(7) The premise that man is separate from nature, and hence that nature is to be exploited and "controlled" rather than cooperated with.

(8) The "economic man" image, leading to an economics based on ever-increasing GNP, consumption, and expenditure of irreplaceable resources.

(9) The premise that the future of the planet can safely be left to autonomous nation-states, operating essentially independently.

(10) The disbelief that "what ought to be" is a meaningful concept and is achievable.

If we are correct in this tentative judgment that the various aspects of the world macroproblem, while they may be ameliorated or postponed by certain technological achievements, are instrinsic in the basic operative premises of present industrialized culture - if this is correct, then it follows that education toward changing those premises is the paramount educational task for the nation and for the world. This involves at least education toward responsible stewardship of life on earth with the associated changes in values and premises. It probably includes adaptation to a new and evolving metaphysic which will support these changes (since values are always rooted in an implicit picture of man-in-relationship-to-this-world), and probably calls for a new alliance between education and law enforcement to help us through a coming time of troubles. And it calls for a resynchronization of values held by presently divergent groups.

We would not pretend that these conclusions are demonstrated. We do claim, however, that if further analysis substantiates this interpretation of our situation, no other educational issues can compare with these in long-range importance. Changing our values and premises is not just a good thing - it is a necessity.

Major United States Problem Areas Related to the World Macroproblem

Several major problems, most of them related to the "macroproblem", pervade the projected alternatives. They are interconnected, so the issues (i.e., near future subjects for decision) associated with each of them form correspondingly interrelated sets. We shall comment briefly below on four of these problems.

1. PROBLEMS FLOWING FROM ECOLOGICAL IMBALANCE WITHIN THE UNITED STATES

This subject appears to be significant along nearly all of the alternative future paths considered, but its policy implications differ from path to path. It is a central problem focus from which educational policy implications are drawn in the next section. The key questions seem to be: a) What is the objective severity of the problem? b) What might be expected to be the nation's response to the problem along various paths, and, for various degrees of objective severity, what might be the consequences of such a response in each case? c) How might the problem shape and be shaped by education? Each of these implies important educational policy issues.

Imbalance within the ecology in this country might be characterized by too many plants growing in Lake Erie or too many people in Los Angeles or by too many chemical compounds of the wrong kind present in air or soil or water. In every case, the test for "too much" lies in the quality of life open to Americans and (less immediately) people in other countries. There can be no doubt that chemical pollution of various kinds already has chipped away significantly at that quality of life, and that related biological imbalances (such as overpopulation of algae or people) also threaten us.

There is, however, considerable uncertainty as to the real urgency of the problem. May it be solved almost casually once national attention has been focused upon it, or is the issue so desperate that scenarios beyond about 1990 are nearly all ones of collapse and disaster? Knowledgeable spokesmen can be found for each viewpoint. The issue remains one in which such differences exist largely because the American emphasis upon specialties of various sorts has almost forbidden serious research concerning complex wholes. The needed study could be initiated in this country's centres of higher learning (although structural reform would be needed in most of them before this could be done effectively), and the habits of mind necessary to follow through on initial studies could be inculcated from the earliest grades. In any case, the salience of the question among the future projections suggests that one of the more urgent issues facing American education concerns the discovery of the real character and seriousness of the problem of ecological imbalance, and the nature of the educational task regarding it.

If, as now seems likely, the problem is neither trivial or desperate, there still are good reasons for acting initially as though it were very difficult to understand and relatively severe. First, it may be severe, and one of the broad avenues toward the less desirable alternatives on the futures "tree" lies in corrective efforts that are too little or too late. Nothing will be lost and much may be gained by starting early with a great deal. Second, whatever the objective severity of the overall problem, the history of efforts to adjust the complex web that makes up any ecology shows that piecemeal interventions have usually proved harmful. One of the high probability ways into chaos consists of premature, unknowledgeable attempts to cure the more evident symptoms of imbalance one at a time. Third, the activity of national

response promises itself to be a salutory educational experience for the country and for academia, drawing together the threads of national life whose separateness now is the most threatening single factor in the immediate future, and forcing within academic and student circles an attention to rich interconnectivity and organic continuity that has been spectacularly rare for very many decades.

2. UNITED STATES ISOLATIONISM AND POPULATION SUBSISTENCE ABROAD

Most of the futures projected for the end of the century are ones in which very many - billions - of people in the underdeveloped countries of the world are hungry most of the time or have had their numbers sharply reduced before that date by pervasive famine. As with the problem of ecological imbalance, there are legitimate differences (within the present state of knowledge) as to just how soon the condition may become serious. Only a few extremely optimistic projections suggest that the problem can be postponed into the next century. Nearly all of those few paint a scenario that leaves some seven billion people on earth in the year 2000 living under conditions of extreme ecological fragility, in the sense that any serious natural or social disruption of the order which is prerequisite to those peoples' support might find the earth overpopulated by a factor of two - with no option except death for the excess.

This problem couples most dangerously with a recent tendency toward United States isolationism which is observable both in the "right" and in the "left" political forces in this country. If this trend continues there is little chance that the Green Revolution can succeed in the tropics, and the resulting conditions when our aid is withdrawn are likely to deepen the American impulse to turn away. Such a turning probably would not have the catastrophic economic effects here that Lenin once thought it would but there surely would be substitution costs as trade dried up. Such inefficiencies would force reductions of the American standard of living or of the wealth reinvested to produce future wealth. Recession or welfare stultification would be a possible consequence, cutting still further the material bases of possible help to hungry peoples, and the situation might well drive itself ever downward and inward.

An implication which can be drawn from this analysis is that education which fosters the holistic conception - in world economic and political interdependencies as well as other problem areas - may reduce the short sighted tendencies toward isolationism and lead toward an appreciation of the interconnectedness of decisions in diverse areas.

3. AUTHORITARIANISM

Another problem highlighted by the futures "tree" is that of possible losses of freedom to one or another kind of authoritarianism. Most, but not all, of the paths of that sort take their departure from an élite seizure of power under straitened conditions, so the majority of such cases are to be found toward the inept (i.e., left) side of Figure 12. In a few cases, however, the ineptitude is the consequence rather than the cause of the authoritarianism, as when society splits into antagonistic subcultures in a premature, ideologically dominated kind of cultural pluralism, leading to outright intergroup warfare or to a dithering impotency which invites the services of a "Caesar".

A number of educational policy implications can be drawn from this aspect of the futures "tree". For adult education, it would seem to suggest attention to historical instances in which freedom has been voted away, to the ways in which self-appointed élites have in the past drifted into megalomania, and to the opportunities opened to conspirators when a nation's groups bicker among themselves. Similarly in college and high school curricula the ways might be brought out in which anti-democratic means have corrupted otherwise admirable efforts toward reform and gone further and cost even the freedoms that had existed before the attempt. The rise of Hitler (partly out of the impatiences of Weimar) is an important case in point. In planning for the lower grades, we might do worse than to revisit John Dewey on democracy and education.

4. VIOLENCE WITHIN AMERICA

Closely allied with authoritarianism, élite arrogance, and ecological imbalances are problems of political violence. It is a short step from stamping down the words of an unpopular speaker to stomping out his life. It is a progressive extension of an existing condition when groups move from the violation of due process in minor ways to the outright formation of private political

armies. And it can come as no surprise if the proven efficacy of the knife in slum surroundings leads to adoption of assassination as a political tool.

Descriptors of socially pervasive or politicized violence were not explicit in the factors used to project future alternatives, and therefore such conditions did not show up vividly in the descriptions of those alternatives. They are there, however, underlying most of the less desirable and more chaotic alternatives. Indeed, in some of the future histories it appears that two major educational concerns will be adaptation of the instructional processes to conditions in which the "Blackboard Jungle" is common rather than exceptional, and the direct use of education to reduce the level and severity of violence in the society and its politico-economic life.

Societal Tasks and their Educational Components

The preceding sections outlined several different uses to which a set of alternative future histories could be put and demonstrated several sweeping problem areas, each of which could be used as a basis from which to derive policy implications for education as well as other policy areas.

If the set of alternatives reported here (or something like them) are the contexts within which we are to allocate limited education resources - psychic, human, and economic - then what sorts of detailed policy implications are suggested? The following discussion is from the standpoint of fostering a "war on ecosystem imbalances" (social as well as physical), (right major stem of Figure 12), and avoiding the "slough of despond" (left major stem). This seems not only to be an eminently reasonable position, but is also directly in line with the President's 1970 State of the Union message. (In adopting a national focus of analysis we are trying to present a framework for thinking, rather than specific policy proposals. Hence the analysis should not be irrelevant for an international audience.)

The matrix of Figure 18 contains headings along the top which indicate various educational areas in which a given social task may impact. The listings in the left column are major social tasks suggested by the array of alternative future histories. Elements in the matrix indicate aspects of the educational components of these societal tasks. The discussion below is arranged as though the matrix were being scanned horizontally.

Figure 18 - MATRIX OF SOCIAL TASKS AND EDUCATIONAL COMPONENTS

Aspects of the educational component of societal tasks

Societal task	a. New Conceptualizations	b. Research and Development	c. Institutions	d. Educational environments	e. Programme content, resources	f. Processes
1. Make direct attack on aspects of the world macroproblem						
2. Control technological development and application						
3. Alter values, perceptions/and premises						
4. Establish a new sense of national purpose						
5. Meet the educational demands of varied groups						
6. Educate for coping with an uncertain future						

1. MAKE DIRECT ATTACK ON THE WORLD MACROPROBLEM

If indeed the world macroproblem is as represented, its solution is the paramount societal task before us. Undoubtedly a direct attack on specific aspects must be made. The implications of locating the roots of the problem in basic belief-and-value premises will be examined later on.

a. New conceptualizations required for dealing with the world macroproblem include preeminently that of the entire biosphere as a closed ecosystem in which human culture has become a significant part of the system. We need gross models for a homeostatic world ecological balance, and a long-term strategy for reducing the have/have-not gap within the nation and in the world.

A new concept of education is demanded which includes development of those attitudes conducive to survival of human civilization and an overall high quality of life. Training is especially needed in making that combination of reality perception and value judgment which Geoffrey Vickers has termed "appreciation", and in dealing with complex wholes - in viewing self and social situation in their full ecological, cultural, and historical context.

b. The most urgent research task suggested directly by the alternative future histories is the establishing of the degree of seriousness of the world macroproblem. There can be no doubt as to the reality of the various aspects of the problem. Considerable disagreement among observers exists as regards the real urgency. We need to know.

One apparent policy move is to mobilize the education and research resources of the nation's universities for a massive, trans-disciplinary, problem-centred approach on environmental, population, and anti-poverty aspects. This is no simple matter. Our universities have little tradition of either multidisciplinary or problem-centred research or education. They are not equipped and do not train for looking at complex wholes. They tend to be enamored of technological cures for human problems.

Sociology in the university has significantly lessened its earlier emphasis on the semiphilosophical "humanities" approach in favour of an emphasis on techniques and empirical studies, based on a premise that man is a creature of his drives, habits, and social roles. In psychology this view is likely to be even more explicit, with consciousness considered to be an inconsequential accompaniment to behaviour governed by external stimuli

and instinctive urges. Political science tends to focus on the processes by which public policies are made, and to be relatively little concerned with their contents. Amid the measurement of attitudes, population movements, organisational trends, political behaviour and the modelling of society and governments, little attention is given to the historic questions relating to man, his condition and his destiny. Even less attention is given to the man-earth whole, to the politics of the biosphere.

This is simply to say that the nation's universities were not designed to perform problem-centred research for society at large. If they are going to be so used, numerous aspects need re-examination and probable alteration, including reward system, departmentalized structure, subject-matter divisions and operative values. The inadequacy of techno-scientific values and premises for the guiding of human affairs is one of the central matters at issue. Thus it is important to recognize that research funding given to universities to work on aspects of the world macroproblem could, in the absence of a thorough re-examination of basic premises and values, add to the problem rather than to its solution.

A second research task, also obvious and also following directly from the "tree" of future histories, is design of specific short-term social indicators as "early warning" detectors to show along which "stem" the society is trending over the period 1970-75. Such a research task could be a precursor to development of a more complete set of indicators for monitoring the state of society.

c. The nature of the macroproblem, and the above remarks on the unsuitability of present university institutions and procedures for responding to the need, suggest the desirability of fostering, in a few selected universities, creation of institutional forms suited to holistic research attacks on the overall problem (such as a Planetary Policy Research Center, either university-based or with multi-university support, a macroproblem-solving research activity as a joint undertaking with a nonprofit research institute, etc.). The precedent of universities responding to defense research needs after World War II offers some guides and cautions.

As regards the educational task, institutional innovations are needed to facilitate trans-disciplinary, future-oriented, problem-centred studies.

d. At all educational levels educational environments are needed that foster comprehension of complex wholes and of specifics in total context, and particularly of the biosphere and its elements in total historic-geographic context. This implies two things in particular. The effective environment needs to be extended outside the traditional classroom to include the entire life space of the student - the out-of-doors, the inner city, the social institutions which affect him, the mass media. The attitudinal climate needs to be one that frees the student emotionally to struggle with problems for which there are not easy and specific solutions, to adjust to or cope with uncertainties, and to anticipate contingencies.

e. In view of the world macroproblem, the foremost educational need is to train in ecological thinking and appreciation of human diversity from the primary grades. At all levels there is a need for holistic, future-oriented, trans-disciplinary, problem-centred, change-oriented study of human problems, for an understanding of complex wholes and historical parallels.

Equally needed at all levels is continuing study, with progressively more sophisticated conceptual tools, of the broad human questions of justice and equality of opportunity, of individual liberty to seek fulfilment, of local and world community, of human dignity.

f. The most obvious implication from the foregoing is that problem-centred education and inquiry training deserve far greater emphasis than they have had in the past. In particular, citizens of all ages need training in dealing with complex wholes and in applying common sense to graspable pieces. This is not only to keep them from being at the mercy of demagogues, but also so they will not feel impotent in the face of expertise, thus delegating the responsibilities of citizenship to thinktanks and bureaucratic agencies. Among the promising educational processes for accomplishing these aims are simulation exercises and gaming, and alternative-futures exercises.

2. CONTROL TECHNOLOGICAL DEVELOPMENT AND APPLICATION

Like the first task, this is outside the domain of education proper. However education can play a facilitating role. If the macroproblem is a consequence of population plus technology, and would be present even if population were stabilized at present levels, it becomes clear that some form of control is required over

technological development and application. Furthermore, this control, to be effective, would have to involve not only this nation, but the entire developed world.

Control from the top down is well known not to be very effective unless there is also a widely shared belief in the desirability of such control. This belief does not exist at present. Only after we have educated ourselves to appreciation of the necessity for such collaborative control will it become a feasible step to take.

a. The world macroproblem demands new concepts of supranational organisations for environmental control, coordinated industrial development and poverty alleviation, and control of technological developments which can threaten individual rights or world stability (nuclear and biological weapons of mass destruction; biotechnology for altering the human body, mind, foetus, and genes; surveillance devices; etc.). It seems apparent that nationalism has to be supplemented by a concept of planetary control organisation, a central aim of which will be to foster the use of technology and industrialization in the service of a higher quality of life in a broad humanistic sense.

b. Research into planetary management structures and techniques, and large-scale conflict resolution, seems called for.

c. The need for new supranational organisations, having enough delegated power to accomplish their essential tasks, is mentioned above. Education planning organisations and educational networks covering the industrialized world may be needed eventually to help prepare for taking planetary responsibility.

d. In addition to educational environments mentioned in other sections of this discussion, special attention might be paid to internships and similar arrangements for gaining experience with supranational deliberations (e.g., in United Nations, NATO, OECD, UNESCO, international business corporations, etc.).

e. Development of holistic courses in planetary history-geography-ecology, supranational organisations, conflict resolution, regional and planetary management, etc., is obviously relevant.

f. Comments under 6(e) and 6(f) below apply here.

3. ALTER VALUES, PERCEPTIONS, AND PREMISES

As discussed earlier in the section entitled "pathogenic premises", the world macroproblem will not be solved by top-down

control of population and technology alone; specific changes in basic premises, perceptions, and values will be required. In particular, emotional as well as intellectual awareness is needed of the ineluctable fact that we are one race, on one planet, with total responsibility for the future of both. Some sets of operative values are compatible with the fulfilment of man's potential and the achieving of a high quality of life; others are not.

Undertaking this task implies the engagement of emotional and conative, as well as cognitive, faculties. It is not enough that we be intellectually aware that nationalism is now a suicidal course, or that altered values are required if the course of the increasing have/have-not gap is to be reversed. If deeply-held premises and values are to be reexamined for possible change, educational experiences must be contemplated which are akin to psychotherapy in that they aim at bringing the individual into closer touch with himself. In such inner exploration he may discover a felt realization of the inevitability of one inseparable world, and a felt shift in his deepest personal values and most basic premises. This means bringing into education really what the recent talk about the "affective domain" was only hinting at. To be sure, the risk exists that this will not always be done with due respect for the individual's basic right not to be manipulated. This must be weighed against the other risks of not making such value re-examination a part of education.

a. The major concept to be dealt with in this societal task is that of new pathogenic aspects of centuries-old cultural premises. Given the basic factor - increased domain of human control - which makes the future so different from the past, the paramount research and educational task is the re-examination of those premises, especially those which seem so self-apparent as to be beyond question.

A brief list of candidates for such re-examination was presented earlier. One in particular seems worth singling out for special attention. This is the premise that the "mechanomorphic" or machine-like view of man and his world (which has proved an extremely useful model for some purposes) is a necessary outcome of systematizing exploration of that world in an open-minded spirit of inquiry. By mechanomorphic we mean to imply the following characteristics:

- the assumption that the true way to know something is from objective examination;
- the trust in impersonal over humane bases for judgment in human problems - e.g., "the scientific method", chance (as in the draft lottery), legalisms, statistical frequency (viz. Kinsey), etc.;
- narrowed range of appreciated experience - emphasis on rational-cognitive functioning and on manual-motor actions, with less significance attached to sensual, aesthetic, relational, mystical, affective, and reverential aspects of experience, to states of being and being-in-process;
- along with this, a devaluation of life as an art, of play, of rituals and festivals, of unfettered curiosity about the unexplored, of activities that are not "useful";
- absence of a deep feeling of being a part of nature and of the evolutionary life process.

b. Two obvious research tasks follow from the preceding analysis of pathogenic premises and values. One has to do with the processes of change; the other with the question of what to change toward.

The area of person-changing processes has been enthusiastically explored in recent years, by social scientists and psychotherapists, by persons interested in executive development and organisational change, and by a mixed group of "humanistic psychologists" and participants in the "growth centres" movement. Further research is needed to systematize what has been learned and to explore forms appropriate to the structures and aims of formal education; also in the area of emotional and conative development, of adults as well as children.

Among basic research tasks, the highest priority - in the light of the foregoing analysis - attaches to the possibility of developing what might be termed a new "moral science", supplementing the existent physical, biological, and social sciences. We use this term to indicate the possibility of a systematized and empirical body of knowledge relating to a natural, organismic base for an organised valuing process within the human individual. It would, in effect, transfer the questions of the nature of the good

life and the good society (for man on Earth) into the realm of empirical inquiry, somewhat as questions about wholesome (holy) diet were transferred from the realm of religion to the realm of science. The beginnings of such a moral science may be represented in the works of such psychologists as Carl Rogers, Abraham Maslow, and Clare Graves. Other clues may be found in anthropological studies, in research in psychotherapy, and in recent research on altered states of consciousness. If such a moral science were to materialize, its survival value could be extraordinarily high. It could revolutionize much of educational thought, and markedly affect society's goals for its educational institutions.

c. A greater diversity of types of educational institutions are needed, both to encourage and facilitate experimentation with altering premises and values, and to better match processes with types of children. Further discussion of this point will be postponed to 5(c).

d. Educational environments for facilitating re-examination of basic premises, values, attitudes, and perceptions tend to be characterized by a non-evaluative, low-threat, open, permissive atmosphere, wherein individual perceptions and feelings are at least as important agenda as knowledge about values and beliefs, and wherein the individual feels safe in considering the possibility of change. A key element in the environment is the openness and non-defensiveness of the teacher or group leader. Clearly, to provide such environments in the formal school system implies significant departure from the traditional classroom and administrative patterns, as well as special teacher training.

If by "educational environment" we mean any deliberate attempt to increase knowledge and awareness, and alter values, this includes much more than the public and private school systems. Using the word in this expanded sense for a moment, it is interesting to consider what educational influences have produced the most significant impact on youth in the last decade. If we had the data available, we would likely find that the intended effect of schools ranked very low. (The prison-farm atmosphere, competitive examinations and irrelevant makework of some inner-city schools has no doubt made considerable impact, but this was unintended.) Perhaps the two top-ranking influences would be the worldwide network of rock music radio stations, and TV commercials. The role of the

rock stations as a communication network for youth revolutionary forces throughout the developed world has been considerable. As we look toward technologies of the future, one in particular commands attention in this respect - electronic video recording (EVR). If these taped programmes, selling for something like the present cost of a record album, are to supplant TV and rock records for the young (and especially the latter as an evolutionary medium, for like rock records, EVR can be produced by a relatively low-capital company) they are of the greatest interest to those who would affect the minds of the young. This might well include the United States Office of Education and State Departments of Education.

e. As is apparent from the above discussion, what characterizes education toward re-examination of premises and values is not so much content - which might cover a wide range of relevant material - but, rather, "upending" cognitive, perceptive, and evaluative experiences, and opportunities conducive to "unlearning" in order to be free to adopt a new response pattern or perception. In spite of the fact that a great diversity of content can be adapted to this purpose, two types appear especially useful. One is the history and present experience of the individual himself. The second is the intellectual history of mankind, which is replete with examples of "obvious" and "self-evident" beliefs and perceptions which were either demonstrably (in retrospect) pathogenic or for other reasons were rejected by future generations.

Although mentioned before, the need to comprehend the notion of complex wholes, and the associated concepts of total context and of contingent thinking, is such as to deserve further emphasis. The tendency toward specialization and parochialism in subject areas is contrary to the demands of a future in which rationally purposeful choice requires an ability to consider an ever increasing number of complex and dynamic interrelationships. Both the trained ability to deal with human reality in terms of complex wholes, and the ability to adjust to or cope with uncertainties and to anticipate contingencies, are essential educational achievements of the competent and responsible citizen. Reintroduction or strengthening of the areas of history and geography as spatial and temporal contexts for today's problems might prove a fruitful course.

f. Processes are required that foster openness, authenticity, free exploration and willingness to risk, and that are supportive of the individual while he re-examines deeply-held values,

perceptions, and premises. As is noted in 3 b. above, much is known about such processes, although the systematization of such knowledge has not been adequate.

4. ESTABLISH A SENSE OF NATIONAL PURPOSE

While the precise historical reasons may not have been established, it is apparent that the nation is seriously fractionated and very likely is trending toward still further dissension. Today's youth deeply questions the meaning of the nation's policies and apparent aims. A significant fraction of the population - largely minority groups and youth - have concluded that established authority on national and local levels is illegitimate - that is, it does not adequately represent their interests, and it is not based on trust, nor on a general consensus. "Middle Americans" are no longer silent about their complaints.

The world macroproblem will demand a national unity if it is to be solved - that is, if we are to avoid a drastically lowered overall quality of life. But, on the other hand the exigencies of the crisis could be the occasion for the nation's coming together with a new sense of common purpose and, in the process, reaffirming the original declared goals, to bring a "new order" into the world for all mankind.

The alternative future histories make it clear that the decade ahead is likely to be one of considerable turmoil, with society sensing not only that fateful choices are being made, but also that its ability to plan and implement actions may be less than adequate for the tasks required. Two things appear essential if the nation is to hold together during these trying times. One is a clear and compelling national purpose, to take responsibility for the future of the planet and of the human race, and to make steady progress toward the goals of reducing injustice and preserving individual rights. The other is a determination to insure that those goals are carefully guarded in the process of providing the necessary force to preserve law and order.

a. Three concepts will aid education to make its best contribution in this area. They are:

- Education for coping with a troubled and uncertain future (see Task 6 below);
- Education to meet the educational demands of varied groups (see Task 5 below);

- Education toward a new national image, suggesting a new relationship between education and law enforcement.

The first two of these will be discussed presently. The third has to do with recognizing an area where education and law enforcement have a common task.

Among the most urgent tasks for this nation are the restoration of the image of America as a provider of moral leadership and as an advancer of civilization, the development of a sense of the legitimacy of established authority, and the commitment to reservation of those fragile and hard-won political institutions which have evolved within Western political tradition for the protection of individual rights and the fostering of liberty and justice. Within these broad boundaries are tasks of reform for law enforcement agencies, for the political leadership, and for the policy as a whole. Within these national tasks, also, are some which can best be carried out by collaboration, at local as well as state and Federal levels, of law enforcement and educational agencies.

These last include increasing appreciation of the need to preserve and protect our democratic institutions, developing the image of the law enforcement officer as impartial protector of individual rights and safety, educating citizens and communities to demand (and be willing to pay for recruitment and training of) a police force of exceptional character and ability, and increasing appreciation of the historical and worldwide uniqueness and significance of the founding of the United States.

The basic assumptions, values and goals implicit in the nation's founding clearly fail to inspire the allegiance they did some generations ago. One reason for this is the widespread opinion, particularly among the young, that the nation has grossly failed to behave in accordance with them. A second reason is more deeply rooted and may partially account for the first. This is the widely held belief that modern science has shown to be a myth the fundamental premises implicit in the Western political tradition - that the universe has a moral order, discoverable by man; that man is, by virtue of his transcendental nature, endowed with reason, will, and a valid sense of value; that in some transcendental sense all men are created free and equal; that evolution and history are ultimately purposeful. In short, the metaphysic that supported the founding of the nation no longer prevails.

This presents a profound dilemma. The concept of a transcendental, choosing, ultimately responsible self is essential to the entire theory of democratic government. It underlies the assumption that the criminal is responsible for his act. It is basic to the assumption in the judicial process that the judge can meaningfully make a normative judgment. Significantly, the "new moral science" discussed in 3(b) above, insofar as it has been developed at this time, tends to reaffirm the metaphysic of the founders.

b. Several areas of research emphasis are suggested by the above. We need to understand better the causes of the crisis in authority, and of the rapidly rising dissidence over the past decade. Schools and colleges will no doubt continue to be focal points for expressed dissent and discontent; the law has been weakened through a multiplicity of events, ranging from excessive tolerance of illegal rights infringements by radicals to enactment of unenforceable laws such as those relating to sexual practices and drug use. Given these two factors, research is needed on the problem of how to preserve an atmosphere conducive to learning in our secondary schools and colleges. Still another research task has to do with exploration of ways in which educational and enforcement agencies can collaborate on tasks of concern to both.

The dilemma of the "displaced metaphysic" underscores the significance of research in the "new moral science", particularly in the area of altered states of consciousness. Because of the highly exploratory nature of this research, together with its extremely great potential importance, consideration should probably be given to a long-term funding commitment with expectation of limited early payoff. Criteria for evaluating quality of research may have to be somewhat modified from those used in the behavioural science area in general, since it is intrinsic to these investigations that some of the implicit premises of conventional behavioural-science research are among those challenged in the new exploratory work.

c. All sorts of top-down efforts to generate a sense of national purpose are suspect among dissidents. Thus it is well to be wary about institutionalizing the process. A national educational effort toward coherence and common purpose, largely outside the formal educational system, in connection with the forthcoming Bicentennial Celebration, would seem to be a promising approach.

Institutional collaboration between educational and law enforcement agencies was mentioned above.

d. The discussion above suggests supplementation with educational environments outside the school such as legislative and judicial proceedings, police patrols, research participation on aspects of the world macroproblem, etc.; also programmesinvolving teachers acting as sheriff's deputies, police performing teaching services, etc.

e. On the subject of relevant educational content there is little to be added to what was previously stated.

f. The same holds true of processes.

5. MEET THE EDUCATIONAL DEMANDS OF VARIED GROUPS

In the course of working with the dynamics of the alternative future paths we found it necessary to consider the interactions between four different major stakeholder groups in society. These four groups tend to have significantly different educational demands. While there is no great precision in the grouping, the listing serves to highlight educational demands which are not being met:

1 - The poor and disenfranchised

Basic demand: To partake of the affluence of American society.

Educational demands: Effective teaching of cognitive skills and development of achievement motivation which will facilitate obtaining satisfactory employment and inclusion in the mainstream of society.

2 - Status-quo oriented "middle America"

Basic demand: Maintaining traditional values, preserving and insuring security (economic and political).

Educational demands: Conservatism; passing on the ideals of the past; competent teaching of traditional content.

3 - Materialist/esteem oriented

Basic demand: Foster material and technical development of American society.

Educational demands: Technologically progressive but structured education; diversity of goals and processes; individualized learning opportunities for the gifted.

4 - Humanistic, person-centred

Basic demand: Foster a world environment conducive to individual growth and community.

Educational demands: Open, pluralistic education to meet varied needs; expanded educational goals, areas of concern, and methods; divergent institutions and processes.

The schools tend to be geared to the demands of the second and third groups. Even here evidence suggests that creative, imaginative thought tends to be stifled. The perception of the first and last groups that their educational needs are not being met is contributing significantly to current discontent and alienation.

a. In the case of the first group, the poor, it is particularly important to place the problem in a broader context than just curriculum and teaching methods. To be poor is to be out of the mainstream not only economically but also in terms of political power and limited ability to control one's environment and future. Whatever the origins of the social syndrome of poverty, its characteristics of despair, hopelessness, powerlessness, and failure create expectations - in the poor themselves, in children and their teachers, and in those who come in contact with the poor - that tend to perpetuate the syndrome. Schools geared to middle-class, white-majority experiences and learning patterns engender frustrations in minority-group children that further reinforce the patterns.

Some experimental programs have been developed to eliminate these effects of negative expectations and middle-class learning environments. What has not changed, however, no matter what form of compensatory education is provided, is the underlying requirement placed on schools by society to "sort out" the more capable from the less capable students on specific academic bases. When poor children accept the labels from the sorting process, and with them the grounds for assigning those labels, they end up as failures in their own eyes and in those of society. Even the best special programmes can be of little help after the special situation ends, and sorting and labelling begins again.

Thus, some fundamental change seems called for with regard to the sorting and labelling function of the school and its interference with the educational function. This dual function has

deep roots in the economic organisation of the society, and any change will come slowly. In the short run, perhaps the pernicious effects of the sorting and labelling process can be counteracted by fostering in the child a disbelief that it affects his essential worth. Through support of the child as a person, apart from his competences or lack of them, he can be encouraged in his natural desires to learn about and make sense out of his environment, to play, and to grow. Such support is difficult because those who would teach children to "disbelieve" labelling and sorting must exist within the labelling and sorting system itself. The current demands for community control, or separate "community" schools, represent attempts to meet this problem.

This concept of the inherent conflict between the sorting and labelling and the educational functions of the schools has important application to current attempts to enforce racial integration in the schools to right an imbalance in educational opportunity. Racial mixing will accomplish little if the failure/success labels maintain the segregation at the classroom level.

The failure of education to meet the needs of the poor may profitably be viewed in the light of another conceptualization that has received wide acceptance in the field of psychotherapy. This is the concept of unconscious intent. The idea is widely familiar that the accident-prone victim unconsciously intends his accidents, that the "unintended consequences" of the neurotic's acts are intended at an unconscious level. Extending the same principle to social problems suggests that a partial explanation for repeated failures in attempts to improve education for black ghetto youngsters may be sought in the unconscious intents and expectations of the white majority population.

A different kind of problem is posed by the alienation from educational institutions of the fourth group, the humanistically oriented segment. These are the youth who reject the materialist values and protest the psychological oppression of the establishment in favour of an outlook putting high value on the world of inner experience, the integrity of the individual, and the community. The "Great Refusal" has a number of faces, but one aspect is in essence a proposal to replace the type of basic premises that were earlier noted to be, in some sense, pathogenic. Furthermore, these replacement premises tend to be supported by a "New Age" metaphysic, which has some of its roots in Eastern religious

philosophies. To the extent that "The Age of Aquarius" thrust represents a growing force toward the transformation of man and society, it deserves serious attention. Every educational policy decision, whether advertently or not, implicitly aids the "new reformation" or acts to suppress it. In such times, it may be particularly crucial to distinguish carefully between reforming and destructive forces, both of which may be somewhat uncomfortable to live with. Not only the preservation of civil order, but also the manner in which it is done, assumes unusual significance. If we are in the midst of a period of transition comparable to that of the Protestant Reformation in the depths to which it shakes the social institutions, then the issue becomes whether society can round the bend or is thrown off the tracks in the attempt.

b. As indicated above, little is really known about the importance of racial mixing relative to other factors that may contribute to the difficulties of poor children in school. Research is badly needed to give a more definitive answer as to the relative effects on intellectual potentiality and achievement of nutrition of mother and infant, infant fondling, early-childhood sensory experience, home emotional climate, primary-level teaching methods, remedial measures, etc. From a cost-benefit standpoint it could well turn out that the cost of seeing that mothers and infants are well fed and that mothers or surrogates can afford time to fondle their infants would be extremely cost-effective in the light of later social costs related to mental retardation and emotional and character disorders. These considerations suggest that, while the "right to read" is a significant political goal, as a research goal it may not lead to a sufficiently basic framing of the questions.

Turning to the demands of the humanist group, we see what may be the beginnings of a significant counter-culture movement in the new "free schools", where anti-establishment attitudes are taught along with the "human potentialities" emphasis. The size and vocality of this group appears to be increasing rapidly. They protest, in particular, sorting and labelling of human beings, the cult of expertise, and academic-intellectual "irrelevance".

The varied demands, and consequent discontent, strongly suggest the desirability of experimenting with divergent educational institutions, taking a pluralistic approach with respect to educational structures, teacher training, curriculum, and educational processes.

c. One way of accommodating these diverse demands is through a diversity of institutions, in some way made available at comparable cost to the user (through revenue sharing, voucher system, etc.). The use of public funds to allow the individual to obtain the kind of education he wants is a principle which appears to be growing in favour. It is clear that the dichotomies church/state and religion/education are not nearly the straightforward matters they might earlier have seemed to be. The rise of the "new schools", "free schools", and "commune schools" has been termed a religious movement. There is probably a lesser discrepancy between the basic outlooks of parochial schools and traditional schools than there is between the more "behaviour-shaping" and "contingency-management" oriented programmes in the public school system and the more open, humanistically centred ones. Increasing demand is seen for schools where radical questioning can take place. Thus it seems likely that the more basic issue of diversity in educational opportunity will force a reconsideration of past decisions regarding support of private and religious schools with public funds.

Vocational training is another aspect of education which will be subject to pressure for restructuring. Depending on how broadly "benefits" are considered, cost-benefit arguments could undoubtedly be used to demonstrate a net gain for society from any amount of general vocational skills training. This would be true if there were a high emphasis on self-development, perhaps even more than for conventional vocational training. Thus it is more a political question than an economic one, how much of what kind of vocational education shall be publicly supported. The more liberal the interpretation of the term, the more generalized the training, the less it will be liable to attack from the left as "labelling-as-inferior" those who pursue it rather than the college track.

New institutional experiments are clearly needed for preschool education. Preschool training combined with day care for working mothers is a felt need of the poor.

At the other end of the time scale, pressure for restructuring of post-secondary education will continue. Because of increasing rapidity of job-skill obsolescence, and for other reasons, a concurrent and/or alternating arrangement of work and schooling is tending to replace the traditional sequential arrangement of learn-now-work-later. The new generation is likely to demand an even more drastic restructuring of all organisations to facilitate a

synthesis of mind-forming work and educative episodes as the central activity of a self-renewing life. How this is to be provided is the central question relating to structuring of post-secondary education.

One of the most potent forces toward new educational demands has been the altered relationship between man and knowledge. In a way which was not true before the last generation or two, people have come to perceive organised knowledge as essential to the attainment of almost any significant goal value, whether it be wealth, respect, power, enlightenment, health, or tranquillity. As a consequence, a significant fraction of the first, second, and fourth groups above have come to have an ambivalent or hostile reaction toward knowledge and expertise. Knowledge is viewed as a significant weapon of the power structure; the knowledge culture is seen as the predominant socializing and selection mechanism of a manipulative, if not repressive, establishment. Thus a sense of potential access to knowledge has come to seem crucial to success and to survival. A significant amount of the current protest regarding education arises from the perception that, not only does contemporary education poorly equip people to comprehend and cope with their environment, but the patterns of professionalization, research, and recruitment/socialization to the power élite which characterize the educational system contribute powerfully to the repression of those who don't make it into the power élite, and to the captivity of those who do.

Substantially larger percentages of the population than ever before are capable and desirous of being effective actors in the social process. There is every reason to assume that their demands will continue to mount, both for an educational experience which gives them a sense of access to knowledge, and for the opening up of a system of sorting and labelling and credentialling which they view as oppressive.

d. In some sense, of course, all life is an educating environment. The nature of the above-mentioned demands for greater diversity of educational opportunity suggests that the more we move deliberately in the direction of all society being an educating community, the more closely will the opportunities meet the demands of diverse groups. Many of the dysfunctional aspects of the present educational system may be traceable to the discontinuity between the school and the larger community. This discontinuity

is felt particularly upon entrance to the school, where emphasis suddenly shifts from total to cognitive development, and at the high school level for those who are about to enter the "world of work".

e. The differing demands of diverse groups strongly implies that appropriate content and educational processes will be different for different groups. To whatever extent humans actually tend to follow such a hierarchical sequencing of developmental stages as is suggested by the work of Maslow, Graves, Peck and Havighurst, Loevinger, and others, appropriate educational opportunity may be defined as that which will facilitate the person's moving to the next stage of development he is reaching toward. One implication of this kind of theory is that the individual himself is a better chooser of appropriate educational experiences for him than are the experts. Educational policy structured on the basis of such a premise regarding natural human development would be radically different from traditional policies, and would come much closer to satisfying the demands of the first and fourth groups listed above.

f. The point above regarding "access to knowledge" argues strongly for more attention, for the first two groups particularly, to experience with the process of obtaining knowledge. Perhaps nothing would contribute more to the success of education for the poor and disenfranchised group than repeated success in the experience of gathering, utilizing, organising, augmenting, and ultimately disseminating a knowledge base (about their own community, for example) which they perceive as relevant and useful and over which they exercise continuing control.

6. EDUCATE FOR COPING WITH AN UNCERTAIN FUTURE

The nature of the alternative futures suggests that education which is at all responsive to the two predominant characteristics of the future - uncertainty and rapid change - will emphasize development of a high degree of flexibility and an ability to cope with varied conditions. This implies emphasis on the ability to gain new skills, over acquisition of any particular knowledge; on having access to knowledge, over having memorized any particular knowledge; on the development of a basic self reliance, over a rigid way of coping with the present world. This perspective would affect all aspects of education. The general curriculum would include heavy emphasis on dealing with wholes, rather than specialities,

even from the primary grades. (Some examples are the systems way of thinking about problems, an ecological view of the environment, a holistic history of man on earth, an alternative-futures emphasis in viewing present problems.) Vocational training programs would be completely altered, stressing learning to learn and probably leaving the acquisition of specific skills to on-the-job training. Higher-education studies would stress development of a futures outlook. Recruitment and training of teachers would be altered perhaps most of all, since the other changes are so contingent upon a different type of teacher skills being available. Emphasis throughout would be on an appropriate balance between structured and self-appropriated, self-motivated learning, and between cognitive and affective-conative development.

a. What has gone before suggests that education for the future needs, above all, to be based on two complementary concepts. The first is universal access to educational opportunities which will enable persons to live meaningful and dignified lives without direction from the state. The second is education to develop a sense of alternative futures, and of participation in choosing the future of the planet and of the human race. Because of the diversity of human characteristics, this implies also education toward a pluralistic society in which individual differences are not deplored or resented, but valued. Given the uncertainties of the future, we need to cherish the different standards and life styles of those who live in the "social interstices"; these subcultures may be needed as models.

If any one fact stands out about the world of the future, it is this: There is no such thing any more as a single-line life work. At all levels and in all areas we need flexible, multidimensional people. Perhaps no concept would have more effect on educational policies and practices than this, if it became a vitally operative goal.

b. High research priorities are indicated with regard to several areas. The most obvious, perhaps, is the broad area of change and growth, in the direction of heightened self image, increased self reliance, greater flexibility, and reduced insecurity. Another is experimental learning processes which present alternatives to the teacher/student, linear-curriculum, traditional classroom relationship.

c. Similarly we need to aggressively foster new institutional trial forms and radical pilot experiments, particularly in the area of teacher training. We need new ways of thinking and perceiving, of organising and presenting knowledge. The old departmentalized, compartmentalized knowledge presentation is not suitable education for the future. Because of the rapid obsolescence of job skills, in-service training in all areas, and especially in the educational profession, needs to be far more developed.

d. Educational environments in general have been commented upon in the foregoing. At this point let us focus on what the above analysis seems to indicate for the environment of teacher training.

All we have said points strongly to the proposition that the education of educators should be trans-disciplinary, problem-centred, and change-oriented. Very likely it should be restructured to include earlier entry into active teaching, and much greater reliance on in-service training. Among emphases to be strengthened might be alternative-futures thinking, the Western intellectual tradition, human development in the broadest sense, development of access to knowledge, and education toward social-aid roles. Particular attention needs to be paid to recruiting and holding within educational professions the highest calibre persons. This implies that the educational environment for future teachers needs to be open, challenging, humanising - and that the environment in the schools has to be congenial to, and conducive to attracting and retaining, self confident, highly motivated, humane, high-self-image persons.

"Teaching" which is responsive to the needs of the future will be much less a matter of purveying information, and much more a matter of asking questions together. The teacher with a high degree of self knowledge will be less dependent on his stored external knowledge. He will be unthreatened by an atmosphere of shared learning and mutual respect between "learner" and teacher". He will be less likely to fear showing his inadequacy or ignorance, less likely to stick to the material he knows, less likely to be an impediment to the learner's progress. Thus development of self knowledge would appear to be a highly desirable component of the teacher's preparation. To supply this would require a significant departure from traditional school of educational environments.

e. A number of the comments above relate to appropriate content for future-oriented education. One further point deserves special attention.

One of the most serious lacks in secondary and higher education, as viewed from the world macroproblem standpoint, is subordination of training in asking fundamental questions to the development of expertise in dealing with lesser questions. As an example of what is meant by these terms, consider the historic problems of the early residents on these shores and the solutions adopted - removing the Indians by liquidation and confinement to reservations, and getting agricultural work done by importing slaves. The more fundamental problem of human justice was slighted, and the consequences have affected the entire history of the nation. Today our technological and environmental problems seem serious enough. But if we approach the secondary problem of pollution without due attention to the underlying fundamental problem of the totality of human needs, or the problems of applying biotechnology to "improve" persons or society, without adequate attention to the fundamental problem of individual rights, experience has shown that this generates "unanticipated consequences". At this point in history particularly, development of this awareness of fundamental questions is an essential ingredient in the education of society's leaders.

f. Much of what has been said above argues for educational processes which develop self growth and self esteem, inner security to tolerate uncertainty and ambiguity, futures orientation, confidence in ability to acquire knowledge, holistic perspective, and problem-solving competence.

The real time acceleration in technological change and diffusion which has increasingly characterized the recent past will certainly dominate the near future and several of the year-2000 projections as well. Therefore the educational system in most alternative futures must develop better ways of coping with the problems of decay in competence among professionals within their working lifetimes. The whole area of in-service training should become an even more developed area than at present.

The already critical lack in technicians (as apart from professionals) is a significant harbinger of some of the less attractive alternative futures. Vocational education should be significantly improved, and the educational system may have to undertake

a major effort to change the value pattern in our society so that being a technician connotes status rather than disparagement.

Concluding Remarks

By way of summary, we want to emphasize again the caution about these findings being tentative and preliminary. Yet if the alternative future histories are at all on the mark, the fact that half of the year-2000 states are authoritarian in character indicates one of the more likely dangers ahead. Other dangers are reflected by the very high proportion in which recession is the mood in the United States and hunger and chaos are endemic in most developing countries. The overall message is clear. There is not much point in attempting to educate only for happy individuals in a carefree world.

To the extent that one believes that the analysis of the roots of the "world macroproblem" holds up, to that extent he will believe that the paramount educational task of our time is the altering of the dominant basic premises, perceptions and values of the culture of the developed world.

ANNEX

List of Participants attending the Meeting held in Paris on 4th, 5th and 6th June, 1969

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