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WITH A VIEW TO THE FUTURE:  
TRACING BROAD TRENDS AND PLANNING

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DEVELOPMENT DISCUSSION PAPER No. 61

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Heuristic systems for tracing broad trends into the future are examined, beginning with Mannheim's concept of principia media and running through more recent development in Delphi, technological forecasting, patterns, and scenarios and cross-impact matrices. Here the stress is not so much on methodologies as on development of broad structures and identification of molar variables which influence the future. The approaches of the alternative futurists, especially writers concerned with environment and resources, are examined as counterpoint to more conventional economic development theories. The difficulties of tracing broad concerns to coherent sets of economic, social and educational policies is highlighted, especially in those cases where the competing alternatives are not good versus bad; but rather both bad, or both good.

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WITH A VIEW TO THE FUTURE:  
TRACING BROAD TRENDS AND PLANNING

1.0.0 The Planner and the Futurist

If the planner has a home of his own, it is a futures property, a less secure leasehold than the solidly founded past of the historian or the mobile home of the present activist, but somewhat less shaky than the towers of the utopist or the futurist. In Friedman's terms (1973) the domain of the planner is the near future, with near measured not so much by a precise terms of years as by a term of office, the life span of the administration or organization with which the planner works to realize the plans he formulates.

Planning for the future, even for the near future, presents theoretical, methodological and practical difficulties that should worry any sensible analyst. In the methodological sections of these papers we discuss and exemplify application of the systematic forecasting techniques: cohort and time series analyses and extrapolation and projection based on trend analysis and curve fitting.\* The limits on these methods are notorious, but the practitioner must use them nonetheless. Here we discuss the possibility of using less systematic approaches and methods to track broad natural, social, economic and political forces, and to trace out their consequences for the future.

We will range beyond the application of trend analysis for forecasting the near future in plan documents, and intrude into the domain of the futurist, especially the alternate futurists, who foresee declining resources and quality of life and the need for changed economic

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\* See paper by R. Davis in this collection, "Manpower Planning Methods: Supplementary Section on Curve Fitting." Harvard Graduate School of Education, Center for Studies in Education and Development.

and social goals for the future. Our interest is not so much centered on those futurist methods which could be called systematic, as it is in developing frameworks for structuring the analysis of broad social and physical forces, and for identifying the variables that move within these structures to shape future events and plan outcomes.

Futurists use both heuristic and systematic methods.\* Delphi is a procedure for using the consensus of experts' opinions to trace out the future. Scenario Building is used to develop a coherent story line which relates forces and trends. For assessing the impact and interaction of major events on each other, futurists can construct Cross-Impact Matrices, or develop Patterns. Technological Forecasting projects the orders of magnitude of influential variables. The dynamics of these variables and their interactive effects over time are modeled in the Multiple Interactive Feedback Loop Models of Forrester (1971) and Meadows (1976).

However, it is not the complexity, elegance, or plausibility of the theory and methods of futurists that merit study, but the richness of their insights and intuitions, the creativity of their story line and the attractiveness of their futures values when translated into present-value terms.

Futurists do not live by their methods, nor die by their "predictions," as these are realized or unrealized through the passage of time. The worth of the futurists lies in the richness of their insights and the attractiveness of their values as these mirror present, not future concerns. Who could not opt for the Zenvironment of Hazel Henderson (1978) as alternative to a present world where eyes run, skin itches

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\* For further discussion see Paper by R. Davis, "Development and Use of Systems Models for Educational Planning." Development Discussion Paper No. 68, HIID, June 1979.

and toenails rattle? Though we might wish to escape the present, it is not easy to deal with the future, whether as a planner, futurist, weather forecaster, demographer, election analyst or horse bettor, and the tracing of intractable forces into an untrackable future is, as the words suggest, difficult indeed.

#### 1.1.0 The Planner's Problem in Studying the Future

The employed planner, who must labor to earn his roots, berries, wheat germ and bicycle tires in an imperfect organization confronting the problems of a hectic world, must also face a number of practical difficulties that intrude on his study of the future. Planner-analysts deal with the future in a present context of pressure for solution of immediate problems which afflict the policy and decision makers served by planners. The pressure of current events absorbs time, distracts the analyst and distorts his perspective; but most importantly the pressures of the day force the planner to be concerned with implementation. Something must be done, even if it is no more than preparing a rationalization of why nothing can be done for the moment. In trying to help decision makers to do something, the planner must cope with individual behavior and the dynamics of organizations and social groups; and in this maelstrom, issues arise that are only moderately amenable to rational methods. The problems of planning in a real world and real time transactional context are dealt with elsewhere in papers that discuss transactional\* and morphological\*\* analysis, but here it must be noted that daily pressures do make it difficult for the planner to climb out of his present rut

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\* See Paper by D. Warwick, "Integrating Planning and Implementation: A Transactional Approach." Development Discussion Paper No. 63, HIID, June 1979.

\*\* See Paper by J. De Hasse and T. Welsh, "Morphological Mapping." Harvard Graduate School of Education, Center for Studies in Education and Development.

to search the sky for signs. But the same pressure should help root the search in reality.

### 1.1.1 Imperfect Systems Structures and Sub Optimization

Pressure and imperfect knowledge may also limit planning analysis to dealing with an only sub-set of issues and the variables that serve as indicators of these problems. In some cases the planner cannot identify the full set of variables or the range of their values, or characterize the values; in other cases, the planner may identify the variables but be unable to control or influence them; and in the worst case, the planner may be unable to develop a framework for structuring or relating variables which he knows are important and somehow related. In this situation, planning at best becomes an exercise in sub-optimization, where the goals, which the planner can deal with in terms of the variables he can specify, may be attained, whilst other equally important goals are not addressed, or the likelihood of attaining them is actually diminished.

Sub-optimization is easy to criticize and deserves the criticism Henderson and the counter economists (1978) muster against it, but behind the brilliance of the critique there still is only rudimentary development of an optional framework and perspective for rising above sub-optimization in situations where the goals of social groups are perceived as conflicting. Whether the game is ultimately zero sum does not matter so much as whether or not it is perceived as such by players in the short run. No one sits still for the unfolding when neither planner nor preacher can demonstrate that the future will be better (or worse) for everyone. Alternative futurists can only put up the signs and hope, and when the future signs indicate scarcity and a degraded earth, as in the Club of Rome and Limits of Growth forecasts(1972), then

conservation is one possible reaction, but hoarding is another. Invention and innovation are the least likely of outcomes.

Assessing the human future within the framework of ecological systems analysis, in Boulding's terms (1971) assessing the "goods and the bads", the "services and disservices" for everyone, everywhere and for all times, requires less emphasis on criticism and catch words, and more elaboration and application of analysis to social reality. The environmentalist message must be internalized by the massed poor who have not yet had the opportunity to get their licks in against the ecosystem. The alternate futurists, if their message is to be heeded and practically addressed, may have to deal more straightforwardly with individual and societal obtuseness and perversity, when they are much more comfortable in a utopia of participation and permissiveness. At best the world would have to be more as Mannheim (1949) envisaged it, where the views of the intellectual elite are made to matter through social guidance; and at worst there will have to be ecological salvation through power and coercion, with the hope that the apparatus will wither away. But this is in the future. So far the framework itself for encompassing and organizing ecological knowledge and awareness has not been worked through. Archimedes was confident that he could lever up the world itself if he could find the right spot for a fulcrum; and the alternate futurists are in quest for such a spot at this time.

Other papers in this series attempt to deal with the problem of sub-optimization reflected in the statement of goals for social systems, in the specification of objective functions, and in the limited and sometimes purblind allocations frameworks with which development planners work. No sweeping solutions emerge, but the problem merits the criticisms that Boulding (1968) and others have advanced, and attention to alternative systems and forecasting frameworks outlined in the work of Duncan (1969) and

Forrester (1971). Just as rational planning is of limited use in developing the framework for addressing goals in the broadest and most optimal way, ecological analysis is limited in the depth to which it can penetrate the dynamics of complex social systems. If sub-optimization is the "better-than-nothing" alternative for developing a comprehensive framework and goal statement, black-boxing is the response to the difficulty of penetrating and understanding opaque social contexts and phenomena.

### 1.1.2 Black Box Models in Natural and Social Systems

Many of the systematic analyses supporting economic planning, and ecological approaches as well, are limited to black box portrayals of the social-psychological dynamics that underlie the process being modeled. This is so for the portrayal of the dynamics of a national economy modeled in the aggregate, the analysis of population dynamics and the forecast of population growth. In educational planning it appears even more clearly in the forecasting of enrollment flows and systems throughput, and in education production function analysis, in which the central process of an education system, the myriad acts and reactions in teaching-learning, are summarized by a few numbers or analyzed as an input-output process with the limited models of regression and least-squares.

The observation much favored by Henderson (1978), that a system cannot be managed if it cannot be modeled, is attractive in a wistful way, but may be impossible of fulfillment, because no social system and few physical ones can be satisfactorily modeled; and yet within limits they must be managed. A central concern of analysts of both social and natural systems is population dynamics, but modeling the simplest dynamics of human population change is far from adequate. The population projections of the U.S. Bureau of Census are projections and not forecasts,

much less predictions, simply because the many variables which affect population growth cannot be identified, or their effects analyzed.

The Census projections depend on sets of assumptions about changes in the molar components of mortality, fertility and migration, without any precise attempt to model the variables which affect these components. Apropos of the analysis of ecosystems, Murdoch (1971) discusses the modeling of less complex and more easily observed populations: "The great proportion of the problems we face in managing ecosystems are population problems... The famous cyclic populations of small mammals have been studied for 40 years, and still there are several theories competing to explain the data." Discussing the population dynamics of the spruce budworm (caterpillar), Murdoch states, "After 15 years of study the major causes of mortality have been found for most of the life stages in the insect, but after this enormous effort, it is still not known what normally limits their numbers..."

If those who work in the analysis of ecosystems are this modest about the limitations of their work, it behooves analysts and planners when structuring the analysis of human social systems to be wary of expecting ecology to afford a new framework for social planning. Murdoch states: "In the case of real ecological systems one does not try to describe every interaction and the relationships among all the variables... Indeed, the art, as in any science, is to draw a caricature of the system, etching in the really crucial lines..." This may have a familiar ring and resonance for social analysts.

It may be comforting to analysts and planners who deal with human social systems that their colleagues engaged in analyzing physical and

natural systems are forced into the same black box approaches when dealing with the reality of their world. In other papers of this series\* the shortcomings of the black box approach to social analysis and planning are discussed, but resolution of the problem is not advanced.

The planner-analyst does the best he can when attempting to deal with the human social systems he must deal with, and there is no methodological salvation offered by ecological systems analysis. This should not suggest that those who criticize development economists and planners for being insensitive to ecological perspectives and frameworks are not correct in their concerns.

In this paper we will examine some of the broad forces that planners must track into an unknowable and intractable future, and many of these economic, social and educational currents are bound into, or bounded by, physical and ecological variables and systems. The social planner must be aware of the potential future effects of energy and mineral resources, the effects of climate, the potential limits of food supply from land and water resources, and the limits of fresh water itself. Population growth and environmental degradation will affect economic growth and the quality of life; and, in turn, the quality of life will have effects on population dynamics and social and cultural development. It will be no easier for the planner to analyze relevant physical variables within an ecological framework, than it is to deal with the limited economic and social variables that planners have traditionally attempted to analyze. Modeling the internal dynamics of complex natural systems is not markedly simpler than modeling social systems. The analyst will still make do with

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\* See Footnote, page 2.

molar variables, incomplete specification, systems caricature, and black box analysis.

### 1.1.3 Knowing About the Future Versus Dealing With It

If it is difficult to "foresee" the future, it is even more difficult to do anything about it; and yet presumably this is the purpose of planning when applied to tracing forces, events and future consequences. The planner must deal with the future on the basis of present and past data and a set of methodologies that are simplistic and limited, where they are systematic, and open, unbounded and wild when they attempt to escape from rigor and rigidity. Critics of rational planning seem to have had the deepest faith, and now exhibit the bitterest disappointment, in the limitations of rational analysis, when applied to projecting, forecasting or "predicting" the future. But even when planners are sufficiently skilled or lucky enough to glimpse something of the future, they are faulted because their plans, and the policies and programs they engender, cannot do much about the future.

Both critics and supporters may have expected more of rational planning than the approach could deliver. The warranty for this assertion will be sought in this paper which examines the extent to which planners are able to analyze the inter-play of important natural and man-made forces, to trace out their consequences in terms of social, economic and political trends, to incorporate this analysis into forecasts of probable future states of social systems, and to develop plans, policies and programs that are relevant to these future states.

#### 1.1.4 Planning and Doing

At the outset it will be stated that even the most accurate analysis and forecast may not lead to plans, policies and programs that do anything about the future conditions traced.

In the process of planning, the foresight that informs plans, policies and programs operates in three different modes according to context; and the expectations of the outcome of planning should vary accordingly. First, there is the prudence and foresight that supports planning in the managerial context, when the domain is small, the time horizon short, and the control of assets, in the form of both material resources and social support, is strong. Here there may be a reasonable expectation that analysis and planning can influence future events in the short term. Secondly, there is the foresight that is guided by analysis of a process embedded in a complex social surrounding. In this context it is not alone that the control of assets is weak, but the process under study may only be caricatured through limited models and black box analysis. Hence, foresight may not hold over any extensive domain of different circumstances or over any period of time, and the influence of policies on future events will be correspondingly weak. Lastly, there is foresight provided by the study of broad forces operating in a complex context with consequences likely to influence events over a long time horizon. The planner's purpose may be no more than to trace these forces in lineament. Analysis in this context may increase present knowledge, but this knowledge may not be translated into policy and program instruments that will affect future events.

When it comes to tracking broad forces and their probable effects, it is hard to analyze all the forces that impinge. The force at issue may be difficult to identify or analyze in order to array the anticipated concatenation of events in the form of a prediction. It may be even more difficult to do anything to affect the outcome, even if it can be

glimpsed. Most major social variables, which are aggregated of many individual choices, are not under control in the present, much less in the future. If present preferences cannot be added and expressed to the satisfaction of all, choices projected into a future in which the chooser cannot know his status, will be even less easily summed and expressed in a tractable objective function. The objective function is a statement which relates goals, or "objectives" to outcome levels as these are assessed by pre-determined criteria and criteria levels. The objective function shows the extent to which we accomplish what we set out to accomplish within the system as we define and model it. Yet, though it may be impossible to know the future, and useless to try to control it, generally it is considered prudent to give thought to the future; and some ways of thinking about the future are more productive than other ways. At issue is whether it is productive to think about the future, whether or not anything can be done about changing it? Also at issue is the question of assessing the usefulness or quality of thought about the future.

#### 1.2.0 Assessing the Quality of Future Thought

In all of the talk and writing about planning, the specialized segment of this field which deals with the near future, and the broader field of futurism, little has been written about criteria for assessing the productivity of thought about the future. In conventional appraisals the position seems to be that futures thinking has demonstrated its worth, or its uselessness, when things come out, or fail to come out, as foretold. This seems a limited standard by which to judge matters. It would

seem that the value of thought about the future is best demonstrated by its relevance to both the present and the future. In terms of the present, thought about the future is productive when:

- a. It clarifies thinking about present problems.
- b. It encourages confronting present problems.
- c. It aids in resolving present problems.

If thought about the future contributed only this much it would pay its way, but it is also common to assess the productivity of future thought in the light of future events:

- a. Good and bad future events come out as foretold, without intervention, i.e. the forecast is fulfilled for better or worse. The forecast is accurate.
- b. Bad events are avoided because of intervention prompted by future thought. The forecast is effective.
- c. Good events are brought about because of intervention prompted by future thought. The forecast is constructive.

In tracing broad forces and their probable future consequences, it is rarely possible to prove the effectiveness and constructiveness of future thought, although it is possible to assess accuracy.

Alternate futures of reduced waste, through cutting away unnecessary consumption and husbanding diminishing resources; enhanced quality of life through closer attention to ecological balance and environmental quality, and economic development, founded on self-actualizing models of production and equitable distribution, have been conceptualized by Ward (1972), Boulding (1968), Forrester (1971), Meadows (1972), and Schumacher (1973) and expounded and diffused by

Henderson (1978). By the criteria proposed above, the work of the "alternate" futurists may be useful, whether or not future depletion of resources and degradation of the environment and reduced quality of life come to pass, or are avoided by changed policy and timely intervention. The preaching of the message is serving to clarify thinking about present problems; it is stimulating policy makers to confront these problems, and in a certain measure to resolve them; and if not, at least to ameliorate or defer their consequences.

In the future, and even in the near future on which the planner works, some of the goods and bads will undoubtedly come to pass in some places without policy intervention; and thus the present thought to the future will prove accurate. Some of the bad outcomes will be avoided and some of the good alternatives will be attained, and thus the future thought will prove effective and constructive. The more probable consequence is a mixed result, rather than a perfect record, but even if there is no avoidance of bad and attainment of good, the future thought may serve to improve the present.

In the best of worlds the futures forecast serves to alert constituencies and policy makers to take action to avoid future harmful consequences; but the futurist and planner have served nonetheless in tracing the consequences, irrespective of decisions and actions taken. That energy resources, especially petroleum, were being depleted, through rising use encouraged by unrealistic pricing, was not news provided by the ecologist and alternate futures group. A U.S. Presidential Commission in the middle fifties (1954) projected just such a future of depletion and scarcity, and no policies were developed, programs implemented or conservationist attitudes prompted, until an

emergency shortage, political and not conservationist in inspiration, added force to the discomfort of a sharp price increase. Though the Commission forecasts of depletion did not prevent waste and promote conservation policies, their projections and the continuing studies and reports of U.S. Geological Survey bulletins, were useful as futures thought, and prime material of planning and policy analysis. The point, is that planning and forecasting serve, whether or not policies and programs are developed to fend against, or secure, the future states that are traced out.

#### 2.1.0 Systems Frameworks for Analyzing Forces that Shape Plan Futures

To analyze the broad forces that will shape the future, the planner requires:

- i) a systems structure or context to guide analysis;
- ii) a means for identifying and assessing the status and change in major variables within the analytic framework;
- iii) a set of methods for analyzing the variables and portraying the changes in them over time;
- iv) and a policy context to shape inferences from analysis.

Clearly the planner works within a framework of his own individual and culturally determined knowledge, skills, attitudes and values. These values not only orient the policy choices, they also guide selection of a systems structure and identification and characterization of variables. Arguments about "culture free," "value neutral", or "objective" frameworks or paradigms for analyzing social, or even physical systems, are made of straw, for even the choice of the basic analytic framework is value-founded and subjective. Much less are

variables selected and characterized objectively; and to claim objectivity in the formulation of policy conclusions drawn from social analysis is preposterous. An argument might be made as to whether one framework and analysis mode is more objective than another but it cannot be resolved or even reasonably argued except within one or another framework.

### 2.2.1 Natural or Ecological Systems Framework

Natural or ecological systems models provide one framework for structuring analysis of the broad natural forces which will shape the future. The ecological framework with its tang of naturalness may suggest that it is the most basic and objective framework for analyzing social as well as natural systems; but it is neither more objective nor more basic than any other framework, as the arguments over environmentalist issues reveal. Still the argument for structuring analysis within the broadest natural or ecological framework is persuasive, for if the environment is degraded, resources depleted, and food and energy wasted away, all man's future works and ways will come to naught.

As a framework for analyzing the future of mankind, even the ecological model is not wholly sufficient. First, there is no framework for tracing ecological consequences comprehensively; secondly, there is no framework for tracing consequences in depth; the masked model and black box are just as ubiquitous in the analysis of natural systems. Environmental rapine and its consequences influence, and are influenced by, the political, cultural and economic thoughts and deeds of human social dynamics. These influences must be analyzed in detailed fashion within other systems frameworks and with other paradigms. Still, the ecological framework may provide the outer framework within which social systems are limned.

As Murdoch (1971) has explained, there is no serviceable model that spans the major ecological systems of the earth, or even a model that delineates in any complete way the ecology of limited field environments, or the dynamics of natural populations. When ecologists, environmentalists and counter economists advocate an ecological framework for analysis, they are not suggesting that a full fledged model is available for the analysis, but merely that an ecological framework provides guidance for avoiding the restricted views imposed by economic or political systems frameworks. The tracing of future consequences must be broadened from the limited perspectives provided within economic and political frameworks to include wider effects in the surrounding environment. The ecological systems context provides this framework, but it does not provide an all-purpose method for getting inside all economic, cultural and political systems problems, or for tracing their consequences into the future.

### 2.3.0 Social Systems Frameworks

Economics does provide a framework or systems structure for tracing broad consequences of interest to planners; and despite criticisms of its limitations, the paradigms of economics enable the analyst and planner to deal with an important class of societal variables. Decisions reached within a framework of economic system analysis, as Henderson (1978) claims, may be sub-optimal, but the same limitation may be equally true of analysis applied in ecology. Viewed from within the framework of ecological systems, the paradigms of neo-classical economics as applied through private capitalist structures, and the theory of the Marxists as worked out through state systems, are more similar than different in environmental consequences.

Planners working within the framework of either one of the two systems must still deal with differences that are meaningful to the policy and decision makers served by the analysis. Under one system a market of buyers and sellers is assumed as fundamental, while participants who can, do their best to destroy its untrammelled operation in the future; under the other system a cooperative of producers and consumers is assumed to be fundamental by participants who do their best to escape it. The way in which these conflicts are worked out differently in the respective system is of considerable interest and importance for planners attempting to track the future of their political and economic system. Analysts with a broad ecological perspective may find the political and economic differences of minor significance, but analysts within the systems must deal with the future with appropriately different social models of the economic and political systems.

#### 2.4.0 Political Systems Frameworks

Political systems frameworks provide planners with a basis and a structure for tracing the future dynamics of power, control and compliance. In this paper we will not dwell on political forces and structures as they are manifested in the organization of government bureaucracies and administrative machinery. Centralized and autocratic control and administration, as contrasted with decentralized administration and local participation, influence the substantive and formal character of planning and future thought. The transactional context in which plans are formulated and implemented and the morphology of the systems and administrative structures condition the way analysts

and planners work out the future. These matters are discussed in other papers in this series\*. Our interest is in the broad social currents and political forces that influence the future.

Again from the ecological perspective, particular configurations of power and control may be of little significance if the future brings a world of environmental chaos; but the ecological future will be shaped by differences in political forces and dynamics, and the decisions at the societal level these politically structured forces affect. Depleted resources and environmental degradation are the consequence of greed and power operating in a context of social and political ignorance or indifference, and only through the exercise of countervailing power and control will this be resolved. Etzioni (1968) defines power as the capacity to overcome resistance, to introduce changes in the face of opposition and to draw on and energize assets. In few systems is power absolute and coercive, and control complete, and hence the effective exercise of control depends on the social structuring of compliance. Power applied in the system may be coercive, which attempts to gain compliance through force of sanctions; remunerative, which attempts to secure compliance through material rewards; or normative, which aims to evoke moral compliance through the symbols of esteem.

Different forms of power evoke different forms of involvement, commitment, and compliance, but to attain any set of ecological or economic goals will require organizing political forces for the broadest form of social action. Depleted resources and degraded environment result from the sum total of individual and group goals and actions, and only organized political efforts to change goals and actions

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\* See footnote, page 3.

can reverse the damage. The alternate futurists prefer that this be accomplished by promoting the internalization of changed attitudes in millions of individuals, through education and information circulated through participant networks. They prefer the exercise of normative power leading to compliance through moral involvement. However, if the pressure for changing the course of the world is as exigent as portrayed, and the state of ignorance, outside of a few islands of affluence, as vast as it seems, time may run out on the preferred alternative, and the future may require direct application of coercive power and control. The alternate futurist may be forced to choose whether the social or the natural environment is to be polluted.

The author once observed a young man attempting to change through education and tribal cooperation the environmentally devastating slash-and-burn agriculture practiced by mountain tribesmen in Southeast Asia. An alternative approach to the same policy was also enforced by punishment at gun point meted out by area police. Assessment of the results of the two approaches was not wholly supportive of the view that Etzioni's Normative Power and Moral Involvement alternative will be the way of the future.

The value preference of those who advocate an alternative future of ecological harmony and environmental quality is for normative power evoking a moral response through participation, shared concern and internalization of political and economic goals that harmonize with environment; but this is only one possible power/compliance configuration. Whatever the form of power exercised or compliance attained, the planner must deal with political systems and the key variables that

operate within them, and he cannot assume that ecological harmony will come under political conditions of normative power evoking a moral response through social participation.

Murdoch (1971) speaks to the point of ecological harmony and social disharmony. He points out that it is the sum of individual decisions which leads to unchecked economic growth, and the consequences of this which degrade the environment. He states, "The problem is quite simple: Whatever the collective good may require, it is almost always to the individual's benefit to increase his personal wealth." It is also this individual and type who in the natural order of things increases and multiplies his kind. Apropos of "genetic altruism" he states, "Thus natural selection, by definition, ensures that those genotypes survive and increase that produce more reproductive offspring than do competing genotypes."

The ecologist's case-of-cases on man's exploitative potential is Hardin's (1968) story of "The Commons". Each shepherd added sheep to graze on the common land, because it was in his short-term interest to add to marginal over-grazing, even if in the long run the common resource was destroyed. Future problems which may require resolution through power and even coercion, are not all founded on lack of knowledge, as in the tribal slash and burn example, or on individual profit motives, as in the Common's case; very often two highly valued rights and goods clash. An example is the development of solar energy in the Northeast, which is reported by Sliverstein (Boston Globe, 12 July) to be slowed by unrealistic warranty standards imposed on equipment makers in a new field to protect consumers, and subsidies for homeowners which encourage them to wait for more subsidies. The environmental good,

solar energy, clashes with the social good, consumer protection. The goods do not simply clash with the bads; the goods conflict with the goods.

These conflicts may become more tortured in the future than the present ones that environmentalists have learned to handle: environmental protection, versus jobs for workers, cheaper power, or economic growth.

Ecological damage, vastly increased in potential danger for all with more effectively destructive technology, must be approached by the planner as a future problem. The problem can perhaps most clearly be appreciated from an ecological perspective, and the framework of the ecologists provides a basis for analysis, but there are social, political and economic dimensions of the problem best analyzed by the models and methods of these fields. The structure for analyzing the problem and synthesizing a solution through policies and programs is not provided by ecology. Resolution, if it is to be effected, must come through social systems analysis, and economic, political and social policies and programs. There is a question as to whether the alternate futures forecasters are shying away from possible, some might think likely, political alternatives -- preservation of the environment and its resources through social control and where necessary, implemented through political coercion. This is by no means an unlikely response if the survival of large groups, or even the species, is perceived as a future possibility.

One shudders to think what political powers could, or would do, in the name of world survival, when so much destruction has been wrought in the name of mere national survival. There is a smack of power and coercion, the domestic big stick, to the efforts of one of our more effective conservationists, Theodore Roosevelt, and this in the days when the issue was more one of aesthetics and recreation than survival.

A future in which the issue is the survival of the human species is

not often raised even by the most fervid ecologists. Wheeler (1978) accuses some ecologists and environmentalists and alternate future advocates of proposing mere tinkering when the issue is much more serious. He states, "But it is time, past time, that we looked up to confront full-face the long-term prospects of our survival as a species... Our survival is by no means assured..."

C.S. Peirce (1942) examined the alternative of individual immortality long ago, and after finding it unappetizing, concluded, and it is possible to read a sense of relief into his final words, -- "In place of this we have death." This may also be an alternative for mankind, though few planners or futurists have been bold enough to face it. Their faith is still rooted in social controls of more benign form; and Mannheim (1949) advocates this form of societal control through planning. His words have relevance to a future where the natural environment must be preserved without destroying the political and social systems many of us now value.

#### 2.5.0 Social Systems Frameworks : Mannheim's Conception

For Mannheim (1949), planning requires analysis and resolution of the conflict of "goods" or "bads" that arise from conflicting goals and systems perspectives. His theories could apply to a potential conflict between goals for the natural systems and goals for social systems, although in Mannheim's hour the world seemed more likely to perish by catastrophe in the social and political system rather than through decline in the natural environment. Mannheim viewed planning as future oriented: planning was for him foresight deliberately applied to human affairs, so that the social process was no longer the chance product of conflict and competition. Mannheim did not quibble about the limitations of rational thought when applied to human social affairs through planning. Planned thought was the highest stage of rational development, but his was a rationality that was concerned with

synthesis as an end beyond analysis. The planner searched through factors to arrive at regularities and formulate them as principles. Mannheim did not charge planning with the responsibility of guaranteeing success in controlling whatever future might be foreseen. There was no option to planning; it was an inescapable task. Planning analysis had to deal with reality and its interdependent problems, and it was not purely a theoretical exercise, but was concerned with influencing social control, even when that implied the existence of power, control and coercion in social and political systems. The moral objective of planning was to preserve and enhance freedom, subject to democratic control.

Mannheim, more clearly than others, accepted the importance for planners of attempting to identify the broad forces that shaped present and future social systems. The prime task was to describe these forces, called "Principia Media", after terminology in Mill's System of Logic. The Principia Media were the regularities sought in the rational exercise of planning. They were inter-connections that defined the particular character of a social pattern; they were universal forces in a concrete setting, the basis for viewing present reality; but because they were regularly recurring special laws they could be used for tracking the future. Planning was "a predictive strategy which strives to bring under control the as yet uncoordinated principia media of the social process." The quest for the planner was the discovery of these "principia media" which in combination were the forces which dominated a social epoch. The task was not to discover them "post-mortem" through history, which assumed that what happened was the most important or only possible play of forces that could have happened. Inquiry into the current play of social forces was required.

For Mannheim the planner's task was to investigate and identify "principia media" as they emerged, in statu nascendi, and to describe them

as multiple possibilities, not as single predictions. He faulted futurists, as he faulted the historian, because in the "prophetic error", futurists described what will happen from a welter of possibilities, selecting according to their own wishes. Planning then, was an attitude of watching over the factors at work in a society in order to "detect new possibilities which are coming to the surface at the proper moment." The purpose of monitoring society, of the ceaseless inquiry and research into social dynamics, was "to reinforce those possibilities which had been identified "at those points where vital decisions must be made." The planner sought knowledge of broad forces to shape decisions and social action, but the planner was not engaged in "establishing", which Mannheim equated with "colonizing", or "administering", which Mannheim thought of as something that took place after the "principia media" had emerged and the forces had been brought under control and stabilized.

Mannheim described the process of inquiry into the "principia media," as it proceeds through exact description, comparison, causal explanation, the search for regularities, and the formalization of principles. He gave examples of planning for key social objectives: full employment, social security, economic and educational opportunity, world order and peace, and what to Mannheim was the centerpiece and safeguard of all social development -- the formation of "democratic personality". The purpose of planning was always freedom. Freedom was to be insured through the constitution of "the democratic personality". This was to be accomplished through education, broadly conceived.

Through education and communication the society was informed and guided, and intellectual elites, the personalities of high social disinterest, emerged to identify the "principia media" and guide social planning. Perhaps Mannheim in his day was foreseeing elites of the alternate futures and ecology groups who have identified the principia

media of "principia media", the finiteness of man's earth and its resources in conflict with the profligacy of man's use of these resources; and from this conflict the host of physical, economic, political and social consequences that will follow in the future. If so, Mannheim would recognize the legitimacy of elites identifying and communicating their "principia media", but he would be less likely to understand the discomfort some of these elites express about their own elite status. This may be the "principia media" -- the emergence of a social conscience so tortured and refined that it shrinks from contemplation of undemocratic means for social preservation. Mannheim's thoughts could comprehend this dilemma, for he struggled to accommodate planning and social guidance to the pursuit of unlimited freedom.

Mannheim never gives clear examples of "principia media" for his time and place. One might infer that they included: the conflict between the mobilized powers of totalitarian systems and the latent power of democratic states; the intrusive and expansive outreach of technology; urbanization, and social complexity; the aging of industrialization; the power of mass communication on public opinion; the rise of mass education; the breakdown of moral and religious authority, and philosophical coherence.

The concerns of the environmentalist, ecologist and alternate futurists would not have been central for Mannheim. Concerns about environmental degradation, ecological damage resulting from population growth, technology and resource depletion do not coalesce into "principia media" for him. He does not address the resolution of these problems through social planning and societal guidance. But his basic concept of "principia media", and his objective of harmonizing social guidance and freedom, do provide a structure for addressing such problems.

Ecological, economic, political and social frameworks do provide the futurist and planner with a systems structure for analyzing the broad forces

or "principia media" that will affect the future. Within these structures analysts can identify the variables that relate to the "principia media." Futurists work on the tracing of these variables into the future. Planners attempt to trace policy and program implications of the future.

### 3.0.0 Population as a Central Variable of all Future Systems

The study of populations is central to all systems analysis and planning frameworks. Population variables and their dynamics provide a basic focus for studying the future of natural and social systems alike. Though energy flow and the cycling of material may be the central variables of natural ecological systems, the focus of most systems study is on how populations interact with the materials that are synthesized out of energy to create at various trophic levels the food webs that sustain and limit populations. Most central of all populations is the human population with its power to influence all other populations in all ecosystems. Murdoch (1971) defines a population as a group of organisms belonging to the same species and living in the same area so that there is a possibility of interaction among its members.

The dynamics of all populations are determined by birth, death and movement or migration. These are the components which are analyzed in the forecasting of the future populations in natural or social systems. Given the structure, or age distribution of the population, and knowledge of the dynamic components, the future numbers and distribution of the population can be estimated. In even the most seemingly simple populations, however, the factors that influence population components are not clearly modeled, nor are all variables identified and charted. This holds as surely for estimating insect populations as it does for humans. The problem of managing ecosystems is linked to the problem of charting and managing populations, whether in natural systems not wholly controlled by man, ecosystems more directly influenced by man, such as the producing

ecosystems that provide basic sustenance, or man's social system.

There are limits to the increase in all populations and these are imposed by food and space which impose cycles of rapid growth followed by the leveling-off of growth and then decline.

### 3.1.0 The Future Population and the Variables of Natural Systems

To this point the ecological systems model accommodates the forecasting of population as a central influence on the future. Planners who must analyze population size, structure and change, conceptualize the problem in much the same way, whether they are estimating future food supplies from an animal or plant population in man's managed ecosystem, or the human population that will depend on these future resources. The methods for projecting population are covered in other sections of these materials\*, and here our interest centers on population dynamics as a central force in shaping the future. Though the size and structure of future human populations are of interest in and of themselves, the planner is more often interested in the future population in relation to other variables that can impose limits on the size and quality of the population.

### 3.1.1 Population and Living Space

Few planners are yet concerned with the future absolute balance of population size and living space. The limit of space itself is not a direct future issue. In world perspective the earth is not physically crowded by the present population or likely future populations. The density of the population, the number per unit of area, may be of concern to those few nations where land mass is small and population large and growing, and it may be of even greater concern in areas within the nation where the population is most densely settled, but even in Calcutta, basic physical space suffices. The urban planner, who deals most directly with population and space, is more concerned about the qualitative effects of the population/

\* See Paper by R. Davis, "Population Projection and Demographic Analysis." Harvard Graduate School of Education, Center for Studies in Education and Development.

space balance. Crowding is made more serious by pollution influenced by problems of disposal of household, vehicular and industrial wastes. More serious still are the social pathologies that can be exacerbated by crowded and polluted space and the attendant poverty almost inevitably part of such areas. The urban planner, or local planner, does forecast population densities, the effects of these densities on pollution and the physical quality of life, and the social pathologies the local environment engenders. Yet the author who spent a few years planning physical, social and economic programs in the most crowded of bustees in Calcutta, did not observe any pure effect of crowding or population density that resources and different construction patterns and living arrangements could not have ameliorated. Planners even in the poorest urban areas are not yet contemplating a future in which there will be no living space for populations.

Population distribution in spatial terms is a concern of spatial planners working on regional and urban development, but the focus is on needs assessment, provision of services, and enhancement of productivity, rather than absolute space constraints. This is true also of the branch of educational planning called school mapping.

Even though national, regional and urban planners are not yet dealing with a future in which space is insufficient for population, forecasts and plans may be shaped differently in countries where ratios of population to space, or land area, differ. There will be obvious differences in land settlement and colonization plans, and in plans for agricultural development, depending on the ratio of population to arable, grazing or forested land. There may also be differences in human resource development plans through education and training, and in delivery of services. The planning of education reform in El Salvador was shaped by

population density and land scarcity and the objective of producing a highly trained and disciplined work force capable of intensive utilization of resources on the model of Japan. Paraguay, where land is plentiful and population scarce, has pressed more to settle empty areas in the Chaco, or promote their development by outsiders. Only recently, as pressure is felt to provide skilled workers for the development of power resources, has there been greater efforts to intensify education and training.

In summary, the population to land ratio is a future force that planners must reckon with, but the influence on forecasts and plans is more apparent in countries where there are marked contrasts in population density, and in overcrowded urban areas within countries. High population densities also affect planning in some rural areas in India, Bangladesh and Java. In most situations it is the population ratio to land as a food producing resource, rather than land for living space, that presages future problems.

### 3.2.0 Population and Food from Land and Water Resources

Population in ratio to land as a potential source of food is a central variable in plans and forecasts. Most countries survey and inventory the extent and quality of their crop land, pasture land and forest resources, plan the use and productivity of the land, and forecast the future production, processing and marketing of the food and fiber yields. In the future, the land will not change in quantity, but it can change in quality and productivity. Requirements for the output of land will change over time, as population increases and per capita consumption rises. Hence, the amount and kind of land and its output in ratio to the size and consumption patterns of the population is a central force in shaping plans and forecasts. The variables can be

analyzed and tracked within several systems frameworks.

There is a narrow ecological framework for analyzing how the synthesis of plant food by solar energy is managed by intervening through technology in the transformation and cycling of materials. Plant and animal species are genetically modified to increase yields; nutrients and water are applied to increase yields; and disease and pests are controlled. Within this framework the planner projects yield according to a limited number of variables identified as relevant to the managed portion of the ecosystem. This narrow ecological or technological framework is closely related to economic analysis of the system. The system is analyzed mainly according to technological intervention and effects, or by economic analysis of inputs and outputs.

Ecologists and alternate futurists are warning planners working within present technological and economic frameworks to adopt a broader ecological framework for their analysis of present and future consequences. The broader ecological framework is required because ecosystems, even "managed" ones, are open, and all future effects cannot be assessed within the narrower framework.

The genetic modifications may lead to plant population simplicity and increased vulnerability to catastrophe; the application of nutrients and pesticides may affect surrounding area ecosystems adversely. The technology requires use of scarce fossil fuel resources to produce nutrients and to power machines. Pollution from pesticides and machines may adversely affect other areas. The soil may be depleted in the long run through overworking or through increased salinity in water application. Water resources, rivers, lakes and the sea itself may be polluted by run-offs from pesticides and industrial wastes; and food chains affected.

The point here is not to offer a rudimentary cataloguing of

environmental dangers: of damaging the ecosystems, and thereby destroying future product; of degrading the environment and the quality of life; and of exhausting scarce resources. The issue is: difficult as it is to plan limits on future production within an ecological framework and still satisfy population/food requirements -- and it may be more difficult than some environmental advocates suggest -- the planner must use this framework and project the outcomes which derive from it. The broader ecological framework may give a future prospect that is very different from that yielded in narrower technological and economic analysis, and a future of limits will have social and political consequences as well as physical effects. The environmentalist's criticism of the narrow technological and economic viewpoint of growth planners may be well taken, but there is still lacking a teleological framework for associating natural systems with man-made social and economic systems; outside of the religions of the world, that is.

### 3.2.1 Mineral and Energy Resources and Future Prospects

The stock, use-rates, and depletion schedules for mineral and energy resources within a national boundary are dealt with by analysts with special competence in the field, and the general planner incorporates their assessments into the appropriate sections of his forecasts and plans. The focus of interest may be production targets for mineral and petroleum resources, the availability and price of the resources related to the technologies and production targets of the national economy, and the export market demand and price structure. The human resource planner may also be required to estimate employment and education and training requirements in the mines and petroleum production sectors and the effects of production in these sectors on manpower requirements in related sectors.

At issue here is not forecasts of supply and demand of mineral and energy resources for conventional short and midterm development plans, but the broader

effects of the future world shortages of mineral and energy resources. World supplies of the principal minerals and conventional energy sources, use-rates and depletion schedules have been charted for some time. Diminished stocks of key minerals have long ago been forecast by Cloud (1969) and Park (1968) and foreshadowed in early surveys by Lovering (1943). The same is true of petroleum as a prime energy source. Forecasts of possible scarcities go back more than two decades and appear regularly in government publications, The Minerals Year Book (1965) and in special commission and study reports, Hubbert (1962).

For the planner the future issue is rather one of analyzing and forecasting what the technological and economic consequences of almost certain depletion of key minerals and petroleum will be. Schumacher (1973) has presented technological alternatives; Roulding has discussed economic alternatives; and Daniels (1964), White (1965) and Glasstone (1967) discuss alternative energy sources from solar energy, geothermal energy, tidal power, and nuclear power. The limits on expansion of hydroelectric power capacity and the costs, direct and indirect, and the costs of greater use of coal, and exploitation of oil shales, have been estimated. Here there are no options to analysis of limits within a natural systems framework; and for the planner, the future issues are confined to projecting almost certain decline in production, the economic consequences of decline, the development of alternative technologies, and the environmental and social consequences which will follow.

### 3.2.2 The Future Costs of a Degraded Environment and Declining Quality of Life

A world where the land is deforested, stripped, eroded, soils leached and salified and turned to desert, where fresh water streams and lakes are polluted and even the ocean food chains are adversely affected by

pollution, where the earth and atmosphere are made dangerous by ionizing radiation and the air is polluted to levels where it is assuredly dangerous to health and may have effects on weather and climate, is a world that is already partially upon us. Here the futurist need not resort to dark prophecies of things that lie ahead; he can point to the immediate, though not worldwide, examples of the evil. Hence, the problem, as is the case with depleted mineral and petroleum resources, is not a future problem, but a present danger, and it has already passed into the world of policy and program response within more complex countries and economies.

In countries where the effects of environmental insult and pollution are not so apparent, either because population densities are low and industrial development modest, the planner can use the present state of pollution and environmental degradation in advanced countries as a minatory model; but it is doubtful if it is the blemishes of richer countries that hold the attention of poor ones. In the poorer and less densely populated countries of the world, not only are policies and programs for avoiding environmental degradation not in place, but attitudes of environmental concern have yet to be shaped except among elite minorities. Here the planner does have the task of applying ecological models to frame economic forecasts and plans, and if personal experience is a guide, the receptivity is not high as yet. Some government officials accept the reality of the danger and the future warnings they imply for their situation, but feel that alleviation of immediate poverty, satisfaction of basic needs and the development of more productive -- even in the short term -- agricultural and industrial enterprises is of more immediate concern. Environmental concern is perceived as a preoccupation of the rich; though pollution and deterioration most affect the poor.

Even in areas where the effects of environmental pollution are as oppressive as in any developed country, Calcutta and Karachi come to mind, there is concern, sometimes policy response, a bit less frequently program and institutional actions but rarely implementation. This is understandable in the setting of Calcutta where the norms for bustee environmental sanitation and improvement provided one sanitary latrine for every thirty-five people; one potable water point for every sixty-five; one bath house for every 120; concrete lined but open sewers; paved spots at the intersection of major lanes; and an occasional street light. The need expressed by people of the bustees was for a job, preferably in a stable industry and irrespective of its contribution to general pollution. The ecological framework may serve to identify and raise serious, even fatal, problems which will affect the future, but the resolution of the problem for human populations can only come through social policies and programs; and the development of these policies requires analysis of the social, economic and political forces that can change the future.

#### 4.0.0 Futures Traced from Social Structures and Dynamics

Just as population is the basic focus for analysis of the problem of planning and managing natural systems, and for forecasting future developments in the system, the size, structure and dynamics of populations forms the basis for charting the interplay of social forces and planning responses to future problems. Further, at risk of repeating what might be too obvious to merit mention in the first place, the danger signals that arise in the natural systems are only resolvable through action in social systems. Hence, social, political and economic frameworks for analysis are required, to identify the variables that reflect the principia media of these systems. These variables are basically attributes of the population.

#### 4.1.0 Social and Economic Characterization of Population

The population within any given nation state is characterized structurally by age and sex. Under the category of sex, buried under the code word "female", there is rich trove for the future, but more of that anon, and anent social characteristics. The demographic characteristics of age and sex and the dynamic components of mortality, natality and movement provide the basis for charting future social developments. Central also to the analysis of social dynamics are the cultural characteristics of the population, the ethnic, linguistic and religious membership and the acquired status of literacy and educational attainment. Allied are social and political group memberships and their rights of participation in cultural, political and social activities. The economic characteristics of the population and its groups are indicated by work force participation, and employment and earnings by economic sector and occupation. Related to earnings and income are living standards measured by food, shelter, clothing and household services. The nutritional, physical safety and health status of the population and its subgroups, and the quantity and quality of health, education and welfare support services provided to the subgroups are also central indicators of social development. The spatial distribution of services and conditions by regional or rural-urban status is also relevant. These variables when characterized and depicted in series can become "indicators", used to compare social conditions across time and space.

#### 4.2.0 Social Indicator Schemes

Comprehensive and detailed systems of economic, social and political indicators have been developed by Textor (1963), Adelman and Morris (1967), and Bauer (1966). National indicator series are published in the United States and in other countries, and compiled into world volumes by the United Nations and its specialized agencies. Planners and analysts have been furnished with information formats and schemas of systematic indicators for

assessing population status and basic needs, monitoring service and planning future coverage. Most basic indicator series stay the same over the years; but new indicators are developed and different variables and combinations singled out for attention, as development interests and fashions change, or social diagnosis improves in specificity and coverage.

#### 4.3.0 Indicator Systems and Forces Shaping the Future

The indicators can serve other ends than technical planning. Assessment of economic distribution and social equity, cultural and political integration, and the status of groups on political and legal rights can be assessed broadly on the basis of indicators and more specifically by analysis of the workings of national economic structures, social institutions, and political and legal processes.

#### 4.4.0 Social Systems Frameworks, Indicator Systems and Social Dynamics

The indicator series that specify key social variables, and the ratios, indices and norms derived from observing, measuring and relating the variables, have been less frequently and successfully used as a systematic basis for identifying and forecasting the broad play of forces that may shape the future. The epistemological limitations in developing the framework of indicators, the masking of values and assumptions in the choice, the problems of specifying and measuring variables and relating them in analysis, are discussed in the technical and methodological papers of this set.

Beyond the brute difficulties of dealing with the future in any systematic way, there is the problem of lack of closure between broad systems for guiding social analysis (the work of Mannheim and Etzioni are examples) detailed systems of social indicators of the type under discussion, and analysis of the organizational process and individual exceptions that shape the present and determine the future. The principia media in statu nascendi are not easy to discern in relationship to the welter of variables and indicators moving in complex, social

systems. Hence, either the "principia" are left tantalizingly, though safely, unspecified as in Mannheim (1949), or they are boldly schematized, at risk of abstraction and unreality, by Etzioni (1968).

#### 5.1.0 Assessing Central Currents of the Future

Even without a comprehensive system that applies to the full complexity of social reality, the planner can draw up his own list of broad currents that run toward the future. In some cases the social analyst can chart the direction and specify the force, the flow rate and volume, of these currents; but if there is one sure "principia media" in the landscape it is that some of the major currents not only will not converge, they will impact and conflict. Determining these currents, as best it can be done, is worthwhile for the planner, irrespective of whether or not he can do anything about controlling them.

#### 5.1.1 Less for More

The future as portrayed in the ecological framework provides one central set of themes. The resources of the earth, the energy and materials used by man and his technology, are running down; man's environment and the quality of physical life are being adversely affected and the potential for future increase of physical output, growth as it has been defined, is reduced. Innovative response through alternative technologies may mitigate this, but the prospect is almost inevitably for reduced product and for sharing these reduced portions among increased numbers of aspirants. This central fact must shape the way planners view the future and respond to that view through social plans, policies and programs.

#### 5.1.2 The Process of Sharing Less Among More

But another current running is the growing pressure to assess and meet the basic needs of populations characterized by increasing numbers and vaulting aspirations. In meeting these needs in the social system there is the further contributory stream of objectives that seek to

increase the participation of a massive and growing population so that they may determine their own needs and the manner and pace in which they shall be met. Planners in the social system must respond to this future force as well, and conflict is likely.

### 5.1.3 Power and Control of Sharing

These currents may well not converge, and the terrain between may at best be narrowed by reducing waste and consumption and distributing product more equitably; but this may have to be accomplished with more and not less exercise of power and control, for the convergence must be engineered across class and national boundaries. Instead of convergence there may be class conflict and destruction.

This it seems is the central setting for the future, with the problem founded in physical systems limits but resolvable only through political and economic analyses, and the plans, policies and programs they shape. There are also other secondary streams that may be tributary to the central currents and thereby affect their course.

### 5.2.0 The Contributory Potential of Learning and Communications Systems

The technology for increasing human learning and communication of knowledge may already be reducing population growth if not yet reducing the pressure on resources. Communications could be used to reshape human aspiration, so that the consumption and waste that competition inspire are devalued, and internalized control and cooperation are increased. There are few signs of this, except among elites for whom competition is less critical, but then it is only these elites who have shared in the first fruits of improved learning and increased knowledge. Perhaps, the message will be accepted by all; but if there is one set of activities which social analysts and planners should address for the future, it is the reshaping of learning systems and their environments -- schools, work-place, media and social groups and organizational contexts.

The central outcome of learning should be a sense of reward from consumption foregone. This requires more than elites accepting sacrifice and abstinence after the fruits have been tasted and the tree remains there for the shunning; it is the much more difficult task of educating so that all the population work harder, receive limited material benefits and enjoy it more. For this the educator must get below the surface of present political and economic systems and their professed and un-lived ideologies.

### 5.3.0 Organizations and the Basic Community

Working against the positive flow from improved and expanded learning systems is the fact that political and organizational structures are not crumbling, or even opening their windows. Nor is there persuasive evidence that increased political and organization openness are coming. Where are the alternative open forms that will serve to maintain a future of increased satisfaction from reduced consumption? Not in the notion of networks, at least until the learning systems of the future can handle deep forms of affective learning as well as they now handle deep forms of cognitive learning and shallow forms of affective learning.

### 5.3.1 The Base for Affective Learning: The Family

A disturbance, roiling under all currents, is the decline of the family, which is first among communities. For good or ill, the family has been the only group in which social relations have sufficient affective mortising to sustain and reward members when confronting social sacrifice. In the Calcutta bustees where there was nothing else to shelter man from madness, there was family, and only on the foundation of this primal community, can a future of sacrifice be sustained. If affective learning is to shape and mediate a future of conflict between natural decline and

the social growth necessary to accept decline, the degradation of the family environment, perversely in those societies where concern for the natural environment is most advanced, is a tributary if not central current to which planners must attend. Planners work within state structures and not within family structures, but fortunately many live within families and hopefully have the chance to develop benign social policies through practice there. There seems no other social group but the family on which the burden of affective learning can be placed.

### 5.3.2 The Control of Affective Learning Systems

In the development and control of affective learning based on the family as primary community there is a resource that can be developed that in future potential can replace the physical resources that inevitably will be depleted through time. This is the resource that is currently dead filed under "female" in the bulk populations of the world. One obvious current in the future will be the opening of this group to the opportunity for full economic and political participation. As a consequence of this, work and struggle may provide a surer test of those who are fitted psychically for leadership in developing the affective learning that must prepare humankind for mapping the convergence of currents of the future.

Proposed is something a bit beyond giving those presently classified as female, control of the powerful technologies of learning systems and communication that must surely dominate the future if humankind is to survive. The proposal is that social role be determined by free individual election after trial and test, and not by physical accident attendant on birth; and that the determination be based on the preferred and dominant method of dealing with problems in the world. There might be three role categories: physical, intellectual, and affective; and the latter group, predominantly female until the culture changes, would

control the communication and learning facilities, and rule. Reproduction of the species would go on as physiology and technology dictate, but not get in the way of more vital ecological, social, economic and political dynamics of thought and action for social survival.

#### 6.1.0 Other Eddies and Flows

There are other currents to which the planner may attend, according to his ranking of values and judgement. These may be "principia media" of dying force, but with consequences for the near future.

#### 6.1.1 Urbanization and Industrialization

Urbanization may have spent its force in some parts of the world, but there are still strong effects from migration and the attendant social pathologies of rootlessness and family and communal deterioration. These signs of urban disorganization and chaos are apparent to the unaided eye. Some students of urban ecology, Smock(1971), see signs of better tidings for cities, where the diversity of the population may be the basis for future social strength, and the city may provide the setting for resurgence and social growth. Others see the city as perhaps providing the ashes from which some as yet unidentified flying Phoenix may indeed emerge and take wing, but first the ashes.

We may infer from the wide acceptance of the term of "post-industrial" society that industrialization -- at least in its old forms -- is a partly spent force, in the backwash of which we now live, rather than a future force. This seems consistent with the central ecological argument and the alternative technology advocacy. Still, many run-down mills will have to be turned into museums and schools before the old form disappears; and alternate technology and cottage industry may permit swords to be beaten into plow shares, or the reverse. Industrial and manpower planners are still sketching out their near futures pretty

much as old, but there is more attention to the service professions in even the smaller and less complex economic plans. Here the concern is for future changes that are more sweeping in their effects.

### 6.1.2 Denationalization and Decentralization

Some see force of significance in the trend toward greater differentiation within nation state boundaries. The strength of some tribal, ethnic and old national groups may be rising and the power of the central national unit declining. This may reflect media technology -- the increase may be in the power of amplifiers and bull horns -- but there are situations where the national fabrics will be rent for all time and the consequences will be more than ethnic theatre.

In partial response, planners and policy makers have stepped up the rhetoric on differentiation, and, in some cases, programs have followed which address linguistic and cultural differentiation and aspirations. These forces and responses can only continue in future, when the improvement in learning systems technologies can accommodate them more effectively. More books, and books in more different languages, are coming into countries where homogeneity was once a sound economic argument.

National fragmentation and decentralization currents run strongly at the same time the trend toward transnationalism continues. The power of the multinational firm grows. The world state does not seem to be emerging, but perhaps the basic ecological framework and need will permit attention to problems across national boundaries. Within countries there is much talk of decentralization of services and social response, and this is sometimes combined with hopes for increased local participation and more equitable distribution of power. This is a force that is clear in most country planning and will continue to be. Allied with it are the expressed needs for "bottom-up" as well as "top-down" strategies, Hudson (1976), and this trend will run on. Planners have been accused of resisting this trend because it makes their

work more complex, but this does not seem an accurate placement of the blame. Planners may well welcome the trend; first, because even if it makes work more complex, it, at least, makes more work; and second, because planners thrive on systems complexity, even when the systems don't.

Decentralization, participation and bottom-up strategies are the preferred political and social approaches of most of the liberal elites who advocate alternate futures. The paradoxes inherent have been mentioned. As a broad trend it would seem that decentralization, participation and local differentiation can only increase steadily and into the future. The improved learning and communications technology will facilitate it; the improved educational levels of the population will require it; and both planners and their counter-culture critics are speaking for it. No political or economic system or ideology is really for dependency, although one gets the impression that the dependency theorists are taking on the dark forces of the world. Conservatives are against dependency as it is manifested in welfare action; at least at retail level -- it becomes industrial development when governments wholesale welfare to large industries. Anti-imperialists are against dependency fostered by strong states and multinational firms, even when the patron states and firms claim to be aiding weaker states. People believe in the work ethic left and right, and both majorities and minorities are against patronage. Majorities oppose because it costs them money and time, and minorities because it is partial and demeaning.

The disestablished Marxians, especially in the affluent countries, oppose dependency fostered by imperialism, espouse local participation under ideological guidance, and advocate policies and programs that promote more equitable distribution of economic benefits. The future should be hospitable to these features of their social program; but

other political winds may blow if there are unbearable scarcities and competition among chauvinist nation states or will there be a new form of multinational allegiance and chauvinism of the transnational firm?

#### 7.0.0 Summary

These and other currents run into the future and the planner must identify them and trace their consequences as best he can. The selection of a framework for viewing the present and glimpsing the future is arbitrary and based on the values of the viewers. The ecological framework is no exception to this. Once the danger signs in natural systems are read out, all further response is determined by political, social and economic forces, and analysis must go forward in these system's frameworks. The message is to open these frameworks up, where they have been closed to ecological concerns.

In the social systems frameworks, the population and its characteristics are the basis for analyzing key variables, characterizing their relationships and developing indicators of past and present status and future possibilities. There are no systems of thought that cover social systems comprehensively and yet permit analysis of social forces in all their detail and complexity. Systems of social thought do help in diagnosing broad forces that move toward the future. Some of these future currents will conflict, or interact in ways that cannot readily be analyzed. Selection of certain broad forces that will shape the future is arbitrary, as the choices here illustrate; but futures thought is not devoid of reason and usefulness, even when it is difficult to trace the future; or to do anything about it, to the extent that it can be glimpsed. There remains the question of whether future changes in natural and social systems can be understood, and diverging currents charted, without some encompassing teleological framework; religions have provided this, but ideologies don't seem to stretch this far, at least in our age.

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