

FUTURE STUDIES

Philosophy
Methodology
Application

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TABLE OF CONTENTS

Introduction	1
A. The Philosophy of Future Studies	2
B. The Methodology	4
C. Geographic Application of Future Studies	5
Some Philosophical Issues Involved In Futuribles	8
A. The Idea of the Future	8
B. Determinism	11
C. The Idea of Progress	12
D. The Idea of Change	14
E. Use of Quantitative Data	18
F. Problem of Accidents	19
Future Studies Methodology	21
I. Background	21
A. The Assumptions	21
B. Planning	25
C. The Self-Fulfilling Prophecy	26
D. Value and Technology	28
II. Examination of Existing Approaches	31
A. Extrapolation and Projection	32
B. The Application of Expert Intuition	37
C. Systematized Intuition and Operational Gaming	42
III. Evaluation	49
Geographic Application of Future Studies	54
A. A General Conceptual Approach	54
B. The Role of Accidents	56
C. Future Studies and Africa	58
D. Methodology	67
Footnotes	70
Bibliography	72

INTRODUCTION

In the preliminary examination of future studies, efforts have been directed toward determining whether this infant discipline is relevant to the research interests of the Program of Eastern African Studies.

At the outset, the idea is very appealing. Both social science scholarship and practical policy formation envision rapid and fundamental change in Eastern Africa. The rhetoric, first of independence and now of development and modernization, does not extoll a glorious past or the present values, but rather the future and presumably a better day.

An overriding concern for long term change, however, is not sufficient grounds for an uncritical acceptance of methods which purport to deal with the directions and impact of social and technical change. Two basic issues emerge at once; first, there are questions concerning the availability of the type of data and subject participation necessary to the various types of futures methods. Second, future studies are closely related to social value orientations, policy formation and political decision making. As such, they suggest a variety of ethical implications which must be confronted by any researcher choosing to use the existing methods.

The body of this report consists of three papers dealing in turn with the philosophy of future studies, the methodology,

and finally the possibilities for application in Africa. The three efforts clearly overlap and in fact there has been no attempt toward strict subject delineation. At this stage of the work, it is instructive to examine various reactions to the existing literature as each of the contributors took a broad approach to their subject assignments.

A. The Philosophy of Future Studies

The first paper primarily deals with the assumptions underlying man's view of the future and his explicit and implicit efforts to do something about it. At the very best, any future conjecture is highly subjective. The way in which man chooses to regard it (and most do in some sense or another) will determine his action in the face of its inevitable advance. In a very general sense, his views will be determined by the type of society in which he finds himself. Traditional societies may fear any change which might threaten an already tenuous survival. This view of coming events would be essentially defensive, whereas more modern societies, with built-in mechanisms for social change, may be considered on the offensive as they actively seek to alleviate social tensions and improve the general welfare of the community.

Such sweeping generalities give us the clue that future studies take in a broad range of social behavior. The one

definable boundary seems to be the necessity for dealing with events which have yet to take place and thereby are not subject to normal empirical methods. A second problem, thought not so immediately obvious, is the fact that many of the restrictions in terms of fundamental values and norms which produce predictable patterns in other social sciences are not readily available. In the "present," values or fundamentals are largely institutionalized. They call for patterns of action without questioning, and by definition, in functioning societies, compliance takes place with a minimum of coercion. In future studies, however, the development of these institutions is of great concern. They cannot be considered static and must be added to the list of variables. There are no "accepted" procedures and as a result value and institutional changes as well as technological innovation and demographic trends are all subject for conjecture.

The philosophy of future studies must proceed from these basic uncertainties and come to terms with a variety of related issues as well. The conception of progress implies a particular normative content to social change. Planning assumes both some type of knowledge of possible futures and a desire to influence them. Technology plays an increasing role in social value formation and sets limits in available courses of action. There are serious questions concerning control and accountability as

technology and those who comprehend its complexities come to play increasingly significant roles.

All of these types of considerations must be pieced together into some system of coherent logic if future studies are to gain wide spread acceptance and application. In the case of any innovation where existing norms and viewpoints are challenged, there must be a period of legitimization. There may be a considerable period of adjustment before a new integrated philosophy which includes a rational regard for the future is accepted.

B. The Methodology

Three primary approaches to future conjecture have been considered. Most basic are the commonly practiced techniques for extrapolation and projection of current data and trends. While these methods are carried on with considerable sophistication and mathematical elegance, they produce a stark incomplete picture of the future without the richness of human involvement and conflict which the scholars of the future generally desire.

To fill out this spare picture, various types of scenario writing have been developed. Within the general confines of a projected future, specific happenings and hypothetical sequences of events leading to them are outlined. These word pictures of the future lend to the reality of the procedure by appealing in candid terms to one's intuitive vision of future possibilities.

The most complete methods are those which using techniques of simulation and operational gaming seek to account for a large number and variety of the variables which are found to influence the future. Here a background setting may be established through projection of existing trends and the "Delphi" technique of systematic application of expertise. Then official and public reactions to the setting and alternative policies are registered through the use of decision-making simulations.

The greatest difficulty encountered in this third method would seem to arise in attempts to project a value base for the simulation of a quality comparable to the projected technological background. While inadequate theories of value structure and change plague all the social sciences, they are particularly acute in future studies where static assumptions are just not tenable.

C. Geographic Application of Future Studies

While the first two papers seek to deal with the subject on its own terms, the most important area of inquiry involves their applicability in a cross cultural context. Perhaps a negative, but realistic, view of the problem would suggest that the methodology is sufficiently imprecise that the incomplete and often inaccurate data which characterizes the African scene is no great problem. This is probably an adequate approach to

the first hurdle, but clearly the course is not without others. Of similar consequence may be restrictions on such data as does exist, the fluid and often personalized character of significant events, and the requirement for cooperation among both officials and citizens of the particular area in question. Serious though they may be, none of these types of problems categorically rules out these studies before the fact.

Perhaps a more difficult problem involves choosing an area of research which would be susceptible to the available methods and productive of some sort of meaningful results. Three possibilities have been suggested: (1) the future of bureaucracies; (2) the pattern of leadership succession; and (3) the future role of the military. Offhand, any one of these would appear to be of great interest to the researcher and of crucial importance to developments in Africa over the coming years. Methodologically, it has been further suggested that there might be advantage in using actual actors rather than simulators in analyzing the subject.

While it is fair enough to put forward intriguing suggestions, it is at the same time abundantly clear that actual performance of the research would be a formidable task. Whether a research design could be constructed which was acceptable to the large numbers of groups and individuals necessarily concerned and which at the same time could directly address the subject in a fashion

which could produce valid and valuable results is open to serious question.

If this project is to be carried further, it would seem the next appropriate step would be to make an attempt at circumscribing a specific subject and research procedure. It is only in the actual construction of a research design that the feasibility of this type of future study could finally be determined.

Note: A consideration not mentioned in the papers but which was subject of discussion in the final sessions was the possible impact of future studies methods on those responsible for the planning process in Africa. It was felt that if leaders could be induced to think in terms of the idea that they were creating futures, whole changes of social state rather than the narrow numerical products of a plan or one aspect thereof, the quality of planning and implementation might be considerably enhanced. Given the ubiquity of the planning syndrome in Eastern Africa, a positive spin-off of this sort would be quite valuable.

SOME PHILOSOPHICAL ISSUES INVOLVED IN FUTURIBLES

A. The Idea of the Future

Future studies is the term applied to the reasoned and systematic "conjecture" about the future. It represents an attempt to bring the wealth of data, expertise and cumulative intellectual knowledge in the social and physical sciences to bear on the manner in which man views and deals with the future.¹ It seeks to provide a framework for the study of the future. But this raises a fundamental question about the future: how do we study what has not happened?

In the physical sciences this does not create any problem. The physical laws and their relationships are already assumed to be in existence. They are only to be discovered. Mass, energy, force, motion, elements, molecules, atoms, and all of the mixtures and chemical compositions are essentially knowable. In this sense the task of the natural scientist is essentially that of discovery.

The task of the social scientist, on the other hand, is more than that of discovery. He is called upon to consider the consequences and implications of the discoveries of natural scientists for society. Here lies the problem: society is defined in human terms; and the content of social action and human events are not merely awaiting discovery. Futuristically, they are largely unknown. This apparent unknowability of the future of social events and human actions leads to the crucial distinction between

past, present and the future.

From the social standpoint, the past is the guide for the present and the future. But there are two categories of the past: (1) that which happened and could not be changed; and (2) that which we think happened. This distinction cuts across all areas of life, cognition and perception. In philosophical terms it is the distinction between reality in itself and reality as given to us from sense perception.

Strictly in terms of cognition, man does not and cannot "know" the future. Even the word future is a linguistic symbolization of the unknown. However, man has expectations of continuity from past to present and the faith that such continuity will extend into the future.

For man, "faith in the continuity of the future" must be more than "faith"; it must take the form of cognition before man can orient himself in purposive social action. Fundamentally, man lives in the future, for the future and acts for and towards the future. Take the simple example of location in time and space. Man constantly changes his location from "here" to "there." This change in location always takes place in a succession of time. Man cannot do anything unless he convinces himself that he "knows" that his next step from the "here" to "there" and from "now" to "later" is not into vacuity but into solid ground

and real time. The business executive who "knows" his wife, children and house will be there when he returns, the professor who "knows" that Maxwell Hall will be there tomorrow, next week, next year, are examples. Unless we experientially collapse the distinction between our faith in continuity and cognition, it will be impossible for us to live. Unless we act as if we know that tomorrow will come, all action will come to a sudden halt. But all this is based on our experience of continuity from the past to the present. Actually the projection of that continuity is an assumption, albeit one without which life cannot go on.

There are many implications of this pseudo cognitive perception of the future. One is that the future is a projection of the present. Another is that the future is a series of modifications of the present. In this second case, whatever is not desirable about the past and present is considered alterable or modifiable. It is, therefore, almost impossible to conceive of any dream about the future which does not proceed from the past and present.

Moreover, man throughout the ages has dealt with the unknowns of the future in many ways. From classical philosophy we have the ontological view of the world, a view which has reappeared in the form of contemporary phenomenology. From the "traditional" man come to us such notions as "fate" and destiny. From religion,

God, predestination and other apocalyptic visions have descended into the perception of the future. All these suggest at least two primary ideas: (1) man's attempt to relate to the unknown of existence; and (2) man's attempt to understand and explain that unknown and his own position relative to it.

Future studies take up from these notions about the idea of the future and attempt to help man to deal with that future through a systematic application of social research techniques with a view to narrowing the areas of ignorance and superstition.

B. Determinism

The conception of the future, either at the individual or collective level, involves degrees of determinism. There is a general sense in which the world is predetermined. Physically, the world is determined. Whatever happens in the world is limited by its mass, density, motion, etc. What man can do is limited by what exists in the universe.

But the controversy over determinism has spilled over into historical, economic, social and psychological fields. The cyclical view of history is an example of an historical determinism. Dialectical materialism and the Marxian epistemology are not unfamiliar in the "reproductive" interpretations of life and nature. In the social sphere we can recall evolutionary determinism, social Darwinism, and other environmental determinisms.

Psychology emphasizes not only environmental conditioning, but has also attempted to reduce all behavior to a pattern of pre-determined stimulus and response.

From the "Age of Belief" to the Ages of Adventure, Reason, Enlightenment, and modern Analysis, men have grappled with the fundamental problems of determinism and freedom, the problems of cognition and empiricism. But since man cannot escape dealing with the future, future studies merely hope to aid him in reducing the sphere of prejudice about the future by pointing out the areas in which man can manipulate his future. Future studies seek to point out specifically the "fan of possible futures" or "futuribles" and their foreseeable consequences and remedies, so that planning, preference ordering and the choice process could be approached more rigorously, precisely and more intelligently.

C. The Idea of Social Progress

Apart from the social ramifications of the 18th century Enlightenment, the idea of social progress permeates every society. Man generally views himself as moving from one social order to a better one. Occasionally he formulates the vision of a millenium; sometimes he indulges in the nostalgia for a past "Golden Age." He seldom accepts stagnation; not unless he loses hope completely.

From this point of view, social action is directed toward

the betterment of existing reality, and the diminution of existing deprivations and limitations.

The assumption that the future could be manipulated stems partly from this conception of social progress. The idea of evolution itself is a conception of gradualism in the process of social progress. The idea of revolution is its opposite. Both ideas imply a change toward something. When the process is a conscious one, the posited goal is assumed to be better than the condition preceding it. Futuribles, like most of goal-directed social action, assume the manipulation of events for the achievement of desirable social states.

But, without denying social progress, we can at least suggest that whatever progress there is is not uniform. There are accidents for one thing, which may be for better or for worse. There is the fact of error for another: error in judgment; error in calculation; all resulting from limited perception, restricted understanding and inadequate information. What future studies aim at is to increase the cumulative favorable effects of social action by minimizing the influence of and dependency on chance and error and by maximizing perception, understanding and information. From this perspective it can hardly be argued that projection of futuribles is value free. It does not shy away from value preferences but merely seeks to maximize socially

preferred values through reasoned and disciplined social research.

D. The Idea of Change

Implied in the idea of social progress is the idea of social change. The idea of change is a universal one. But as we have suggested, change is a neutral concept. Change could be for better or for worse; both interpretations of change can be found simultaneously in every society at all times. In the social sciences, however, change and development have become amorphous concepts. A positive view of development is that it is a change for the better, an increase of preferred social values. But we can raise the question whether preferred social values are good in themselves or whether they are good because they are desired. This is the philosophical distinction between the desired and the desirable.

In Western culture the level of institutional, political, economic and general social development has produced a well defined pattern of ascertaining the socially desirable. The values are at least relatively stable to allow for continuity and predictability in social behavior.² But in the newly independent nations, there are too few social foundations for predictability of behavior or the determination of the desirable.

In this regard, the few elite at the apex of the social pyramid are the creators of socially preferred values. This is

especially so in the realm of technological development and political allocation. Society in these areas is being organized largely according to the conception of what is desirable by the upper 5 or 10% of the population.

What has made the idea of change a dominant value almost universally is the fact of technology, which multiplies what is possible to more or less boundless limits. Technological breakthroughs increase alternatives. Soon our alternatives may include whether to live on air-polluted earth or underwater or in outer space. The crucial thing about change, at least for the Western man, is the rate of change. It may be so great that Western man socially cannot catch up with the new innovations. De Jouvenel has suggested that the higher the rate of change the less capable we are to predict the future. For Western man who has hitherto adapted remarkably to technological change as a dominant value, there may be an increase in uncertainty and instability both at the collective and psychological levels.

But for non-Western societies, change will have two fundamental effects. (1) It may accelerate social dislocations, dissynchronizations, and instability, thereby causing a crisis in the social consciences of the new states. (2) The rate of technological change, development and innovation in the West may make the new states perpetual borrowers of technology.

To the degree that technology determines how we do things, technology determines some social values. Sometimes what we do and how we do it cannot be meaningfully separated. A possible implication of this observation is that the West may determine the dominant future values of the non-Western world.

The literature on nation-building in the developing nations suggests that some traditional societies resist social change, especially when the new values are "alien" and threatening. Some societies are more adaptable to change than others. But the problems of adaptability will be increased by the rapid rate of technological change. If the West is unable to cope with the effects of its own technology, what will be the fate of those who are perpetual borrowers? Technological indigestion may remain a possibility for a considerable part of their future. There are sociological and psychological implications of this observation which the future researcher in such areas has to clarify. He must be able to assess the areas' attitudes to change and their responses to the various forms of technocratic organization of society that are consequent upon the introduction of technological change.

Future studies, as we have noted, are an attempt to increase rationality in choice processes. We may want to ask: will rationality increase with a too rapid rate of technological

change? This is a difficult question. Technology is already creating the prospect of mass unemployment, overproduction of leisure, impersonalization, etc. There are psychological consequences of these effects which can hardly favor an increase in individual or collective rationality. Mass social alienation seems to go more with mob action than with rational behavior. These are issues the creators of value in the non-Western world have to worry about among other things.

However, there is a more fundamental problem about seeking to increase rationality in social action. Assuming the individual is rational in his choice processes, there is no assurance that any collective action based on this type of rationality will be rational in the end. Popper, Arrow, Lindblom, and Braybrooke among others have tried to resolve this dilemma in social choice. They have discovered that individual rationality does not translate into collective rationality. It is difficult if not impossible to arrive at an aggregate social rationality. This is only one of the problems.

Another problem is the fact that rationality itself has different usages. Generally in game theory rationality means the conjoint of means and end. In economic terms it means the minimization of costs and maximization of utility. But in social action it may be desirable not to be too rational. For example,

it may be rational to follow the Kantian injunction to tell the truth always. But telling the truth may be destructive in certain social contexts.

Future studies, we must note, do not account for social preferences; they merely seek to aid the understanding of the relationships of such preferences and their foreseeable social consequences. If policy is to neglect the preferences of the majority if not the whole of a society, then experts cannot determine these preferences because they are always a minority. But, like the future studies experts, they can help perfect the techniques by which such preferences are determined, articulated, and aggregated.

The consequences of technology are not knowable in toto nor are they always positive. Future studies do not presume their full knowledge; but they can decrease their negative impact by systematic conjecture about the consequences. They may thereby minimize the predominance of technological determinism in social engineering.

E. Use of Quantitative Data

The methodologies for examining futuribles rely more on the use of quantitative data than other forms of data. This results from the fact that prediction requires precise empirical data; otherwise, extrapolation becomes socially dangerous. But there

is the tendency to assume that only the quantifiable is authentic. Such an assumption would lead to the neglect of important areas of social events. For example, the scarcity of data and their unreliability in the developing nations may lead to unfortunate consequences: (1) if such data is used, the resulting prediction may be ridiculous, irrelevant or create disastrous consequences; (2) if they are discounted, the conclusion may be reached that the social events are not worth studying; and (3) the orientation towards quantitative data may imply that future studies can only be meaningfully applied in the well industrialized societies.

F. Problem of Accidents

De Jouvenel emphasizes the role of accidents in history and social engineering. One cannot by definition project accidents. But future studies must make allowance for them. Accidents can falsify conclusions and predictions. Therefore, there are technological and human accidents as well as natural catastrophes to be taken into account. This recognition has two implications: (1) Future studies will be less productive in areas of society and social events where accidents are frequent. If the non-Western world is accident-prone, then future studies may have less applicability in them. (2) Future studies may not be too optimistic in their conclusions and predictions. Perhaps it may be required to state its predictions and extra-

polations in hypothetical forms in order to reflect the ceteris paribus principle. There are some of the fundamental and philosophical issues with which the future researcher must come to terms.

FUTURE STUDIES METHODOLOGY

I. Background

A. The Assumptions

A modern approach to future studies, explicitly or implicitly, is likely to proceed from three major assumptions.¹

1. The future is not determined or unique.
2. The future is not unknowable.
3. The future can be affected to some degree by the efforts of men.

It is from these assumptions that future studies derives both its validity and its value. An assumption, however, is just what it says: a statement which in context is assumed and not susceptible to rigorous proof. Since these assumptions are to be used as the fundamentals upon which the methodologies are to be built, it is proper to examine them in some detail.

The question of determinism would not have to be noted but for the religious scholarly dogmas of the past. The former asserted a fixed nature to man's destiny (or doom), while the latter sought the proper key to unravel the mysterious patterns of the process. The more modern political "philosophies" of both East and West reflect such traditions. The West argued until most recently for a political and economic state of laissez faire on the grounds that let alone, everything would come out

as it ought. Meanwhile, the other half felt they had discovered history's primary variable and were doing all they could to help it along to its inevitable conclusion.

Perhaps a more convincing case can be constructed for a purely physical determinism. It is possible to argue that all mass, energy and motion in the universe lie in a given relationship and that a change in one results in predictable changes in the others. Hence, once the juggernaut is in motion, there is no stopping or guiding it.

The problem with any such approach is that it is immediately susceptible to absurd reduction which renders it valueless as an analytical tool. It should be recalled that physical sciences have been productive in spite of their inability to proceed from or to explain in terms of irreducible fundamentals. Therefore, even if there is a rigid pattern of action, it is existent at a level of minutia which is not directly relevant to the phenomena that men observe, experience, and/or expect to deal with in social studies including those which seek to deal with the future.

If the future is not perceivably determined, it follows logically that it is not unique. Bertrand de Jouvenel argues that men are confronted by a "fan of possible futures" each possessing a given probability of occurrence.² These possible futures are what de Jouvenel refers to as "futuribles." The

quantitative probabilities of each are most complex depending upon the nature of events, the relative timing of events, and the synergistic products of their combination.

It is these probabilities, however complex, which enable us in a sense to "know" the future. This is in accord with the second assumption. It could be argued that all we really "know" is the instant of the present, and that both past and future are subject to increasing uncertainty as they depart from that unique point in time. On the other hand, in spite of uncertainty, there are many things or events which we expect from the future and in turn we nurture these expectations because they have proven relevant in past, similar circumstances. If this usage is not in accord with the most rigorous analytical definition of the term "know", it certainly would be acceptable for operational purposes.

Clearly some future possibilities are more likely or probable than others, and in a large part it is the task of future studies to sort things out on just such a simple-minded basis. By extrapolating various trends, predicting likely technological events and characterizing men's reactions to these changes, it is possible to assert with some confidence the relative probability of any given future.

From this perspective, viewing the world as having a variety of possible futures, it seems unavoidable that some of these

would be judged by various criteria, more desirable than others. This brings us to the third assumption; that man is able to alter the probabilities of the "Futuribles." It is intuitively obvious that, if a future is at the same time undesirable and undetermined, by reviewing the hypothetical sequence of events leading to it, policies could be constructed with the aim of reducing the probability of its occurrence.

This in fact is constantly, if not too systematically, taking place. Legislating, planning, precedent and procedure all assume a generally "knowable" future and are examples of efforts to influence it. Concepts such as capital, discount and production are based upon the expectation of influencing economic processes in the future. At the most basic level, consistent individual behavior and the formation of institutions all exist in part to inflict predictable patterns on a less than certain future and rest implicitly on the empirically derived belief that they will be effective in so doing. It is fair to say that a very substantial portion of man's activity, public and private, is undertaken in the expectation that he can favorably influence the "futuribles."

The validity of future studies is based on the intuitive acceptability of these fundamental assumptions, which we have attempted to demonstrate. It was also noted above that the value

of future studies emerged from these assumptions. It is clear that if the future were categorically unknowable the whole concept would be void. If the future was knowable but determined, future studies might be able to discover the pattern, but its value would be purely aesthetic. It is in fact man's ability to guide his future which adds a substantial pragmatic value to the process as he seeks to avoid possible disasters and to maximize the utility of the available resources.

B. Planning

Before turning to the methods to be examined, there are a number of other futures-related issues which should be considered. It is in line with the third assumption that future studies becomes inextricably involved with the actual process of evaluation, policy planning, and implementation. While studying the future may possibly be undertaken for its purely aesthetic value, if it is accurate and the methods involved are coherent, then it becomes an invaluable commodity in the eyes of those charged with the responsibility of policy formation. Such a state of affairs can be the setting for possible abuse, in terms of utilization of experts and techniques and in the mode of public application.

Closely related to this is the problem of evaluating future alternatives. While these alternatives may be outlined using

future's methodology, these techniques do not provide criteria for evaluation. These must come from the decision makers and will as such reflect their personal value judgments. Further, their decisions may or may not be subject to public accountability as the complexity of techniques and subtlety of application may obscure motives to all but the most astute observers.

C. The Self-Fulfilling Prophecy

There is another issue which is even more directly related to the pursuit of future studies and which has considerable implications for any given society. The concept of the self-fulfilling prophecy is at best elusive: once an event takes place it is virtually impossible to decide with rigor how it was brought about and specifically whether men were actually unconsciously acting out their worst (or possibly best) premonitions. However, phenomena such as the band wagon effect and the power of fads and trends, the force of habit and the susceptibility of humans to suggestions, intuitively causes one to consider its existence in some form, a distinct possibility. For example, observations that this society is undergoing racial polarization and that it is likely to increase in years to come (the suggestion of a future), in a sense may give license to the associated dismal practices. In this sense the prediction may actually nurture the process which it seeks to condemn, by presupposing

its existence.

In this way even the most academic futurist is confronted with the same problem as the scientist who develops a deadly bomb or gas. While he may not be able to destroy or undiscover the logic which inexorably leads to a given invention or innovation, he must be aware of his responsibilities and avail himself of all possibilities for elucidating the risks which tend to accompany a large number of technological advances. One clear example of such problems surrounds the activities of the Hudson Institute and their projects, some of which are designed to "think the unthinkable."³ While these may be undertaken as an academic exercise, great fear has been expressed that the "unthinkable" might become common place and hence, while gaining acceptance as commonplace, the grounds for action without due consideration of the consequences.

The danger in such circumstances is great indeed, yet it cannot be avoided if future studies are to realize their potential benefits. That is, the systematic exclusion of "unthinkable" futures is more likely fraught with danger than their concerned and careful consideration. The "unthinkable" futures must not, however, be allowed to become the criteria for their own unconscious fulfillment but rather for their explicit avoidance.

D. Value and Technology

We have in passing noted on several occasions the impact of value judgment in the pursuit of future studies. The role of values is considerable both in the form and the content of the different approaches.

De Jouvenel points out repeatedly that investigations of the future are largely conjecture and definitely not science.⁴ The latter is quite clear; the methodology of science requires empirical testing for the validation of its hypotheses. This is categorically impossible when dealing with events which have yet to take place. As a result, conjecture, inevitably skewed by value biases, plays a substantial role in the way one views the future and it is not subject to empirical correction.

The content of such studies is likely to be even more value oriented. In the first place one must establish a general setting or point of view for the study. Obviously there are many ways to usefully characterize the world, none of which are uninterpreted or value free. Olaf Helmer, for example, has suggested that the conflict between technology and social value structure would provide a basic framework. In this context, future projections are derived from estimates of technological innovations and their public impact as they are admitted through society's value screen. That is, consequences of nuclear technology

depends upon the particular society's value map and related judgments which determine how and under what circumstances it is to be applied. The expanding field of genetic engineering is bound to go through a similar screening process as its social relevance is established.

Such a point of view seems to provide an acceptable approach to the content of futuribles; however, the nature of the clash or interaction of value and technology must be considered in somewhat more detail. Both value judgments and technology provide criteria for decision making. In simplest forms, conflict occurs when they suggest different answers to the same decision problem.

There are two basic types of social issues to which answers are constantly sought: first is the definition of social problems and second, the choice solutions. Simply, this analytically separates the notion of "what to do" from "how to do it." At first glance, it would appear that this distinction would establish clear boundaries of decision competence: values for determining the existence of a social problem, and technology for choosing the most efficient solution.

It is not nearly so simple, however, and this may in part be credited to a phenomenon which could be described as technological lag. Briefly, this characterizes the case in which a

value judgment outlines a social problem for which there is no established technique for solution. This leads to an interesting situation where, in the absence of technology, problem solving is undertaken by methods which are grounded on emotive rather than empirical criteria (e.g., resorting to "fiscal responsibility" in the face of a recession). These methods in time gain the legitimacy of tradition if not effectiveness and, when at a later date appropriate technology is developed, its application may be blocked or distorted. Political decision makers may find this a particularly acute dilemma. The defenders of traditional values, they are at the same time held responsible for efficiently solving social problems.

The nature of the interaction between value and technology is bound to play a considerable role in the determination of any "Futurible." Likewise the effectiveness with which any futures methodology handles it will directly bear upon the accuracy of the output, and the key to this process is the researcher's ability to handle social values.

These introductory remarks have been somewhat lengthy; however, it has been an attempt to establish the background for a relatively new type of academic activity. Future studies is strange in its form insofar as it is not and cannot even pretend to be a science. In content it deals with ambiguous possibilities,

and so to be accurate, its output must reflect uncertainty. This new discipline cannot provide unique answers to questions which have no unique answers. Practitioners, therefore, must become acclimated to the prospect of dealing with uncertainty and estimates subject to large margins of error.

II. Examination of Existing Approaches

Daniel Bell in a comprehensive article⁵ has outlined a dozen different processes which in one way or another attempt to project future states. While this comprehensive if not exhaustive listing is informative in a general sense, we shall limit our view to three general categories and examine them in some detail.

In deciding upon this approach, a number of criteria were used. First, we are anxious to concentrate on types of future studies which are currently in practice. Second, we are anxious to examine the process of synthesizing two basic approaches: hard or mathematical extrapolation of existent data and the superposition of intuition or conjecture on this data.

We will begin by examining the nature of extrapolation and projection, and then turn to the more intuitive practice of scenario writing. Finally, the operations analytic approach will be explored, as it seeks to systematically join the first two.

A. Extrapolation and Projection

The most common and in many ways most convincing method of looking into the future involves projections or extrapolations. In examining this process, we shall note the internal assumptions as well as the content or type of data which can be manipulated.

Extrapolation is a procedure whereby, on the basis of past trends and a present reference point, estimates of future values of a phenomenon are calculated. This method is widely applied by social as well as physical scientists. The economist may estimate the future value of GNP by applying an empirically determined rate of change to a current value and by mathematical manipulation arrive at an estimate for some specified time in the future. The same type of procedures are followed by demographers, planners of all sorts, businessmen, etc.

The internal mechanism of interest here is the notion of "rate of change." In fact, not all things do change, and so in some cases the rate of change may be zero--it is fair to predict that certain institutions (election dates, etc.) will have a fairly constant impact over the coming years.

But many things do change, and this is of course the reason that there is concern with the future in the first place. A rate of change (which assumes a coherent pattern exists) may be positive or negative (speeding or slowing), and it may in fact

itself be increasing or decreasing. It could under some circumstances assume a pattern of oscillations.

Populations of many countries, for example, are increasing at a relatively constant rate, perhaps two or three percent per year. If it is possible to assume that rate of increase is constant, then it is easy enough to calculate total population figures five, ten, or twenty years in the future. On the other hand, if the rate of change were to drop from three percent to two percent increase, we would say that the population is increasing at a decreased or possibly decreasing rate.

This is, of course, the rub. Extrapolation is effective as long as the rate of change (or change in the rate of change) is constant. On the other hand, it is most difficult to know if and, of equal import, when it might be likely to vary and by how much.

The same holds in all respects for decreasing trends. The declining importance of rail passenger travel may appear to be headed toward zero, if the present pattern holds.

Oscillating trends are possibly the most difficult to cope with as they reflect repeated reversals in the direction of change (increase, then decrease, then increase, etc.) to say nothing about possible rate changes. The continual ups and downs of the traditional business cycle as reflected in per capita

income was an example. In this case, it was fairly certain that the oscillation would take place, but it was much more difficult to predict the frequency or the amplitude of the reversal.

From these general cases, it can be seen that extrapolation is an extremely valuable if complex tool. On the other hand, in spite of its hard mathematical foundation, the method must be applied with good intuitive sense.

It is mathematically a fact that any constantly increasing quantity (population, GNP, etc.), extrapolated over a sufficient number of periods, tends toward infinity. This is not, of course, a relevant answer to any sort of planning or forecasting problem; hence, it must be modified. The demographers who are clearly capable of making accurate mathematical projections demonstrate the point very well. Kahn⁶ notes that a naive projection of world population from current data alone would produce an estimate some what in excess of seven billion people in thirty years. Many experts, though, feel that the figures will be more in the range of five and a half to six and a half billions and most likely closer to the lower of the two.

This means that the experts feel that the rate of increase is going to change, to decrease over the next thirty years. While there would probably be little agreement upon causes, the general agreement on effect may lead one to conclude it a likely

occurrence, and not one precisely predicted by the mathematics of the model.

Without going into any detail, it is worth mentioning the Rand method⁷ of using envelope curves for long range projection. In attempting to evaluate the overall volume of a phenomenon (public transportation would be a possible example), the systems analyst would construct a composite graph showing the contribution of various technological approaches to the whole over a period of time. Each separate approach would show an initial rapid increase in passenger capacity and then a leveling off of its output at some relatively constant value. The result is a set of superimposed, kneebend curves sloping up and then to the right. By looking at the collection of curves and imputing a general slope to the set, the rate of increase of the phenomenon could be estimated without undue concern for particular cases of innovation and obsolescence. The results of this approach have apparently been rewarding and again emphasize the need to avoid being bound by undue rigor in addressing a less than rigorously defined problem.

In considering mathematical analysis of various types of trends, it is probably fair to conclude that there is a general tendency for numerous types of changing phenomena to experience a period of rapid growth, and then at some point to level off

and hold approximately constant. It is clear, for example, that the current rapid increase in population cannot continue indefinitely and in fact that there will have to be a time that the rate of population increase equals zero or possibly exhibits a moderate oscillation. The current increase in fact is fairly easily attributable to the rapid and uneven extension of medical technology to the underdeveloped countries. This is clearly not a permanent state of affairs. Likewise, the great increase in privately owned motor transport in the West seems as though it would have to level off, particularly if the predictions of increased urbanization are accurate.⁸ Whether increases in phenomena such as power production or personal consumption will also fit this pattern remains to be seen. The point to note, however, is that during periods of rapid increase of a given factor, the mathematical projection must be handled with extreme care. Intuition and good sense must be applied to questioning the likely duration of rapid growth and possible leveling off points.

Finally, brief mention must be given to the timing of events. Extrapolation has a tendency to be done in isolation: it does not easily reflect the impact of related events upon the particular event in question. The impact of exogenous factors can be only estimated and, in so doing, special emphasis must be

given to the problem of establishing time sequences. Synergistic effects, the product of combination of various developing factors, cannot be overlooked, yet demand almost uncanny insight. The inter-relationship of transistor development, computer technology, and the space program, for example, give some indication of the complexity of this aspect of forecasting.

Perhaps the comments in this section have seemed singularly directed toward the denigration of mathematical projections. This overstates the case; they are undoubtedly a most valuable tool. We seek only to dampen euphoric estimates of their capabilities and to point out that there is by the nature of the problem a substantial role for the proper application of intuition.

B. The Application of "Expert" Intuition

The use of intuition has long been a part of the role of politician, diplomat, businessman--all of those who are in position to guide the affairs of society--as well as laymen who attempt to successfully guide their private affairs. In the art of projecting the future, there has been a substantial attempt to bring order and consistency to the application of intuition through the processes of discussion, criticism, feedback, etc.

Bertrand de Jouvenel directs "Futuribles," a research organization in Paris which he hopes one day will lead to the

involve the synthesis of a number of the stronger points in the various approaches. In developing a more comprehensive method, the main emphasis should be given to a) producing a background statement of fairly constant long run trends, b) the "Delphi" estimate of possible technological innovations, c) a "Delphi" estimate of social value developments, and d) the combination of the first three in simulation exercises for the production of "futuribles" and examination of particular problems.

GEOGRAPHIC APPLICATION OF FUTURE STUDIES

A. A General Conceptual Approach

We begin by assuming that the conjecturing of the future is a legitimate art within the somewhat vaguely defined methodological limits. We further assume that there is no intrinsic condition which would prevent the narrowing of such prevision to a particular geographic area; in this case, Africa. People make predictions of the future, that we know. The way in which they "cognize" or "know" the future is contestable; nevertheless, Africans, African governments, and outside observers do "plan" the future, the future of Africa. That is why we have five and ten-year national plans.

Now there is a basic fact to be noted, Predicting the future of anything implies knowledge of the past and present conditions of that "thing." Let us represent out "thing" here by X , and the time blocks associated with X by $F(0, 1, 2 \dots k)$. X can stand for an institution, an idea, an event, or various combinations of them. We represent the corresponding changes in the "status" of X in blocks of $X(0, 1, 2 \dots k)$. That is, at time $F(0)$, $X(0)$ existed as a "fact." If, as we here assume, $X(2)$ at time $F(2)$ is a future of first $X(1)$ and, by telescoping, $X(0)$ at times $F(1)$ and $F(0)$ respectively, then, similarly, $X(0)$ at time $F(0)$ was a future of another "thing" which produced it. The process resulting in successive

$X(0, 1, 2 \dots k)$ could be by evolution, mutation, unpredictable accidents, or, most likely, some combination of these. In this conception, the "present" is a "future" of a given "past," just as a "past" was once a "future" and later a "present" of something.

Furthermore, let us take $X(k)$ at $F(k)$ to represent the "thing" at the present moment in time. The word "thing" is merely a designate here. We have used "F" as time-designate and not the conventional "T" notation to keep our thoughts on the idea of the "future." $X(k+1, k+2 \dots k+n)$ represent possible futures whose time blocks could be compartmentalized into $F(k+1, k+2 \dots k+n)$ respectively, depending on how far into the future one intends to "look."

Therefore, any researcher of X must have accurate data (and the knowledge of their relationships of past and present of X). That is an absolute requirement. After knowledge of past and present of X , there will emerge two characteristics about the future of X . First, there will be desirable (dominating and masterable)¹ futures of X . Second, there will be the undesirable (dominating and masterable) possible futures of X .

The desirable possible futures of X will induce resource allocation according to the intensity of desirability. The undesirable possible futures of X will fall into two categories: masterable and dominating. The first category will elicit a

reactive and preventive response in resource-allocation according to the intensity of physical and psychological deprivation associated with it. The second category, on the other hand, will draw the response of resignation to fate or destiny. This latter category suggests the degree of determinism in the possible futures of X. Of course, the consequences of the inevitable aspects of the future of X will produce adaptive and adjustment mechanisms of their own.

We suggest, therefore, that the analysis preceding the predictions of future X must necessarily take all of the above into account.

B. The Role of Accidents

De Jouvenel believes that accidents play a large role in determining the future. A researcher can make allowances for "accidents," but accidents by definition are unpredictable. From this standpoint, future studies must proceed on the basis of the ceteris paribus principle; that is, barring accidents, such and such future will come about.

Since our focus is Africa, we are well advised to accord greater consideration to social, historical, political, and personality accidents. But to concede this much is to raise the question of relevance altogether.

Intuitively it appears to us that for sometime in the future

these combinations of accidents will play significant roles in the type of futures which emerge in Africa. Some indicators may be sighted in support of this intuition. First, there are sufficient data to suggest that African politics is the politics of individual leaders and personalities. It makes substantial difference, then, who becomes the Prime Minister, the Governor, or the President. The "man" can alter the whole course of the history of his society--for good or evil. There is reason to believe that a single social policy may create more than a piecemeal change in such situations. The change may be grandiose and far reaching.

Second, African social and political institutions are fluid, impermanent, unsteady. They are far less reliable as guides for continuous social evolution. The process of institutionalization itself cannot be taken for granted. It demands critical study as what is institutionalized may be due to no rational choice and calculation, but to chance.

Third, this idea of discontinuous and unpredictable social evolution suggests that the findings of the researcher in future studies may be falsified owing to no faults inherent in the study or its methods. This introduces a high degree of contingency to the statement of such findings. A highly tentative statement of probabilities necessarily casts doubts on the reliance and

relevance of such studies.

There is no way of avoiding this fundamental problem. The degree of success of any future study will depend upon the recognition and careful analysis of social and political discontinuities by those undertaking the study.

C. Future Studies and Africa

Are future studies applicable to Africa as a whole or in parts? Our answer is in the affirmative. But this must be qualified: one must be careful what generalizations one makes about Africa. The more relevant the generalizations, the narrower seems to be the area of effective validity.

Any applications should adapt the general features of future studies to the particular localities or peoples to be studies. What an analyst may safely predict about the Ibo people in Nigeria, for example, may become highly misleading when applied to the Bakongo in the Congo. The same may be said about Moslem Africa, particularly the Maghreb, and the peoples of Africa south of the Sahara and north of the Zambesi.

Such differences in localities and peoples can also carry over into the interests of the researcher. The interest of the latter may be geographically limited or culturally circumscribed. The combination of interests and localization of problems will have important bearing on the methods to be adopted, the adaptations

to be made, and the conclusions to be drawn. In the light of these observations, the following areas of application are more or less randomly singled out. Many of these areas, as we shall see, are receiving much attention already. We list and sketch them only to illustrate the range of possible application.

(1) Population. Here the demographic methods and their refined quantitative tools are unassailable. Every conceivable thing that is being done with demographic data elsewhere could be done in terms of future predictions with respectable accuracy in Africa.

(2) Economic Development. Here the economic tools of analysis can and are being used. GNP, per capita income, export and import trade, national wealth, balance of payments, all are being studied and lend themselves to quantification. However, there emerges a different dimension to this type of predictive accuracy once we raise the issue of quality and the meaning of "development" at the ethical and philosophical levels. Do these issues concern the predictor? Indeed they do: there are only three possible responses to future fact X. If we like X now, we try to preserve it in the present and project its status to the future (desirable future arising from a favorable present). If we do not like X, want it, or desire it, we attempt to nullify it, change its course, alter the expected but undesirable consequences,

and prevent X from occurring. If we do not feel that X is desirable or undesirable, we remain indifferent. Whatever happens does not matter to us in this third case. Inevitably, the predictor and those for whom the predictions are being made are caught up in the three choice processes as they affect both the predictions and the probability of the actual occurrence of X.

It should be recognized that the above two areas (one and two) of contemporary application reinforce each other.

(3) Industrialization. This could be measured quantitatively, too, as a special case of "modernization" (see Apter, Political Modernization). This is, of course, related to a fourth.

(4) Technology. By this we mean the use of technology for the modernization process. The predicted primacy of technology (and hence technocratic forms of social engineering, organization, and administration) has been indicated in the first two parts of this report. How do we go about predicting the consequences of technology? What of the knowable and unknowable but actual consequences? What of social dislocations and value, cultural, and moral dissynchronizations?

We do know that technology and industrialization go together. We also know that Africa is a borrower of technology. It seems reasonable to suggest that the more Africa borrows, the more will

be the impact of "external values" on the possible futures of Africa.

This issue was raised in the first part of this report. If technology becomes a primary force, as we have suggested, and Africa merely a perpetual borrower, then the originators of technological innovations and breakthroughs indirectly determine the future of Africa.

There are other areas of tension. The problems of social dissynchronization cannot be underrated in Africa because that process has not come to an end in relation to the legacies of colonialism and psychological subjugation. The fact of borrowing implies that the borrowing culture may not have the sentiments and values which are correlated with the technology in the "lender's" culture.

The areas of technological application can be easily mapped out, but the vast consequences of technological dependency, the immense problems of undigested or ill-digested technology, cannot be so easily mapped out in the social sector. It is the social ramifications of technological application and not just its visible areas of application which concern us. Any study must come to terms with these ramifications.

(5) Social Institutions. Here the possible evolution, revolution, or mutation of institutions can be studied. The

problem will be methodological. Intuitively we believe that methodological eclecticism is unavoidable. The genius of the competent researcher will show up in the combinatorial richness and relevance of the various methods, eg, decision-making theory, systemic analysis, case study approach, personality analysis, equilibrium analysis, cost-benefit analysis, gaming, simulation, etc. One difficult problem is whether and how the researcher can prestate his method with the rigor and precision that is called for in contemporary social research. Must he proceed in piecemeal fashion and then retrospectively state his method? It is the duty of the researcher to determine the appropriate combination of methods, bearing in mind his areas of interest.

Under (5) a number of institutions have been suggested for a study: (a) Education. This, linked with demographic data and quantitative analysis, can be useful in relating how many people are to be educated, how many are being educated at various age levels; the relation of educational policies, programs and institutions to national, geographic, man-power needs; problems of mis- and over-education can be dealt with in relation to the problems of socio-political stability and development. (b) Bureaucracy. This is one area in which a useful study could be done. More on this below. (c) Leadership succession is a significant area in which little is being done at the moment. (d)

Political Culture and Ideology. We know that ideology has become a significant factor, but both ideology and political culture as conceptual tools remain amorphous. It is difficult to study these in Africa because data is sparse, unreliable, costly to collect, and the educated population is under 10% of the total.

(e) Political parties, parliamentary institutions, assemblies, and constitutional institutions also can be studied.

It should be obvious that all the areas identified under section (5) are laden with research problems and value considerations which are not always mathematically manipulable. These difficulties notwithstanding, we have singled out bureaucracy, leadership succession, and the use of physical technology and education as important areas for possible future studies in Africa. These we believe will substantially determine both the profile and content (value and material) of the possible futures in Africa.

There are no easy and straightforward methods to use in the study of the above selected areas. For example, no researcher can go to Africa using, as he should, survey-interview techniques and tell the "relevant" or "socially significant actors" in the polity that he wants to study leadership succession, when most of the leaders want to remain in power for ever. Must he then lie about his project? Whatever he does he will remain suspect--

a soviet spy, a CIA agent, a saboteur, or an objective analyst. What of cultural bias in any presumed "objectivity"? Who should undertake the study, foreign experts or African experts? African experts are scarce and there may be few African sources of research funds to draw upon.

But suppose we are interested in bureaucracy, leadership succession, and technology and its social application. What approach can be recommended? First let us consider the problem areas before suggesting likely methods of approach: (i) Bureaucracy. We have to determine its composition, method and source of recruitment, education, levels of skills and expertise, stratification, policy and instructional inputs from politicians, policy outputs, efficiency in execution, perception of roles and functions by the actors, etc. Then we would need to determine the effect of the bureaucracy on political leadership, other social institutions and subsystem agencies. Further, and this is very important, we would need to measure changes in attitudes and values, and the socio-political effects of these changes. Perhaps we would need to develop an index of stability.

This index could be the measure of the gaps between possible technology and accepted technology, between technocrats and politicians, between value and social behavior on one hand and technological realities on the other. This could be called an

index of social synchronization. Fundamentally the social and cultural "causes" of the gaps must be discovered by the researcher.

Finally, we would then have to determine how these various factors will change "X" in any blocks of future time we desire (10, 20, 30, 40, 50 years).

(ii) Application of Technology. We can measure this in agricultural modernization, road building, industrial complexes, housing technology and various other ways. Employment problems can be related to education, mechanization of agriculture, demographic mobility (rural-urban influx) increase relative to absorption in gainful employment. The level of industrialization could be related to employment and labor population. This may in turn result in the understanding of the need and capacity for social engineering in the area. The new breed of technocrats can be studied over time and the discerned systemic changes recorded.

(iii) Leadership Succession. We submit that this is the most interesting social phenomenon in contemporary Africa. Future trends will most probably be discernable from it. The role of "accidents" is most crucial here, and it could be perceived in the following process: charisma, personal leadership, loyalty and legitimacy, and the institutionalization of charismatic personal leadership. How these could be projected into desirable futures will remain a problem for the researcher.

In one party states, for example, succession in party leadership may determine political and social succession, especially in those areas where the party is the state and, extensionally, the party leader becomes the party and the state. The sway of whims, discontinuities and fluctuations will make "confident" predictions almost impossible. But such possibility should not be prejudicial to objective consideration of such states.

This observation follows that expressed by de Jouvenel that the more rapid the rate of change the less predictable the future becomes. Predictions will in such circumstances necessarily be limited to shorter periods.

Where the party and the state could be distinguished, leadership succession in the party and in government would have to be examined separately but in relation to each other. The role of business leaders, trade union leaders (in short the various "social elites") will demand close attention as they determine political leadership succession.

The "electoral system" may yield some patterns of leadership succession, but above all the military will require closer scrutiny. Contemporary Africa is coming close to replacing the avant-garde nationalists of the "colonial-independence" era. Who will take their place? How will the replacement take place: by coups or semi-coups, by the collusion of a civilian-military

alliance? This bears critical watching. Are there spill-over effects of coups from one state to another? Is the military a reasonably reliable social reformer?

D. Methodology

For these areas which we have singled out as relevant and interesting, we have discussed the application of a modified Delphi technique and a further modification of Helmer's simulation technique. The following is an outline of the approach (bearing in mind the combinatorial, methodological suggestions above).

There will be three levels of analysis: (1) Experts using the questionnaire Delphi-technique will project their analysis of bureaucracy, leadership succession and technological application (as examined above) into specified future time blocks $F(k, k+1, k+2 \dots k+n)$.

(2) The actual participants in these institutions---bureaucrats, technocrats, political, government and party leaders---will project their own futures and those of their respective institutions as they perceive them and act toward them. (3) Then a third group of experts, possibly the research team, using survey research methods, interviews, etc., will ask the actors to "predict" the futures of other institutions in which they are not direct actors. For example, bureaucrats will look at the political leaders. Politicians will view technicians and

bureaucrats and be analyzed in turn by the other two groups.

The results will be formidable and perhaps unwieldy. If they are manageable at all, they can hardly be expected to coincide at all three levels. It is from this "bank of projected data," however, that a final prediction of the possible futures will be made.

As we have suggested, this approach goes beyond Delphi technique. It also corrects the drawback in some approaches by using actual actors instead of pretenders or simulators to measure responses. It seems correct to suggest that no matter how closely the simulator can understand the real actor, he is never in the real situation and he can never feel what the real actor feels.

Whatever is the method adopted, one thing stands uncontested: it will be the combination of many methods and approaches.

The ideas suggested here fall far short of a research design. We seek not to undertake a research design because of the values, preferences and sensitivities involved in the researchable topics selected. Working out a research design should follow, after the researcher has determined the parameters of his interests, with an eye on how and by whom the research would be supported, and

for what ends. It is very difficult to detail how future studies could be applied specifically to Africa. The continent is vast and changing rapidly. But we are confident that the areas we have sketched will generate new interests, ideas and researchable topics for the scholar interested in the social forces which will determine the possible futures in Africa, or any developing area of the world.

FOOTNOTES

Some Philosophical Issues Involved in Futuribles

¹Bertrand de Jouvenel, The Art of Conjecture, Basic Books, New York, 1967.

²This may be breaking down in America as social dissynchronization increases.

Future Studies Methodology

¹These are explored in some detail in Olaf Helmer, New Developments in Early Forecasting of Public Problems: A New Intellectual Climate, Rand Corporation P-3576, April 1967, pp. 1-4.

²de Jouvenel, op. cit., pp. 14-19.

³Herman Kahn and Anthony Wiener, The Year 2000, Macmillan, New York, 1967. This book is characteristic of the type of speculation being carried on by the Hudson Institute.

⁴de Jouvenel, op. cit., pp. 16-17.

⁵Daniel Bell, "Twelve Modes of Prediction," Daedalus 93, Summer 1964, pp. 845-880.

⁶Kahn, op. cit., p. 36.

⁷Ibid., pp. 34-39.

⁸Ibid., p. 7.

⁹de Jouvenel, op. cit., p. 277.

¹⁰Bertrand de Jouvenel, Futuribles, Rand Corporation P-3045, January 1965, p. 1.

¹¹Ibid., p. 6.

¹²Ibid., p. 12.

¹³Kahn, op. cit., pp. 5-9.

¹⁴Ibid., p. 5.

¹⁵Ibid., p. 7.

¹⁶Ibid., p. 9.

¹⁷Ibid., p. 6.

¹⁸Olaf Helmer, Social Technology, Basic Books, New York, 1966.

¹⁹The study was a term project for a course taught by Professor Villegas at Cornell, spring 1968. It is unpublished. The methodology employed comes from Olaf Helmer, A Use of Simulation for the Study of Future Values, Rand Corporation P-3443, September 1966.

²⁰Olaf Helmer, The Use of the Delphi Technique in Problems of Educational Innovation, Rand Corporation P-3499, December 1966.

²¹Helmer, Simulation, op. cit.

Geographic Application of Future Studies

¹This terminology comes from de Jouvenel, Conjecture, op. cit., p. 52, and refers to the distinction between those futures which man may influence and those beyond his powers.

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This article of considerable scope focuses on the processes of prediction as they are explicitly and implicitly manifest in the social sciences. It is essentially a conceptual rather than methodological background.

Helmer, Olaf. Social Technology. New York: Basic Books, 1966.

The description of the Delphi technique in detail is augmented with an example of its application.

_____. A Use of Simulation for the Study of Future Values. Rand Corporation P-3443, September 1966.

Helmer provides a detailed account of his simulation exercise for determining various futures. Included are sample forms and procedures.

de Jouvenel, Bertrand. The Art of Conjecture. New York: Basic Books, 1967.

De Jouvenel's work is a sophisticated, readable discussion of the nature and philosophy of future studies. Its value lies in providing a conceptual orientation rather than elucidating a specific methodology.

Kahn, Herman, and Anthony Wiener. The Year 2000, A Framework for Speculation on the Next Thirty-Three Years. New York: Macmillan, 1968.

A full description of the Hudson Institute approach to future studies including the "Standard World," analysis of long term trends, and "surprise free" projections. A wealth of data, analysis and scenarios are included. Despite the predominant consideration of "defense" problems, the method and application are illuminating.

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FUTURE STUDIES METHODOLOGY

I. Background

A. The Assumption

A modern approach to future studies explicitly or implicitly is likely to proceed from three major assumptions.¹

- 1.) The future is not determined or unique.
- 2.) The future is not unknowable.
- 3.) The future can be affected to some degree by the efforts of men.

It is from these assumptions that future studies derive both its validity and its value. An assumption however, is just what it says, that is, a statement which assumed and not susceptible to rigorous proof. Since in this case they are to be used as the fundamentals upon which the methodologies are to be built, they must be given some preliminary consideration.

The question of determinism should not have to be noted but for the religious scholarly dogma's of the past. The former asserted a fixed nature to man's destiny (or doom), while the latter sought the proper key to unravel the mysterious patterns of the process. The more modern political "philosophies" of both East and West reflect such traditions. The West argued until most recently for a political and economic state

of laissez faire on the ground that let alone, everything would come out as it ought. Meanwhile, the other half felt they had discovered history's primary variable and were doing all they could to help it to its inevitable conclusion.

Perhaps a more convincing case could be constructed for a purely physical determinism. It is possible to argue that all mass, energy and motion in the universe lie in a given relationship and that a change in one results in predictable changes in the others. Hence, once the juggernaut is in motion, there is no stopping or guiding it.

The problem with any such approach is that it is immediately susceptible to absurd reductionism which renders it as valueless as an analytical tool. It should be recalled that physical sciences have been productive in spite of their inability to proceed from or explain in reducible fundamentals. As a result, even if there is a rigid pattern, it is existent at a level of minutia which is not directly relevant to the phenomena that men observe, experience, and or expect to deal with in social studies including those which seek to deal with the future.

If the future is not perceptibly determined, it follows logically that it is not unique. Bertrand de Jonvenel argues that men are confronted by a "fan of possible futures" each

each possessing a given probability of occurrence.² These possible futures are what de Jouvenel refers to as "futuribles." The probabilities of each are most complex depending upon the nature of events, the relative timing of events and synergistic product of their combination.

It is these probabilities, however, complex, which enable us in a sense to "know" the future. This is in accord with the second assumption. It could be argued that all we really "know" is in the instant of the present, and that both past and future are subject to increasing uncertainty as they depart from that point in time. On the other hand in spite of uncertainty, there are many things which we expect from the future and in turn we nurture those expectations because they have proven relevant in past similar circumstances. If this usage is not in accord with the most rigorous analytical definition of the term "know", it certainly would be acceptable for operational purposes.

Clearly some future possibilities are more likely or probably than others, and in large part it is the task of future studies to sort things out on just such a simple-minded basis. By extrapolating various trends, predicting likely technological events and characterizing men's reactions to these changes, it is possible to assert with some confidence

the likelihood of a given future. In addition, to the assessment of the probability of individual futures, it seems unavoidable that some of these would be judged by various criteria, more desirable than others.

This brings us to the third assumption; that man is able to alter the possibilities of the futurables. It is intuitively obvious, that if a future is at the same time undesirable and undetermined, by reviewing the hypothetical sequence of events leading to it, alternative policies could be constructed with the aim of reducing the probability of its occurrence.

This in fact is constantly, if not too systematically, taking place. Legislating, planning, precedent and procedure all assume a generally knowable future and are examples of efforts to influence it. Concepts such as capital, discount and production are based upon the expectation of influencing economic processes in the future. At the most basic level consistent individual behavior and the formation of institutions all exist in part to inflict predictable patterns on a less than certain future and rest implicitly on the empirically derived belief that they will be effective in so doing.

We noted that the ~~future~~ value of future studies emerged from these assumptions. It is clear that if the future were categorically unknowable the whole concept would be void. If the future was knowable but determined, future studies might be able to discover the pattern, but its value would be purely aesthetic. It is in fact man's ability to guide his future which adds a substantial pragmatic value to the process as he seeks to avoid possible disasters and to maximize the utility of the available resources.

B. Planning

Before turning to the methods proposed, there are a number of other futures related issues which should be considered. It is in line with the third assumption that future studies becomes inextricably involved with the actual process of evaluation, policy planning and implementation. While studying the future, however, unlikely, may be under taken for its purely aesthetic value, if it is accurate and the methods involved are coherent, then it becomes an invaluable commodity in the eyes of those charged with the responsibility of policy formation. Such a state of affairs is often the setting for possible abuse and in this case both in terms of procurement of experts and techniques and in the ~~making~~ mode of application.

What
Closely related to this is the problem of evaluating future alternatives. While these alternatives may be outlined using future's methodology, these techniques do not provide criteria for evaluation. These must come from the decision makers and will as such reflect their personal value judgment. Further, their decisions may or may not be subject to public accountability as the complexity of techniques and subtlety of application may obscure motives to all but the most astute observers.

C. The Self-Fulfilling Prophecy

There is another concept which is even more directly related to the pure data of future studies and which has considerable implications for any given society. The concept of the self-fulfilling prophecy is at best elusive: once an event takes place it is virtually impossible to decide with rigor how it was brought about and whether men were actually unconsciously acting out their worst (or possibly best) premonitions. However, phenomena such as the band wagon effect and the power of fads and trends, the force of habit and the susceptibility of humans to suggestions, intuitively causes one to consider its existence in some form, a distinct possibility. For example observations that this society is undergoing racial polarization and there it is likely to

increase in years to come (the suggestion of a futurable), in a sense may give license to the associated dismal practices. In this sense the prediction may actually nurture the condition which it seeks to condemn by presupposing its existence.

In this way the most ivory tower bound futurist is confronted with the same problem as the scientist who develops a deadly bomb or gas. While he may not be able to destroy or undiscover the logic which inexorably leads to a given invention or innovation he must be aware of his responsibilities and avail himself of all possibilities for explaining the risks which tend to accompany almost all new technological advance. One clear example of such problems surround the activities of the Hudson Institute and their projects designed to "think the unthinkable".³ While it may be undertaken as an academic exercise, great fear has been expressed that the "unthinkable" might become common place and hence, while gaining momentum, the grounds virtual reflex actions.

The danger in such circumstances is great indeed, yet it cannot be avoided only controlled, if future studies are to realize their potential benefits. That is, the systematic exclusion of "unthinkable" futures is more likely fraught with danger than their concerns and careful consideration.

They must not, however, be allowed to become the criteria for their unconscious fulfillment But rather for their explicit avoidance.

D. Value and Technology

We have thus far mentioned on several occasions the problem of values in relation to future studies. The role of value judgment is considerable both in the form and the context of the different approaches.

De Jouvenel points out repeatedly that investigations of the future are largely conjecture and definitely not science.⁴ The latter is quite clear; the methodology of science requires empirical testing for the validation of its hypotheses. This is categorically impossible when dealing with events which have yet to take place. As a result, conjecture inevitably skewed by value biases, plays a substantial role in the way one views the future and it is not subject to empirical correction.

The content of such studies is likely to be even more value oriented. In the first place one must establish a general setting or point of view for the study. Obviously there are many ways to usefully characterize the world none of which are interpreted or value free. Olaf Helmer for example has suggested that the conflict between technology and social value structure would provide a basic framework.

*This you
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know the
future.*

In this context, future projections are derived from estimates of technological innovations and their impact as they are admitted through society's value screen. That is, the social consequences of nuclear technology depends upon the value map and related judgments which determine how and under what circumstances it is to be applied. The expanding field of genetic engineering is bound to go through a similar screening process as its social relevance is established.

Such a point of view seems to provide an acceptable approach to the content of futuribles, however, the nature of the clash or interaction of value and technology must be considered in somewhat more detail. Both value judgments and technology provide criteria for decision making. In simplest forms, conflict occurs when they suggest different answers to the same decision problem the clash occurs.

There are two basic types of social issues to which answers are constantly sought: first, is the definition of social problems, and second, the choice solutions. Simply, this analytically separates the notion of "what to do" from "how to do it." At first glance, it would appear that this distinction would establish clear boundaries of decision competence: values for determining the existence of a social problem, and technology for choosing the most efficient

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solution. It is not nearly so simple however, and this may be credited to a phenomenon which could be described as technological lag. Briefly, this characterizes the case in which a value judgment outlines a social problem for which there is no established technique for solution.

This leads to an interesting situation where in the absence of technology, problem solving is undertaken by methods which are grounded on emotive rather than empirical criteria (e.g. resorting to "fiscal" responsibility " in the face of a recession). These methods in time gain the legitimacy of tradition if not effectiveness and so when appropriate technology is developed its' application may be blocked or distorted. Political decision makers may find this a particularly acute dilemma. The defenders of traditional values, they are at the same time held responsible for efficiently solving social problems.

It is fair to say that the nature of the interaction between value and technology is bound to play a considerable role in the determination of any "futurible". Likewise the effectiveness with which any futures methodology handles it, will directly bear upon the accuracy of the output, and key to this process is the researchers ability to handle social values.

This assumes that ideally new technology should always take precedence - This has never been accepted by society always prefers that which has been known & experienced.

These introductory remarks have been somewhat lengthy, however it has been an attempt to establish the background for a relatively new type of undertaking. Future studies is strange in its form insofar as it is not and cannot even pretend to be a science. In content it deals with ambiguous possibilities and so to be accurate, its output must reflect uncertainty. This new discipline cannot provide unique answers to questions which have no unique answers. ~~Practitioners~~ Practitioners therefore must become acclimated to the prospect of dealing with uncertainty and estimates subject to large margins of error.

II. Examination of Existing Approaches

Daniel Bell in a comprehensive article⁵ has outlined a dozen different processes which in one way or another attempt to project future states. While this comprehensive if not exhaustive listing is informative in a general sense, we shall limit our examination to three categories and examine them in some detail.

In deciding upon this approach, several criteria were used. First, we are anxious to concentrate on types of activity which are currently in practice. Second, we are anxious to examine the process of synthesizing two basic approaches: hard or mathematical extrapolation of existent data and the superposition of intuition or conjecture on this data.

We will begin by examining the nature of extrapolation and projection, and then turn to scenario writing. Finally, the operations analytic approach will be explored, as it seeks to systematically join the first two.

A. Extrapolation and Projection

The most common and in many ways most convincing method of looking into the future involves projections or extrapolations. In examining this process, we shall note the internal assumptions as well as the content or data which can be manipulated.

Extrapolation is a procedure whereby, on the basis of past

trends and on a present reference point, estimates of future values are calculated. This method is widely applied by social as well as physical scientists. The economist may estimate the future value of GNP by applying an empirically determined rate of change to a current value and by mathematical manipulation arrive at an estimate for some specified time in the future. The same type of procedures are followed by demographers, planners of all sorts, businessmen, etc.

The internal mechanism of interest here is the notion of "rate of change." In fact, not all things do change, and so in some cases the rate of change may be zero—it is fair to predict that certain institutions (election dates, etc.) will have a fairly constant impact over the coming years.

But many things do change, and this is of course the reason that there is concern with the future in the first place. A rate of change which assumes a pattern exists may be positive or negative (speeding or slowing), and it may in fact itself be increasing or decreasing. It could under some circumstances assume a pattern of oscillations.

Populations of many countries, for example, are increasing at a relatively constant rate, perhaps two or three percent per year. If it is possible to assume that rate of increase is constant, then it is easy enough to calculate total population

figures five, ten, or twenty years in the future. On the other hand, if the rate of change were to drop from three to two percent increase, we would say that the population is increasing at a decreased or possibly decreasing rate.

This is, of course, the rub. Extrapolation is fine as long as the rate of change (or change in the rate of change) is constant. On the other hand, it is most difficult to know if, and of equal import, when it might be likely to vary and by how much.

The same holds in reverse for all decreasing trends. Decreasing importance of rail passenger service may appear to be headed in the direction of an approach to zero, if the trend holds.

Oscillating trends are possibly the most difficult to cope with intuitively as they reflect repeated reversals in the direction of change (increase, then decrease, then increase, etc.) to say nothing about possible rate changes. The continual ups and downs of the business cycle as reflected in per capita income is an example. In this case, it was fairly certain that the oscillation would take place, but it was much more difficult to predict the frequency or the amplitude of the reversal.

From these general cases, it can be seen that extrapolation is an extremely valuable if complex tool. On the other hand, in spite of its hard mathematical foundation, the method must be

*Problem is not
but rate of change
but nature of change*

applied with good intuitive sense.

It is mathematically a fact that any constantly increasing quantity (population, GNP, etc.), extrapolated over a sufficient number of periods, tends toward infinity. This is not, of course, a relevant answer to any sort of planning or forecasting problem; hence, it must be modified. The demographers who are clearly capable of making accurate mathematical projections demonstrate the point very well. Kahn⁶ notes that a naive projection of population from current data alone would produce an estimate some what in excess of seven billion in thirty years. Many experts, though, feel that the figures will be more in the range of five and a half to six and a half billions and most likely closer to the lower of the two.

Probably This means that the experts feel that the rate of increase is going to change; to decrease over the next thirty years. While there would probably be little agreement upon causes, the general agreement or effect may lead one to conclude it a likely occurrence-- and not one precisely predicted by the mathematics of the model.

Without going into any detail, it is worth mentioning the Rand method⁷ of using envelope curve for long range projection. In attempting to evaluate the overall volume of a phenomenon (passenger travel would be a possible example), the systems analyst would construct a composite graph showing the contribution

of various technological approaches to the whole over a period of time. Each separate approach would show an initial rapid increase and then a leveling off of its output at some relatively constant ~~gain~~ level. The result was a set of superimposed kneebend curves sloping up and then to the right. By looking at the collection of curves and imputing a general slope to the set, the rate of increase of the phenomenon could be estimated without undue concern for particular cases of innovation and obsolescence. The results of this approach have apparently been rewarding and again demonstrate the need to avoid being bound by undue rigor in addressing a less than rigorously defined problem.

Generally in considering mathematical analysis of various types of trends, it is probably fair to conclude that there is a general tendency for numerous types of changing phenomena to experience a period of rapid growth, and then at some point, to level off and hold approximately constant. It is clear, for example, that the current increase in population cannot continue indefinitely and in fact that there will have to be a time that the net population change equals zero or possibly moderate oscillation. The current increase in fact is fairly easily attributable to the rapid and uneven extension of medical technology to the underdeveloped countries. This is clearly not a permanent state of affairs. Likewise, the great increase in privately owned motor transport

in the West seems as though it would have to level off, particularly if the predictions of increased urbanization are accurate.⁸ Whether increased in phenomena such as power production or personal consumption will also fit this pattern clearly remains to be seen. The point to note, however, is that during periods of rapid increase of a given factor the mathematical projection must be handled with extreme care. Intuition and good sense must be applied to questioning the likely duration of rapid growth and possible leveling off points.

Finally, brief mention must be given to the timing of events. Extrapolation has a tendency to be done in isolation: it does not easily reflect the impact of related events upon the particular event in question. The impact of exogenous factors can be only estimated and in so doing special emphasis must be given to the problem of establishing time sequences. Synergistic effects, the product of combination of various developing factors, cannot be overlooked, yet demand almost uncanny insight. The inter-relationship of transistor development, computer technology, and the space program, for example, give some indication of the complexity of this aspect of forecasting.

Perhaps the comments in this section have seemed singularly directed toward the denigration of mathematical projections. This overstates the case; they are undoubtedly a most valuable

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tool and we seek only to dampen euphoric estimates of their capabilities and to point out that there is by the nature of the problem a substantial role for the proper application of intuition.

B. The Application of "Expert" Intuition

The use of intuition has long been a part of the role of politician, diplomat, businessman--all of those who are in position to guide the affairs of society--as well as laymen who attempt to successfully guide their private affairs. In the art of projecting the future, there has been a substantial attempt to bring order and consistency to the application of intuition through the processes of discussion, criticism, feedback, etc.

~~Bertrand~~ Bertrand de Jouvenel directs "Futuribles," a research organization in Paris which he hopes one day will lead to the establishment of a "Surmizing Forum." This is described as a public policy oriented institution "to which experts from very different fields will bring special forecasts so that they may be combined into more general forecasts."⁹

De Jouvenel's "Futuribles"¹⁰ thus far has produced in the neighborhood of a hundred scholarly essays in which experts speculate on likely future changes in a variety of fields. The method utilized in producing "reasoned conjectures" involves the "author giving his opinion . . . that things will shape up in a certain way, more or less by a certain time, /and/ describe the steps whereby that shape will be achieved, that situation will be

reached."¹¹

The way in which these specific conjectures are generalized by the "surmizing forum" is not made clear by de Jouvenel and he certainly does not produce any rigorous framework for analysis and evaluation. Likewise, there is not formal set of empirical projections constructed by the experts and which would serve as guidelines and boundaries for the various essays. (One may assume that the experts are implicitly aware of such things.)

A similar rather unstructured intuitive approach was taken by the French "1985 Work Group,"¹² which was established to look at social and economic futures. Here the procedure involved "ten wise men" who listened to twenty reports of future expectations, mostly prepared by government departments. The members of the group then expressed their reaction to each report and these were noted by junior civil servants who in turn produced a comprehensive report under the guidance of the Plan Commissioner.

Again, while the role of intuition is admittedly indispensable, its subjective nature means that it must be handled with great care and as systematically as possible.

The Hudson Institute provides an increment in the level of sophistication with which expert intuitions are produced and manipulated. The procedure is outlined in The Year 2000 and noted above. The most important advance lies in the projection of a background against which ~~intuitive~~ intuitive future estimates are constructed.

While the emphasis of the Hudson ~~of~~ work leans toward international problems, its method regardless of content is relevant. To create the background, a concept of "surprise free" projection is used to produce a "standard world."¹³ This procedure is just what it sounds like. The best empirical projections and extrapolations, modified by good sense, are combined with a number of basic long term trends to produce a surprise free projection: the general state of the world barring totally unforeseen events of great impact which could possibly arrest or reverse trends of long standing.

The extrapolations form the baselines or limits within which the rest of the estimation must take place. The variables involved include population, GNP, energy sources, literacy, etc. A limit, for example, would operate to confine predictions of industrialization within the possible availability of energy, literacy skills, etc.¹⁴

The long-term trends of a more general nature involve increasing secularization, expansion of the meritocratic elite, expansion of technological know how, etc.¹⁵

The "Standard World" and several variations produced by the ~~the~~ surprise free projection is taken as the environment for more detailed examination and analysis of specific issues. It should be taken as only one possible though likely norm for comparison and provide the basis of discussion and criticism; it is important that the standard world not be considered rigid or

certain. It is most likely that there will be both political and technological "surprises" before the year 2000.

Hudson uses several variations on the standard world to provide a degree of latitude while maintaining a consistent base for analysis. Their "Canonical Variation"¹⁶ suggests that the standard world may show a very general trend toward 1) increased cooperation and integration, 2) strengthened nationalism and low level ~~level~~ of cooperation, or 3) minor but relative constant conflicts.

The standard world and its variation are the starting point for issue analysis using the scenario technique. This to some degree reflects ~~de~~ de Jouvenel's use of expert intuition. Scenarios as described by Kahn and Weiner are a "hypothetical sequence of events constructed for the purpose of focusing attention on causal processes and decision points. They answer two kinds of questions: (1) precisely how might some hypothetical situation come about step by step; and (2) what alternatives exist, for each actor, at each step, for preventing, diverting, or facilitating the process."¹⁷

The similarity between the scenarios and de Jouvenel's procedures are clear. It is not sufficient to surmise that an event is likely to take place in the future; it must be justified by a reasonably likely course of events leading up to it. One ~~might~~ would assume that this procedure would be considerably enhanced given the elaborately worked out general framework provided in

Kahn's approach

This is certainly the first step in bringing together the uses of projection and intuition. It is apparent, however, that the looseness of the intuitive proceedings, which by their nature are much dominated by a single individual's outlook, stand in ~~sharp~~ contrast to the relatively rigorous empirical extrapolations. The differences in the subject matter will necessarily produce this contrast to some degree, but it is important to inflict as much order and system as possible on the application of intuition.

C. Simulation and Operational Gaming

There are a number of approaches which methodologically systematize expert intuition. Helmer's Delphi system¹⁸ and his simulation exercise as applied in the Villegas, Latin American Village Exercise,¹⁹ are two examples. In both cases, the techniques force groups of "experts" to interact, reconsider, and refine their judgments.

Helmer's Delphi technique involves the use of successive questionnaires interspersed with added information and feedback.²⁰ The object is to produce opinion convergence on a given issue among a group of experts.

Without going into great detail, the procedure is somewhat as follows. A group of experts might be asked to estimate the year when mind expanding drugs would become commonly accepted.

- 1) The first questionnaire would simply ask the question

in as unambiguous a fashion as possible.

2) The second questionnaires ~~xxx~~ submitted to the respondents would be accompanied by the results of the first, and they would be asked to reconsider and, if so desired, to revise the first answer. If at this time a respondent's answer still says outside the interquantile range (middle 50%), he would be asked to present reasons for his disagreement.

3) In the third round, the results of the second ~~phase~~ plus the reasons expressed by the deviants are added to the questionnaires. Estimates are revised and those still outside the new or revised interquartile range would be asked to respond directly to opposing ~~xxx~~ arguments.

4) The fourth round consists of feeding in the previous results and arguments from step 3 and making final judgments.

Using this method, Helmer hopes to accomplish a number of things: first by distributing questionnaires rather ~~xxx~~ than getting the experts together for discussion, he feels that the personality, leadership, bandwagon effects, etc., are eliminated. Second, it is likely through an impersonal interaction of questionnaires and feed backs that the interquantile range will be decreased; and third, there are in some cases significant shifts in the median (rather than the average) response which is ultimately taken as the best estimate.

Once this phase has been completed, it is possible to take

a cross section through at some point in turn and note those events which have taken place and those which are likely to be on the threshold. This estimate then can serve as a guide for planning or possibly the basis for producing scenarios.

Helmer suggests two possible deviations from his basic method. First in the above outlined method of determining median and interquantile ranges, it is possible for the respondents to self evaluate their relative competence in a given area. This ~~if~~ provides a basis for weighting the questionnaire responses *Does* and, according/ to Helmer, improves the results. A second ~~variation~~ variation on the theme involves the use of a decision making format where participants act as planners who must divide resources among possible innovations or government action. The "possible" innovations could be estimated by the questionnaire method and the second variation used to establish a planning priority among them.

Both of these variations were incorporated in an experiment held at the University of Pittsburg Conference on the effect of technological change on American values. Helmer in this case presented a simulation exercise²¹ derived from the Delphi method but which specifically allowed for the introduction of participant values to alter the probable outcome. While Helmer was concerned with innovation in general, this ~~same~~ same format was used and perhaps is explained in greater detail by the exercise involving the future of a Latin American barrio which has been noted above.

The method is the same in each case and rates a brief examination.

Rather than using the questionnaire technique, the simulation involved direct group participation; somewhere between ten and thirty people is best. The group is in turn subdivided into perhaps ten smaller units and these are assigned specific roles in the simulated planning for and reacting to the future.

Recalling for a moment our opening remarks concerning the interaction of technology and values, both can be seen to play a role in this approach. Technology will set the limits on the possible courses open to the planners, values will influence their choice among them and the reaction of the "planners" to the consequences. *TX*

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The Simulation takes place in four phases:

- 1) There are two subgroups designated as planners. They are at the outset confronted with a group of technical innovations likely to be available during the planning period. Further, each planning group is given a world view which it is instructed to promote (individual social equality vs. maximum individual opportunity, for example). The planners are then asked to divide resources among various of the technical innovations which best promote their particular world view. Out of this we have designated World I and World II, two possible futures.
- 2) The second phase involves assigning social consequences to the innovations accepted or promoted by the two differen

worlds. If, for example, one of the worlds incorporates new developments in inexpensive public housing, the various primary and secondary consequences of such action are evaluated. Through various refinements, the most salient social consequences of each world are determined.

3) Next the social consequences were divided into three groups: a) those characteristics of World I, b) of World II, and c) of both. The Third group were immediately included as part of the future world. The others (a and b) are presented to perhaps six more subgroups, this time representing different groups in the society (students, political elite, housewives, etc.). Each group examines the total set of social consequences and by assigning preferences to each, comes to an overall preference for World I or World II.

4) Finally a weighting process for the groups in phase # 3 is undertaken. This is to establish the relative influence of the several societal groups in promoting or blocking the various social consequences of the actions anticipated by the planners for the two worlds. This phase assumes that planners must ~~be~~ to some degree respond to the attitudes of the planners and particularly to those more influential groups within the society.

With these four phases completed, it is possible to look back and determine which social consequences are acceptable to the weighted social groupings and from there to determine whether

and to what degree the future world will resemble World I or World II.

Finally, as noted above, with this as background, various sceanrios can be produced. These may describe the future world in general, combining in coherent form the policies and social consequences determined to be most probably. The scenarios may also depict specific happenings within the projected environment using the techniques described above for such writing.

This concludes our survey of a number of the techniques for future studies. We have tried to examine two techniques--projection and intuition--as they are brought to bear on the possible conflict between technology and value. The distinction between projection and intuition has been fairly clear throughout since this μ issue cannot be avoided in future conjecture--they in effecot from an exhaustive definition of the approaches. The clash between value and technology is not nearly so obvious as it is by no means necessary for the scholars of the future to view the world from this point of ^{view} ~~of view~~. It is really only in the Helmer simulation that the conflict is played out at all, and then the existance of technological lag is not handled explicitly. We will come back to this but it is well to point out that the assumption that the discovery ~~app~~ and application of technology are synonymous is just not tenable.

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III. Evaluation

Since remarks as to the adequacy of these various approaches have been made through out the body of the paper, the evaluation will be brief. It will concentrate on the Helmer simulation with the idea of using the other approaches to suggest possible improvements.

1) One thing which Helmer seems to lack is the hard background projection of the type suggested by Kahn in The Year 2000. This does not refer to the innovations which Helmer does specifically note, but rather the "surprise free" background. In all phases of his simulation, planning, determining social consequences and reactions, it would be of primary importance to be aware of such relatively fixed values as future population, literacy, GNP, etc.

2) In the simulation exercise, the source and the nature of the possible innovations is determined by those administering the exercise. One presumes they have been derived using the Delphi technique but this is not clear. Further, this Delphi application, as in the case of the simulation, should be carried on against a hard background of data extrapolations. There is in none of ~~the~~ Helmer's Delphi descriptions an indication that such limiting conditions are supplied to the "experts" along with the questionnaires.

In effect it seems fair to say that while Helmer had made impressive progress in the systematic handling of intuition, he has not made maximum use of the environmental factors which show

a relatively constant rate of change and hence are quite predictable.

3) ~~Passing~~ Turning to the use of management of intuition, one particular problem turns up in relation to the value constructs. It is illustrated by the results of the Villegas experiment, which we have not reviewed here; however, this does not preclude the possibility of looking into it.

In two of the operations it is necessary to create a value construct. First before instructing the planners to select policies to promote World I or World II, these worlds must be given a value orientation. In our example, this was presented as the non-exclusive alternative between ~~individual~~ individual social equality and Maximum individual opportunity. Value definition is also required on the part of the various simulated societal groups which are expected to react to the social consequences of the two lines of policy formation.

The problems result in first accurately portraying the likely present values of given societal groups and second the goal orientation of the planners (e.g., World I, World II). There may be a tendency to establish goals which seem reasonable to bourgeois American participants but which have little relevance to the action they are in fact attempting to simulate. This is likely to be particularly acute when attempting to apply the model to a problem in cross cultural situations. The disparity in culture and knowledge of the environment between ~~the~~ the real people and those attempting to simulate their attitudes and actions

may indeed be great.

Without going into detail the results of the Villegas exercise demonstrate the point. The squalid conditions in the simulated barrio were confronted with moderate ideas and moderate possibilities for action. The result was, that in thirty years, the barrio had hardly changed at all. Villegas notes this weakness and in fact suggests that if there were in the real world no more changes in marginal urban areas than the exercise suggests, the results would be catastrophic. He ascribes the difficulty to unimaginative and conservative inputs, which is approximately what we have been arguing here. The existence of extreme values and ideologies must be considered a likelihood both in regard to planning and public response.

A second problem related to the intuitive aspects of the model involves the concept of value change. While the whole procedure is geared to the examination of changing conditions, values appear to be taken as fairly constant. A solution to this problem is not obvious but merely assuming that values will change slightly if at all is just not acceptable. The changes in the United States world view over the last twenty years is remarkable on any scale and this must not be overlooked if a future estimate is to pretend to any validity at all.

This is probably the least manageable aspect of future studies. There clearly is no standard method for estimating long run social value changes. One can only suggest that considerable

time and attention be focused on the problem and every effort made to "psych out" value trends among different groups in society and the impact that various types of innovations would have on the trends. One possibility might be the application of the "Delphi" method to the problem of predicting attitude changes as well as technological innovations. The object would be for experts to evaluate the likelihood and timing of the emergence of various value patterns, and if successful would to some degree reduce the static quality which pervades an important part of the model.

In summary, it is apparent that none of the methods is beyond criticism. On the other hand, a valuable course might involve a synthesis of a number of the stronger points in the various approaches. The application of one in no way would seem to exclude any of the others.

The main emphasis should be given to a) producing a background statement of fairly constant long run trends, b) the "Delphi" estimate of possible technological innovations, c) a "delphi" estimate of social value innovations, and d) the combination of the first three in simulation exercises for examining particular problems and producing futures.

Footnotes

¹These are explored in some detail in Olaf Helmer, New Developments in Early Forecasting of Public Problems: A New Intellectual Climate, Rand Corporation P-3576, April 1967, pp. 1-4.

²Bertrand de Jouvenel, The Art of Conjecture (New York: Basic Books, 1967), pp. 14-19.

³Herman Kahn and Anthony Wiener, The Year 2000 (New York: Macmillan, 1967). This book is characteristic of the type of speculation being carried on by the Hudson Institute.

⁴de Jouvenel, op. cit., pp. 16-17.

⁵Daniel Bell, "Twelve Modes of Prediction," Daedalus 93 Summer 1964, pp. 845-880/

⁶Kahn, op. cit., p. 36.

⁷Ibid., pp. 34-39.

⁸Ibid., p. 7.

⁹de Jouvenel, op. cit., p. 277.

¹⁰Bertrand de Jouvenel, Futuribles, Rand (P-3045), January 1965, p. 1.

¹¹Ibid., p. 6.

¹²Ibid., p. 12.

¹³Kahn, Op. cit., pp. 5-9.

¹⁴Ibid., p. 5.

¹⁵Ibid., p. 7.

¹⁶Ibid., p. 9.

¹⁷Ibid., p. 6.

¹⁸Olaf Helmer, Social Technology, (New York: Basic Books, 1966).

¹⁹The study was a term project for a course taught by Professor Villegas at Cornell, spring 1968. It is unpublished. The methodology

employed comes from Olaf Helmer, A Use of Simulation for the Study of Future Values, Rand Corporation, 1966.

²⁰Olaf Helmer, The Use of the Delphi Technique in Problems of Educational Innovation, Rand Corporation (P-3499), December 1966.

PHILOSOPHICAL ASSUMPTIONS IN FUTURE STUDIES

The Idea of the Future

De Jouvenal contrasts the past and the future by contrasting, "what is accomplished or achieved and has taken unalterable form with that which is in progress, still fluid, and capable of ending or being completed in various ways."

This leads future studies to make the assumption that what is in the future can be manipulated. It also raises an interesting question on the nature of the present. If the past is known - in the sense that it was experienced - and the future is always not experienced, then the present is nothing more than a fleeting moment juxtaposed in between the two. On the individual level perhaps this attitude towards the past, present and future, makes sense in that the individual acting can order the absorption and use of data this way. On the other hand with regard to society the use of the past, present and future in this sense leads to some confusion. The present in terms of social action is not a moment in time. Rather, the present is extended to embrace the time necessary for the actors in society to perceive the relationships. To the extent that social phenomena is extremely complex one can even hypothesize that social relationships are not known (experienced) in toto and therefore social action exists on a level of cognition and belief. Since as social actors we cannot know the total range of relationships of the present we dwell only on the past and the

future. We experience that which is in the past and we look for possible futures on the basis of that. We logically 'jump' the present because we really cannot establish the relationships and their bearing on the social act at a moment.

Of the future then, it is assumed that it is not already determined since we have not lived the present to know what its bearing will be. The future further is 'knowable' in the sense that we expect some form of continuity, from the past and the present, to be related to what is to come. To the extent that acts, be they individual or societal have effects, the future is affected in a way we can never foresee by the acts of men. To argue that the acts have some bearing on the future is to only hypothesize the relationship and not the degree.

It is necessary to look at the history of man at different stages to clarify the previous section. Consider the hypothesis that traditional (non-scientific) man attributes the future to fate. Fate here stands for the concept that he has not power over the causal relationship in the future. On the other hand (rational) scientific man looks at the world in terms of causal relationships and is likely to argue that even though there are not clear empirical proofs there are laws which govern relationships over time and space. This has become particularly crucial in the post-Einstein relativity. Thus the future has attributes which in part stem from the past.

Thus we can speak of determinant factors, dominant factors, statistical impossibilities et cetera. Here the Fundamental assumption is the fact that things in the universe do not happen at random and that there is some order which can be studied and found out.

Significant also is the value idea that man seeks betterment. Future studies assume that by studying what is likely to happen choices will be made now to aid in affecting that which is valued as opposed to that which is not better. A relevant point here is that always it is better to use technology to aid man's work. This implies that technology and inventions will be used for the betterment of man. This puts emphasis on the newness. Therefore that which has been is not crucial since it is only used as a crucible into which one can dip at will but always looking for the new. The traditional is then not the prime mover but rather a millstone in many ways. The consequences of this assumption are phenomenal. One wonders whether at times man is not better off in keeping traditions. Psychiatrists have written extensively on the damage to personality resulting from stressing acquisition of the new at the expense of the traditional and the known.

The stress put on the new stems most immediately from the acceptance of the idea of change. This acceptance of change is more marked in Western societies because it is something real. It is something

4

real in the sense that it can be seen or cognated. Consider the slum dweller. If he wants a better house it is because better houses are real. They are in suburbia. This assumption in Future Studies does not take into account the fact that in some societies change is not real. In the developing world the change which most of the time is introduced by outsiders or those with outside influences is unreal to the social actors. To the peasant change does not represent real possibilities, rather it threatens what is rational and prudent, the tradition vindicated by time and experience. To change in the case of most of the world is to plunge into the unreal, the unknown.

The future in Western thought is seen as changing. Thus change as an idea becomes the prime mover of the future. The future therefore is non-directional but it clearly must change because not to change, in terms of values is to stagnate. De Jouvenal tells us that "Nowadays our positive value is change." Perhaps this is irrelevant if one has to study the future in traditional societies. Yet it has been suggested that one could assume that the "valuation" of tradition can be viewed as a dominant future (in De Jouvenal's meaning) for such traditional societies. The future researcher in such areas has to clarify the assumption he is operating on with regard to the attitude of such a society towards change. If change as an idea is rejected and the future

is seen as being in the hands of fate, man as an individual or as a collectivity cannot act and have any bearing at all on the future. His acts are perceived as rooted in the past and extending only to the very transitional present.

Man Desires Progress

All future studies assume that given choices man, individually and collectively will always seek to minimize cost and to maximize payoff. This assumption fails to take into account the fact that not all men or collectivities have the ability to distinguish the cost and payoff parameters. It is possible that in the area of social action that most of the time action is not based on actual cognition of any loss-benefit schedules. In such a case even though perceptions about future possibilities are not taken into account. Even where they are there is also the problem of their relation to the loss-benefit schedule.

Social inertia is defined as the principle which leads individuals and collectivities to hold onto what they see as has been and to hold onto it as a value preference, tends also to deny progress.

With relation to evaluating progress stemming from technology in the developing societies, the problem of innovation is fundamental. It has been said that probably there is not any area of technology where the developing countries can make significant primary changes. This is to say that the area of technological breakthroughs is a monopoly of the already industrialized societies. This means that

6

progress for these developagg societies will lie more on their ability to absorb borrowed technology and to innovate. In a capsule it will lie on a small elite which has technological values permeating the traditional sector. This permeation ceases to be a technology problem and becomes a conflict of values. Beyond the value conflict is the question of totalizing or expanding the numbers and impact of those reached by technology. This calls for new theory of social dynamics and re-evaluation of the assumptions of progress. Where technology is accepted and there is continual invention, like in the West, the social norm point to technology as a way of problem solving. In the developing areas where technology is borrowed and there is little or no invention, progress ~~next~~ can only be perceived as acquisition of the technology and its implied values. It is possible to postulate that there may be times when this progress by definition is unacceptable to the people.

Also, one should make a conceptual difference in the use of progress in industrial societies and traditional societies. In the former there is a greater chance for acceptance of technological breakthroughs - e.g. live undersea - than it is in the latter. There is patent need to establish some qualitative criteria to account for this distinction in progress.

All conceptualizations of progress which are set up in the ~~to~~ from-to form are linear in a sense. They see the history of society

as developing in a linear way, with perceivable cause-effect relationships. This is indeed a dubious assumption, particularly about the future. There are areas of convolutions where the progression is inverted and there is consequently negation of the cause-effect relationships in the future. For example to handle taxes and personal data one may need computers at the national level. Technologically it is possible but ideas about privacy may be so strong that the plan cannot be executed with the consequence that some taxes are not paid, and hence fewer services. On the other hand the Mafia may establish a computer system to process payoffs. What manner of progress is this? I suggest that the inability to make value judgments about the nature of the effect of technological progress leaves the future study researchers without any choice but to rather talk about "possible futures", that is to say what may happen without suggesting many of the consequences of the technology. To the extent that one does not know the value-mix operating in the future one has no choice but to assume the existing values as a constant given.

Knowledge of Possible Futures and the Problem of Choice Preferences

Once the possible futures are known social actors are supposed to act according to the implications by those who do future studies. This is a fallacious assumption. Man does not always act so rationally and particularly man in a social collectivity. Even if

we assume individual and collective rationality we cannot know the possible futures. One can only believe since there is not empirical proof of the possible futures. Possible futures can only be used to point out some range - and not all - choices. Whether one makes the choices and the direction of choice are areas which are unclear in most future studies. In a world ~~of~~ where human organization follows the national principle it is theoretically (if not empirically true today) possible that there may be a time when some nations monopolize of all possible futures to the extent that they are the creators of technology. One is raising the point that knowledge of possible futures may actually point out ways of blocking achievement of them under the principle of self-interest - all universalists not withstanding.

The very nature of the future - indeterminate - makes all studies of the future projections of values, preferences and choices of those who do the study. This hinges on the fact that the determination of the range of the possible futures is also a delineation of the range of choices. There may be other choices outside this range. Conceptually the future has unlimited choices. The study of the possible futures also hinges on the values of those studying. It is only by projecting their values that they can see the possibilities and argue also that some things will not be acceptable. For example, the conclusion that there will not be nuclear war hinges on the value judgment that at least nuclear

powers are committed to the idea that termination of all life is not a desirable value. It is conceivable that persons with other values - better dead than red - would lead to very different conclusions of the future.

Future studies are very weak in accounting for the preferences of society. Almost all studies rely on experts in spite of the fact that the value preference distribution of experts is not reflective of the value preference distribution of the society in general. One is aware that since Condorcet, scholars have agonized over the problem of individual preferences and their aggregation into social policy without agreement. Future studies seem to make the assumption that as technology increases its dominance on social policy requisites, the preferences of the expert will become the accepted policy values. This is in violation of the principle that social policy should reflect at least the majority if not the value preferences of a society. Experts are always a minority in all social systems. It is doubtful that there will come a time when their value-preferences will be accepted as the value system dominant in society.

Primacy of Technology and Social Leadership

Most future studies give technology as the greatest force in society. Thus the assumption is that technology influences society much more than any other single factor. This is doubtful. Even more doubtful is the follow-up of White's Hypotheses [Mass Culture:

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Popular Arts in America, eds. Bernard Rosenberg and David Manning White, Free Press, 1957] that society has three tiers - at bottom technological; in middle social and on top philosophical. Thus energy - the prime mover of the cultural system comes into it at the bottom - the technological - and therefore influences the top two layers. Whereas to some extent this is true - there may be instances of reversal in order. If the Soviet System decides the philosophical - ideological - may determine the technological - by assigning all 'brains' to Heavy industry rather than agriculture. Anyhow this fundamental assumption permeates most writings of the future particularly the nature of social change. [Lindberg Chapter 3] This automatically leads to the idea of technological ^edeterminism.

Most writers feel that for every technological advance there are consequences which follow and since "society as constituted is not sacred" there must be adjustment to the technology. This is a simple idea which looks logical but is it? Take for example automation - there are workers who get displaced but they move to other jobs and society does not reconstitute itself. Rather there is adjustment. It, I do not think, cannot be shown for example how nuclear energy - a major technological breakthrough has led into restructuring of both the American or Soviet social systems internally. The same social groups still remain probably in the same relationships.

The argument for technological determinism further hinges on the idea that as complexity increases only the technocrats are in

positions to know and therefore to lead socially. Perhaps this has had at one time in history been true but does the twentieth century experience lead us to conclude the same? My answer would be positively not. As complexity increases we find that the technocrats are not only as divided as the society but they are "technocrats" only in their field and therefore suffer from the same inadequacies. Beyond this there is also the fact that in most societies technocrats are never in positions of political leadership - they are on tap but not on top. Thus non-technocrats can undercut their 'technocracy'. Look at A.B.M. and Cigarette regulations or the position of a military expert in U.S.S.R. Experts have always been ^{and} ~~and~~ will always continue to be not of the people and therefore poor leaders. Their social leadership legitimacy is denied by their very expertise and 'rationality', Mosca notwithstanding.

The values in the future are going to be technocratic and will be transmitted to all other sectors by the technocrats. To the extent the future is 'indeterminate' it follows that one cannot decide what values will be and also one can hypothesize that we do not know their transmission procedure.

The same problem can be raised vis-a-vis the logic of the developed as opposed to developing world.

Change, Progress, Development

These three words are analytically applied to the third world

in most cases to signify being like the West - in economics, government and socially. At least in having an industrial-monetary economy, rational bureaucratic government and individual rights primarily. We have noted that technology is seen as the prime mover for the future. The question then arises since the third world is in the present is it going to leap past technological breakthroughs and what is the impact. Concretely the third world is going to skip steam power and hydro-electric power for nuclear power and solar energy power? I have to admit the writers do not address themselves to such a question but they seem to imply that there are 'stages' of absorption of technology.

Coupled with this is the old problem of social leadership. Can we assume that the technocrats from the third world as purveyors of the idea of change are to dominate the systems? Is there any data?

The problems of leap-frogging technological developments have not been raised in future studies just as the problem of technocrats and leadership in the third world have not.

Commitment to Social Evolution and Use of Quantitative Data

That future studies argue that given what is, these are the possible developments, points out a tacit assumption that social systems evolve toward something. They might be restricted by other things but they go on. Social evolutionary theory is

generally accepted in Western intellectual circles in this century but one can raise the objection that when it is coupled with use of quantitative data only it leaves other areas of human organization like metaphysics and values out. Once one looks for the quantitative data to illustrate evolution one may miss 'non-evolution' going on in the social systems. On the other hand even if there is evolution in some quantifiable sections of society - say economic and social data - in other areas - like the value of human life and its sanctity - there actually might be retrogression (non-evolution). One is reminded of the intellectuals of the underdeveloped world who argue that in spite of the underdevelopment of their economic and social systems - in comparison to the West - their societies are more human.

Assumed Continuation of Social Systems as they are

The crucial idea is as they are. Thus we study what the impact of technology is on the structure of the U.S. system and its subsystems, on the world organized into nation states, even on the world dichotomized into North-South, White-Non-White, Developed - Non-Developed. The fundamental philosophical assumption is that these systems/subsystems will continue in the future. They might change relationships (within and without the system but they will continue). To the extent that the future is indeterminate perhaps all systems will not exist as they are. Who knows?

The Problem of Accidents

One could hypothesize that in all social systems there are factors which lead to disruptive accidents. There probably is not a way to 'program' these into future studies. Consequently most future studies do not even address themselves to the problem. Perhaps a distinction can be made in terms of possible technological accidents and social accidents. The former would stem from the misuse of technology and the latter from social actions, whose consequences lead to disruption of the social system. The writer offers no solution to the problem of conceptualizing accidents out in the future but it is clear that to leave accidents/of future studies is to ~~impart~~^{out} their ~~xxxx~~ utility.

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