AD-766 502

FUTURISM

Alfred Oxenfeldt

Columbia University

Prepared for:

Office of Naval Research

July 1973

COLUMBIA UNIVERSITY

BUREAU OF APPLIED SOCIAL RESEARCH

FUTURISM

By

Alfred Oxenfeldt

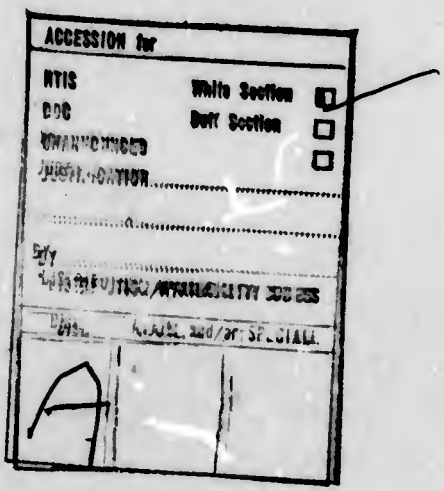
BUREAU OF APPLIED SOCIAL RESEARCH

Columbia University
605 West 115th Street
New York, N. Y. 10025

The Bureau of Applied Social Research is an instrument of Columbia University's Graduate Faculties for training and research in the social sciences. The Bureau has for many years served as the research laboratory of the Department of Sociology, and it also facilitates social research by students and faculty of other departments and schools of the University. The Bureau's governing board includes representatives from all of the University's social science departments and several professional schools.

The Bureau carries on a program of basic and applied research under grants and commissions from foundations, government agencies, social welfare and other nonprofit organizations, and business firms. In so doing it provides experience on major empirical studies to graduate students and makes available data and facilities for student projects; it provides research facilities to faculty members; it offers training and consultation to visiting scholars, especially from social research institutes in other countries; and it makes the results of its investigations available through publications for lay and scientific audiences.

A bibliography of Bureau books, monographs, articles, unpublished research reports, dissertations, and masters' essays may be obtained from the Bureau's Librarian.



Security Classification

DOCUMENT CONTROL DATA - R & D

1. Originating Activity(Corporate author) Bureau of Applied Social Research Columbia University, New York, N.Y.	2a. Report Security Classification Unclassified 2b. Group

3. Report title

FUTURISM

4. Descriptive Notes (Type of report) Technical Report

5. Author

Alfred Oxenfeldt with Preface by Paul F. Lazarsfeld

6. Report date July 1973	7a. Total no. pages 48	7b. No. of references
8. Contract or Grant No. N 00014-67-A-0108-0034 NR 177-943	9a. Originator's report no. Technical Report #5 9b. Other Report Numbers	

10. Distribution Statement This document has been approved for public distribution an sale; its distribution is unlimited

11. Supplementary Notes	12. Sponsoring Military Activity Office of Naval Research, Code 452 Arlington, Virginia 22217

13. Abstract

This report reviews the state of futurism as a research technique. It gives a brief history of the field and a who is who of the main leaders active in it. The general procedures are described as well as the main centers which provide the pertinent services. Distinguishing between very formal approaches and the more discursive techniques, the emphasis is mainly on the latter ones. The present report is supplementary to other technical reports by the Columbia project as indicated in the preface.

DD Form 1473
S/N 0101-807-6801 1 Nov. 65 (Page 1)

Security Classification

...
iii

FUTURISM

By

Alfred Oxenfeldt
Professor of Business Administration
Columbia University

....

July 1973

THIS CONTRACT IS FUNDED BY THE OFFICE OF NAVAL RESEARCH, GROUP PSYCHOLOGY PROGRAMS, UNDER CONTRACT NUMBER N 00014-67-A-0108-0034 NR 177-943.

TABLE OF CONTENTS

PREFACE

In various technical reports issued by our project reference was made to the need for the applied sociologist to take into account future developments. This was especially the case in the reports called "Road to Recommendation", "Filling the Gap between Knowledge and Decision" and "Organizational problems of Applied Social Research." It seemed desirable to have available a summary of the present state of the techniques usually summarized under the slogan "futurism".

Professor Oxenfeldt has observed the development of this field and has often acted as advisor to the Columbia ONR Utilization Project. For the present summary, we had some financial support from AT&T research divisions to whom I have occasionally acted as consultant.

It should be stressed that Professor Oxenfeldt's review was finished before the study sponsored by the Club of Rome became available.

Paul F. Lazarsfeld
July, 1973

I. INTRODUCTION

A. The subject-matter of futurism

The interests of most futurists are extremely broad; their subject-matter is the whole of society and, more particularly, the direction, speed, and general effects of social change. Accordingly, they discuss such highly diverse matters as human values, the adaptability of individuals and organizations to environmental change, population growth, technology, ecology, religion, medical innovation, educational technology, weather control, the information explosion, the role of government, business institutions and international relations. In contrast, most long-range forecasters study individual circumscribed phenomena.

Most subjects of chief concern to futurists are highly qualitative and amorphous; most are not readily quantified. Also, futurists are deeply concerned with the interrelations among the various sectors of society and their forecasts rest heavily on their views of these interrelationships. (One finds exceptions to this generalization; some individuals, who consider themselves futurists deal with such quantifiable phenomena as speed of transportation, population growth, expansion of "information" and computer capabilities.)

B. The objectives of futurism

According to Dennis Gabor, "The future cannot be predicted, but futures can be invented." This statement acknowledges the impossibility of accurate long-range social forecasting and, paradoxically, indicates its chief value. Man possesses the mental and material resources to influence strongly the future. If he were only to decide what kind of future he desires, he might achieve it. Accordingly, futurists offer people a vision of what they might have and thereby motivate them to attain it.

This goal is neither simple nor trivial. Perhaps the most difficult step in invention is deciding what is to be sought; once an invention is defined, the research required to bring it about is implied. (Much the same idea is conveyed by the famous statement by Durkheim to the effect that the chief function of science is to raise rather than to answer questions.) Put differently, given our society's power to shape its future, if it does not define the direction in which it desires to develop, it is foregoing great opportunities for human betterment, however defined.

Futurism also has a strong negative purpose: namely, to anticipate unfortunate developments so that they might be averted. The present concern with action programs to counter the population explosion and ecological damage indicates the concrete value of long-range forecasts of dangerous developments.

It would be a serious error to view futurism as a field devoted to describing the future. Not only would the field be an abject failure if judged by that standard, as the following section indicates, but one would miss the essence of its major purpose--to insure that many of the events forecast never come to pass. The futurists' main areas of concern accordingly are those which call for social action.

Modern futurism emerged at a time when man commanded the resources to mold his future, so that he need not passively accept and adapt to it. The rapid growth of futurism reflects the confidence of intellectuals that careful analysis of developments as they emerge, objective assessment of their effects and imaginative efforts to capitalize on their benefits and to avoid their evils makes possible a future that is enormously better than the present and past. They clearly fear that without such efforts the future could easily be intolerable.

C. The validity of futurists' forecasts

Many evaluate futurism by the accuracy of its forecasts, but futurists

reject that standard altogether. They are extremely humble about the validity of their forecasts, but do claim that their forecasts are as valid as possible under the circumstances. Even when they describe many alternate futures, the actual outcome is likely to be missing from the set. Futurists try to do the impossible when they forecast 30 to 50 years ahead, especially given the broad focus of their interests. No one understands the many forces making for social change and their interrelations well enough to make valid forecasts. Inasmuch as these forces are very numerous, highly interrelated and are likely to be inconsistent over time, we are not likely to be better social forecasters in the year 2000 than we are today.

Long-range forecasters will usually refrain from forecasting until they believe their prognostications will have considerable accuracy and will be put to specific use. Futurists will knowingly forecast even when they are almost certain to be wrong. They make their forecasts because they believe that an issue is vital and that we must understand where we are headed to facilitate what is desirable and avert what is objectionable.

Futurists' forecasts are not all equally unreliable. When they forecast limited sectors of society and quantifiable variables, they may come fairly close to the mark. Nevertheless, precision is almost unthinkable with so inherently difficult a task as social (multi-sector) forecasting. The following quotation summarizes the situation very aptly:

> There will be no pretense that we can gradually move toward the perfection of methods of anticipating what will actually occur, for such perfectability is not logically possible....What we may hope to improve, if not perfect, is our sense of responsibility for making known the implications of our knowledge. (From Otis Dudley Duncan, "Social Forecasting: The State of the Art" The Public Interest, No. 17, Fall 1969, p. 115.)

II. NATURE OF FUTURISM

If only two adjectives are employed to describe the field of "futurism"--viewed as a new professional field--they must be "surprising" and "diverse."

Those who are deeply immersed in the field cannot help being surprised that many well-informed persons barely know of its existence; or, knowing this, are very surprised to discover its breadth. The great diversity of topics, approaches, subjectmatters, methodologies, and contributors in the field will be described in this section.

Before sketching the origins of futurism, the variety of activities carried on, the nature of contributors to the field and the nature of its literature, the field will be characterized in general terms.

1. Futurism already is a large field; it involves many people, organizations, books, articles, conferences (national and international) and considerable financial investment. In addition, at least three journals in English are devoted almost exclusively to futurism.

2. The field is growing very rapidly, judged by the number of people, organizations, conferences, books, courses, articles, etc. that are concerned with the distant future. Futurism illustrates a conclusion widely stressed by futurists: information and the number of journals in a field expand exponentially.

3. The field is exerting considerable influence and attracting the attention of some influential persons.

4. Many of the writings on futurism are quite technical; on the whole, it is not a subject for laymen, though some writers on futurism are popularizers. As explained later, futurists have introduced significant improvements in forecasting technique.

5. Futurism is a young field, conceptually, even though it can trace its origins to the distant past. Its conceptual youth is suggested by futurists that is simply a recasting of things already said--though some of that does occur. Fresh approaches and thoughts appear with considerable frequency; the flow of ideas appears unlikely to dry up very soon.

6. Futurism is still highly unstructured; no very clear compartments have yet been formed and the field lacks a single central thrust.

7. The field is widely dispersed geographically; interest in futurism is very high in such diverse countries as : Japan, the U.K., France, Austria, Czechoslovakia, the U.S.S.R. and Germany, all of which have one or more centers whose chief concern is "the future."

8. The field seems to be moderately well-endowed with financial support, both private and governmental.

9. The field is well-organized in societies, conferences, commissions, institutes, etc. so that its potential future contributions are likely to be forthcoming.

B. Origins of Futurism

One could date the beginning of futurism at many widely different times; little is gained by selecting one date and pronouncing it as futurism's birthday. Man's interest in the future has always been keen, and some of the forecasts that have profoundly shaped man's thought ahd hopes are found in the Bible. A whole rash of futuristic writings is associated with Utopianism, which can be associated with Plato's Republic, Sir Thomas Moore's Utopia, or the outpouring of utopian writings in the 1840's. Early science fiction writings could also be considered the inception of modern futurism.

The field of futurism that is being discussed in this paper is better dated at the end of World War II and really became visible about 10 years later. Considerable work on futurism was done on behalf of the Defense and State Departments in the U.S. soon after the end of World War II but did not receive public exposure until later. One might date modern futurism either at the time that the men who are now the most prolific writers on futurism received their start in the field, mainly at the Rand Corporation, or at the time that their views were exposed to the public. In either event, the chief point deserving emphasis is that the field owes its birth and rapid growth to government support. Also, its general methodology, policy orientation and the subjects that receive attention from futurists can be traced to its initial financial support, which may account for a disproportionate emphasis on international relations and technology related to weaponry.

The present contours and state of futurism were also strongly influenced by the endowments of two major foundations. Carnegie Corporation funded the Commission on the Future, sponsored by the Academy of Arts and Sciences, in 1965. In 1961, the Ford Foundation endowed "Futuribles" a French society devoted to futurism.

C. Variety of Activities Embraced in "Futurism"

In the following description of futurist activities, no pretense is made of completeness or even representativeness: a complete or representative picture would require a research effort that is far beyond the scope of this paper. Only enough will be said about each of the main areas of activity to convey an impression of the field's scope and rate of growth.

1. Organizations of Futurists

The backbone of any discipline is communication, usually through professional societies which publish journals and hold meetings for their membership to discuss the latest ideas in the field and present work in progress. Several organizations are composed of professional futurists. The boradest of these is the International Congress for Futures Research, whose meeting in Kyoto, Japan attracted 200 professionals from all over the world. Of similar scope is Mankind 2000 International. Among the most active of the societies are the European groups, foremost among which are the European Technological Forecasting Association, the Salzburg Assembly on the Impact of New Technology, and the Alphbach Forum. Also deserving mention is the Futurological Society of Czechoslovakia, whose mission is to present the futurist perspective in the hope of influencing public opinion.

2. Futuristic Institutes

These involve professionals working together in sustained projects on the future. The oldest of these are the policy research organizations like Rand and the Hudson Institutes, which originatated as "think-tanks" advising the U.S. Government on military and foreign policy options. Since these groups have been future-oriented from their inception, some of the leaders in the field have emerged from them. Other policy organizations with a somewhat less pragmatic orientation are the Institute for Policy Studies (Washington) and the Center for the Study of Democratic Institutions (Santa Barbara).

At the center of the field are several institutions whose explicit goal is the study of the future. Among these is the Institute for the Future (Middletown, Conn.) headed by Olaf Helmer, whose prospectus envisioned an initial annual operating budget of one million dollars, with provision for a professional staff of several hundred within a few years. Also influential is the Commission on the Year 2000 of the American Academy for the Advancement of Science, headed by Daniel Bell. The third core group is Futuribles (France), under the leadership of Bertrand de Jouvenel.

The following institutes have been selected from a long list to show the geographical spread of futurism:

Battelle Memorial Institute
Wickert Institute (W. Germany)
Center for Environmental Studies (Britain)
Athens Center for Ekistics
Committee for the Year 2000 (Italy)
Work Group 2000 (Netherlands)
European Cultural Foundation
Social Forecasting Research Unit of the Soviet Sociological Association

3. Special conferences

Many professional societies have shown substantial interest in futurism by making the future the theme of one of their annual conferences. These include the Electronic Industries Assn., World Academy of Arts and Sciences, Institute of Management Sciences, Production Engineering Research Assn., World Congress of Sociology, and the Ontario Provincial Conference for Women. Such conferences both reflect and encourage interest in the future among members of these organizations. Presentations at these meetings are made by members of the associations and by professional futurists.

4. Courses for businessmen

Common in Europe, but rarely seen here, are short (2-day or so) lecture-seminars conducted for executives by commercial conference planning firms

(e.g., Associated Business Programmes Ltd. of Britain). Speakers at these courses are often the most eminent men in the field. In the U.S., full-week conferences for executives have been conducted at the University of Texas.

5. College courses and university programs

Courses in futurism are now available at such schools as Princeton, Case Western Reserve, University of Hawaii, and the University of Manchester. The number of such courses should rise dramatically as the field progresses and with the growing interest of students. Graduate programs to train professionals in the fields of prediction and social change will follow suit; an extant example is the program in policy sciences at the State University of New York (Buffalo).

D. Contributors to the Field

Who are the futurists? Again, we are dealing with an emerging and rapidly growing field. A few years ago, the enumeration of its participants would have been simple; today, major research projects are being undertaken both here and in England simply to learn who is doing what, and the main orientations and methodologies they employed.

One might try various ways of categorizing the contributors to make some sense of the diversity of talents in the field. They vary first of all in professionalism, from sophisticated journalists to eminent scientists, including some of Nobel Prize stature, (Medawar and Thomson). Second, they vary in the breadth of their interests in the world of the future, from those who view only single sectors to those who treat society as a whole. Note, however, that a narrow-gauge futurist would be extremely broad-guage in any other field, and further that even the most holistic of the futurists comes to emphasize certain features that are of particular importance to him.

Another dimension by which contributors might be classified is their

institutional affiliation. Some are academically based; others work in businesses or consulting firms; some work in research organizations; some are government employees; some are free-lance writers. Finally, one might classify contributors to futurism by their main fields of specialization. One finds representatives of the physical sciences, behavioral scientists, social philosophers, designers, economists, historians and a surprising underrepresentation of sociologists.

Since futurism is new, its personnel comes mostly from other fields. Sketched below are some of the most prominent futurists. The list is neither complete, representative, nor in order of importance, but merely illustrative of the names that come up most often in the futurist literature, and of the diversity of their styles.

BUCKMINSTER FULLER. Individualist, author, inventor of the Dymaxion house and car and the geodesic dome. American. Though known as a visionary, he is a prophet of utmost practicality. He and John McHale proposed to the International Union of Architects in 1961 that a study known as the World Resources Inventory be undertaken, "a first stocktaking of what man has to do and what he has to do it with." This research is being carried out at Southern Illinois University.

DENNIS GABOR. Professor of Applied Electronic Physics at the Imperial College of Science and Technology, London. Physicist, inventor, engineer. He is, like Fuller, globally oriented, but focuses on the immediate next steps, "Fighting the greatest evils rather than fighting for the greatest ultimate good."

BERTRAND de JOUVENEL. French political scientist. His major work, The Art of Conjecture, is an extremely systematic account of the numerous types of problems which beset all scholarly efforts to predict the future. By critically examining the assumptions behind the methods, he has laid the groundwork for others to build on. Since then, he has presided over the Futuribles project in Paris, bringing together scholars from many nations to engage in a social scientific attack on the future. The project has so far published over one hundred research efforts. One outstanding quality of de Jouvenel's work is his constant humanistic concern: he has sketched out a discipline which has people and not technology at its core, and which involves the widest possible public participation.

JACQUES ELLUL. Sociologist, historian, lawyer, Professor of History and Contemporary Sociology at the University of Bordeaux. He is best known for his book, The Technological Society, an analysis of the civilization of technologically advanced countries which explores the dominance of the machine-spirit over man, and the prospects for its increase in the future. It is a pessimistic view, and one that has raised a lively debate about the quality of the civilization we are creating.

MARSHALL McLUHAN. University of Toronto. Like Ellul, he is concerned about the impact of technology on man, but not on the level of civilization. Rather, he has understood better than any before the sensory and symbolic changes brought about by the changeover to a technological environment. Technology is an extension of man, and this mediates his experience.

DANIEL BELL. Professor of Sociology at Harvard University, and prime mover of the Commission on the Year 2000 of the American Academy of Arts and Sciences. His emphasis has been on anticipating future social problems, invention of new institutions to meet future conditions, and formulating programs to meet foreseeable problems. He has guided the work of the Commission on a lofty intellectual plane, and now is preparing to put out a series of reports of its study groups.

JOHN McHALE. Artist, designer, Ph.D. in Sociology. Worked as Executive Director with Buckminster Fuller on the World Resources Inventory, a long-range study of the use of man's resources on a global scale. He is presently Director of the Center for Integrative Studies at the School of Advanced Technology, State University of New York at Binghamton. He has published extensively on the impact of technology on culture, mass communications, and the future. His latest work, The Future of the Future, is an outstanding introduction to the field.

OLAF HELMER. Educated in mathematics and logic, with Ph.D's in both, he was from 1946 until recently chief mathematician with the Rand Corporation in Santa Monica, California. His Social Forecasting is one of the most sophisticated treatments of the methodological problems involved in future forecasting. As president of the Institute for the Future, Helmer is a major contributor to futures research in America, and has been especially productive in the area of methodology: the Delphi and cross-impact methods were developed by him and his colleagues. His work may have broad implications for the mathematical social sciences.

ERICH JANTSCH. Consultant to O.E.C.D. (Organization for Economica Cooperation and Development, Europe) and lately in the U.S. has written the bible on technological forecasting, perhaps the most technical of all the books published on the methodology in this field. Yet he is concerned not only with the physical aspects of technological change, but its immediate and long-range social implications.

HERMAN KAHN. From 1948 to 1961, Kahn was senior physicist and military analyst for the Rand Corporation. He has put his expertise in scenario construction to work on projecting the future at his Hudson Institute.

ROBERT JUNGK. With de Jouvenel, he is considered a leader of systematic futures research in Europe. He has outlined his conception of a "European Lookout Institution" to urge official institutions - public and private - to study the future. In 1964, he established the "Mankind 2000" project in order to communicate a sense of the future and of participation in it to a wider public. He is director of the Institute for Future Studies in Vienna.

E. The Literature

Many things one would want to know about the literature of futurism simply cannot be answered without an elaborate special study. What do futurists agree are the crucial changes that will take place, and about what do they disagree? An examination of the futurist literature shows that very little direct debate takes place: futurism is just now developing its paradigm, i.e., its framework for determining what the issues are. Until that is accomplished, it is still possible in many areas for a man to write without taking contrary positions into account.

To categorize all the assumptions, methods, and propositions that futurists employ would be an encyclopedic undertaking. In its place a summary analysis is offered of the contents of the available issues of one British-American journal, Futures, which has been published quarterly since 1968, and in which most of the leading futurists publish. The format is that of a standard academic journal: short articles about defined problems. Thus, we would expect our sample to have fewer composite forecasts, greater technicality, and less depth than the total literature of futurism as a whole.

The major categories for the type of article were arrived at inductively:

1. Values - 10% of the articles were concerned primarily with the effects of technological and social change on human values, and with the need for futures research to concern itself with values.

2. Methods (19%) - In an expanding field, the dissemination of methodological knowledge is especially important. Roughly 20% of the articles explained new techniques.

3. Applications (22%) - A large number of articles explored applications of futures research, and its value to ordinary activities of business or government.

4. Sector forecast (31%) - Ex: "Sand Deserts: Granaries of the Future" - the largest single category consisted of forecasts in specific areas.

5. Composite forecasts (5%) were underrepresented here; the space limitations make it improbable that authors would prefer this format to writing a book-length monograph.

III METHODOLOGY OF FUTURISM

How do futurists form judgments about what will occur in the distant future? When do they elect to employ formal (statistical) forecasting techniques? When do they employ informal non-replicable general approaches? And, what formal and informal methods do they characteristically employ?

Futurists forecast many dissimilar phenomena for widely different time periods, with primary emphasis in some cases on current happenings and in others on long-range developments. No single method can serve such diverse needs. One therefore finds a wide variety of approaches employed by futurists. We would consider statistical methods of curve-fitting at one extreme, which we would term "formal," and reliance on judgment, intuition and logic at the other extreme, which we would term "non-formal."

A. A classification of long-range forecasts made by futurists.

Forecasts of individaul sectors of society should be sharply distinguised from composite forecasts, dealing with many sectors of society. By individual sector forecasts, we mean predictions of such things as: transportation speed, population growth, urban blight, exhaustion of soil fertility, water desalinization, surgical procedures, therapeutic drugs, modes of instruction, etc. It is also useful to distinguish individual sector forecasts according to whether they concern phenomena that are non-quantitative, and therefore not amenable to simple statistical techniques, or variables for which data exist for a long period. Composite forecasts deal with highly complex variables. The most usual phenomenon forecast by futurists is the state of society; in addition, they deal with such things as: the future of the economic system; the nature of the future city, future life styles, and standards of living.

If classified by their scope and formalism of approach, one can develop a

matrix depicting four types of futurists' forecasts. (Exhibit 1). Although one can find examples of each type, they are concentrated in two of them, #2 and #4--based on informal approaches. Individual sector forecasts are sometimes made by formal forecasting approaches especially when the phenomena are quantifiable (#1). When making multi-sector forecasts, futurists almost invariably employ informal methods. Of these two types of forecast, the first (#2) is most common. The formal forecast of individaul sectors (#1) is not rare.

One must appreciate the enormous difficulty of the task essayed by futurists. They forecast for a longer span than most other long-range forecasters. Also, they forecast much more complex phenomena. Little wonder that they are confident that their forecasts will prove to be wrong.

Exhibit 1

Classification of Forecasts

Approach	Scope of Forecasts	
	Single Sector	Multi-Sector
Formal Forecasts	#1	#3
Informal Forecasts	#2	#4

B. Individual sector forecasts: Futurists' methodology

Futurists' writings often analyse a single sector of society. (A "sector" is not a homogeneous unit, by any means; some are combinations of many sub-sectors--like computer technology, ecology, human behavior engineering, etc.) In their individual sector forecasts, futurists will ordinarily include analyses of:

a) past trends

b) very recent developments

c) potential future developments.

Thereupon, they will forecast the few most likely futures and indicate the implications of their forecasts. Their formats are not standardized and not all include every element listed, but most do.

In examining past trends, futurists will sometimes employ traditional statistical techniques of trend fitting and simple correlation, if time series are available for a substantial period. In their discussions of very recent developments, futurists usually rely upon simple description and narrative. Similarly, their discussions of future possibilities are usually highly subjective, representing personal speculations about potential new discoveries based on their knowledge of incipient new developments. When they move from the foregoing to the making of concrete forecasts, futurists occasionally employ a formal statistical methodology. One gets the strong impression that they will use formal statistical techniques only if they will produce the result they intuitively favor.

A simple inspection of this process makes clear that even individual sector forecasts include heavy ingredients of subjective, qualitative non-formal methodology. Certainly, simple mechanical trendfitting would not be acceptable to futurists, for they are generally committed to the premise that the future will be quite different from the past. Nonetheless, some of them do employ traditional curve-fitting techniques, especially in their technological forecasting.

1. Formal methods and individual sector forecasts

As indicated, occasionally a futurist will take a readily quantifiable phenomenon of basic social interest and project past patterns of change into the future and indicate the implications of such changes. Phenomena to which such techniques can be applied ligitimately have already been forecast many times and if anyone is to make a contribution, it will come from employing some non-quantitative technique, presumably building on knowledge of some incipient or impending major change.

Some forecasting methods developed by futurists are not definable in operational terms and are not readily replicable. Still, the results produced by these methods are not simply the excogitations of an individual. Reference is made here particularly to two techniques that are described in section D. They are the Delphi and cross-impact matrix methods. Both essentially build upon the intuitive judgments of experts, but do so in a structured manner. There is method in those uses of intuition.

2. Informal methods and individual sector forecasts

As implied, most individual sectors of society are not readily quantifiable, though ingenuity will often produce some crude numerical indicator of a qualitative phenomenon. Still, with such phenomena, data rarely exist for a considerable period, and therefore one cannot easily develop trends that could be projected. With such phenomena, and they represent the overwhelming majority of what is discussed in the futurist literature, futurists usually employ a highly eclectic methodology--one that builds on slight shreds of evidence and on slender lines of logic. After all, if the subject is vital and the available evidence suggests a serious problem may develop in that area, one would only ask that the futurist make good use of all shreds of evidence available; he is certainly not going to find solid evidence bearing on the distant future under the best of circumstances.

Accordingly, futurists usually employ highly informal and unclear methods in making their long-range forecasts of individual sectors. And, their forecasts are usually stated in loose terms, speaking of two-fold increases in rate of change, enormous expansions in this or that--rather than a naming of specific amounts and specific dates. No study has been made of a representative cross-section of futurists' forecasts, but this writer's impression is that a large majority are of this type.

In the next section, we will consider a wide variety of non-formal approaches

employed by futurists, mainly to develop composite forecasts. These methods are also employed sometimes to make individual sector forecasts.

One example of a non-formal approach to individual sector long-range forecasting should be illuminating both as to futurists' methodology and the substance of their conclusions.

Pierre Bertaux, writing on "The Future of Man" in an edited volume[1] is quite conscious and explicit about his methodology. Bertaux begins with a statement that he has become convinced that human evolution goes on and ...."it goes on very quickly, and that 50 years--two generations--may be a significant period." He also suggests his hypothesis that "mutation may be an adaptive reaction to environment." (Both of these positions represent minority views in the field, as the author acknowledges.) He then suggests three approaches...."to the next step in the evolution of mankind." First, study preceding steps in biological evolution and look for a general trend; second, draw inferences from the analogy between what is now happening to mankind and what happened to animals; third, examine what is now happening with mankind to test the assumption that man is evolving into a new type of man with new instincts, new inclinations and new behavior.

Bertaux sketches all three approaches, casting up fascinating thoughts. On the first score (preceding steps in biological evolution), he says, "The trend of evolution seems to be determined by the increasing density of population and the still rapidly increasin ensity of contact and information, which has certainly a physiological and probably a genetic effect. As long as this evolution of the environment toward more density will be going on, one may assume that the trend of genetic mutation will follow a parallel line; so that some extrapolation from

1. W.R. Ewald, Jr., (ed.), Environment and Change: the next fifty years, (Bloomington, Indiana, U. of Indiana Press, 1968).

evolution in the past to evolution in the future is admissible." p. 14-15)

In exploring the analogy between what is now happening to mankind and what happens to animals, Bertaux concludes that the analogy holds especially in two cases: first, when the density of an animal population exceeds certain limits; and, second, when animals are domesticated. He makes the very interesting observation that "there seems to be no turning back from domestication. The retreat is cut off and man seems to be beyond the point of no return" and likens man to the bee, which now cannot survive without the hive and its associated social organization.

In employing the third approach, which is to observe what is now happening with mankind, he concludes, "There seems to be some evidence that a new type of man is appearing. Its original characteristics are purely psychological; new instincts, new inclinations and a new behavior. They are a degree more gregarious ....These new people cannot stand isolation; they need contact; they want to be together. Their normal way of life is to be inside a group. ...The second characteristic of the trend is the changing relationship between man and woman.... Our historical societies are male societies, in contrast to animal societies which are essentially female....It is quite possible that in prehistorical times the Supreme Beings were female, as cave-paintings and twenty-thousand-year-old sculptures suggest. During the past fifty years our male societies founded on some sort of enslavement of women are returning to--biologically speaking--a more natural situation, where the more stable female element progressively asserts itself, until it perhaps predominates....Modern contraceptives are largely, if not exclusively, female contraceptives. They mean a much more decisive turning-point in the history of mankind than atom-energy and space-research taken together. ...Once the women are freed from their sexual and reproductive enslavement and the tables are turned, not the female, but the male will be

However, most futurists do not roam freely without constraint in making their social forecasts. They employ some procedures that cannot be considered formal forecasting methods, but both provide useful inputs into social forecasts and help to discipline the imagination of the futurist. Specifically, they now use the Delphi method almost routinely to assemble the intuitive judgments of highly informed people; they also use the cross-impact matrix method of forecasting, which tries to take account of the interaction among factors that determine the nature of social change; and the scenario, which is a very flexible notational device that both aids in formulating and in communicating social forecasts. Beyond these, some other techniques are beginning to be employed and refined that are likely to gain widespread application including some exotic-sounding ones like relevance trees, contextual mapping and the morphological approach.

2. Non-formal approaches to social forecasts

For reasons that should now be clear, futurists mainly use non-formal methods to make their forecasts, whether they are for a single or for many sectors of society. The need to use non-formal approaches is, of course, greatest with social forecasts, for the forecaster must consider a large number of variables, many of which cannot be quantified and whose effect on social change has never been established in the past and is likely to change in the future.

Professor Daniel Bell, of Harvard, has probably paid closer attention to the non-formal forecasting methods employed by futurists than anyone else. As far back as 1964, he identified 12 modes of prediction, which he believed encompassed all methods employed to make quasi-scientific judgments about the future state of the world. More recently, Professor Bell has distinguished three methods of social forecasting.[1] These are:

1. Daniel Bell, "The Commission on the Year 2000," Futures, Sept. 1970 pp. 19-25. Observe that the second method is formal, whereas the other two are informal.

1) The analytical identification of future social problems.

As Bell explains it, a forecaster "just knows" and "needs very little expertise to know" that such things as housing, health care, etc. are serious problems. Bell speaks of this method as "rather ad hoc and fragmentary," pointing out that we can identify specific problem areas, but cannot show how they relate to one another.

2) The extrapolation of existing social trends.

This method is employed for phenomena for which we have time series and is self-explanatory. As an illustration, Bell refers to the use of opinion polls and other survey techniques to chart the frustrations of sub-groups of the population and thus anticipate new social demands. Dr. Bell stresses the inherent difficulty with extrapolation, which is that simple projection does not take into account "system breaks"--i.e., sharp shifts in rates of change. Futurists expect many phenomena to exhibit such breaks.

3) The construction of a model of the society in which the relevant independent variables and their dependent functions are identified.

Bell indicates that sociological models are not helpful because "They are either classificatory or metaphorical." Still, any composite forecast incorporates a model--either explicitly or implicitly--that indicates the variables that are expected to account for the nature and speed of change.

Professor Bell then describes a hybrid method of social forecasting that has been adopted by the Commission on the Year 2000. "It is an effort to identify relevant structural changes that will create new social frameworks which set the boundaries of social action out of which social problems emerge." ...."Our effort, however, is to deal with sturctural contexts, which change relatively slowly and whose direction, we believe, can be charted." The interesting conclusions that Bell and his associates have reached by this method can be

summarized here in a few words: 1) The U.S.A. has become a national society; 2) a "communal society" is emerging; and, 3) we are becoming a "post-industrial" society--changing from a goods-producing to a service society.

Whether one considers the 12 modes of prediction or the three methods of social forecasting identified by Bell, one finds highly flexible, non-replicable procedures. Each leaves very substantial room for the forecaster to select different elements to emphasize, freedom to pronounce major breaks with past patterns of development, and to stress new relationships.

It is understandable that one would prefer to rely on forecasting methods that would permit almost any competent analyst to prepare a reliable composite forecast. That emphatically is not the case. Any of the methods identified by Bell, except possibly the extrapolation of existing trends (where he finds assumptions of "breaks" in past relationships) are employed by different forecasters to obtain very different results.

In passing, we should note that futurists do not even agree on what it is they believe is most crucial to forecast about the future. "Society" is a dependent variable that possesses a very large number of dimensions and we find no general agreement among futurists as to what they are.

Although most people prefer explicit and replicable methods, the quality of long-range composite forecasts might beneift if futurists do not constrain themselves by adopting a fairly standardized methodology. What is most needed, it would seem, is a flexible, qualitative approach that permits the forecaster to make use of all he knows and believes; he needs a method that enables him to inform his audience about the facts and lines of thinking that lead him to his conclusions and enables him to state his expectations quite concretely. Straightjackets are for the demented; rigid procedures . . suitable for structured problems of social change cannot be captured by formal forecasting procedures.

Only failure awaits those who employ them. In short, composite long-run forecasts probably will be made by informal methods into the indefinite future.

One conclusion that flows from this review of futurists' forecasting techniques is that they only very infrequently employ formal statistical methods. In this they differ from most long-range forecasters. Their reasons are quite instructive for businessmen, and those who forecast on behalf of business: formal methods imply a persistence of past patterns of change. Anyone familiar with the literature of futurism would not expect such persistence. The future seems to represent a new ball game, and we must understand the new rules if we are to play it effectively.

D. Futurists' innovations in forecasting technique

Three techniques employed by futurists will be described here, for these are the most widely used. In particular, the Delphi method has now become almost a standard technique employed by professional futurists (the chief exceptions are individaul writers who cannot afford the resources to mount a Delphi study.)

1. The Delphi Method of forecasting

This method was developed by Helmer and Dalkey,[1] then both of the Rand Corporation. It assembles the intuitive forecasts of experts in a manner calculated to allow them to interact without permitting anyone to influence the others unduly. The method is a close relative of the "Jury of Informed Opinion" with a vital addition: it allows for a feed-back in a manner described below.

In a Delphi study, after the experts have recorded their initial forecasts in response to a detailed questionnaire, the views of the group are fed back to each individual, anonymously, with the suggestion that he comment on the

1. See N. Dalkey and O. Helmer, "An Experimental Application of the Delphi Method to the Use of Experts" Management Science (April, 1963), pp.458-461.

extreme forecasts and perhaps modify his own. The revised forecasts and comments are summarized and returned to the experts for futher comments and possible revision of their forecasts. The process of forecast-revision, summary of comments and return to the experts with yet another opportunity to revise their forecasts is repeated for the last time. The Delphi method usually produces a high degree of consensus, even though it is not possible for highly persuasive individuals to directly influence the others.

The experts' forecasts are based on intuitive judgments and they are not required to defend their forecasts. The Delphi method aims to build a "best forecast" out of the intuitive forecasts of the most expert individuals in the relevant fields, insuring intellectual interraction among the experts without allowing any individuals to influence the others directly.

Experts vary in ability and scope of interest. A very elaborate experimental Delphi study was made by Dr. Olaf Helmer and T.J. Gordon in which 150 experts were approached and 82 participated. These 82, including 6 Europeans, were divided into six panels; many experts participated on two or more panels. The panels dealt with the following subject areas: 1) scientific breakthroughs; 2) automation; 3) space; 4) weapons; 5) population; and, 6) war prevention. The results of the panel on "scientific breakthroughs" are presented in the following table, partly to indicate the kinds of results that the method produces and because of the inherent interest of the results themselves.

The steps taken to conduct this study will clarify the nature of the Delphi approach.

First round: The participants were asked, by letter, to name inventions and scientific breakthroughs which appear both urgently needed and realisable within the next 50 years. A list of 49 items resulted.

Second round: The participants were asked, again by letter, to situate the 50-50 probability of realisation of each of the 49 items in one of a

number of time periods into which the next 50 years has been divided (or "in more than 50 years," or "never"). These probability estimates were then combined and represented in quartiles and medians, the significance of which can best be demonstrated by an example: If, for the item "accurate meteorological forecasts," the median date is 1975, and the two quartiles are at 1972 and 1988, this means that one quarter of the participants have estimated the "break-even" date (for which a 50 per cent probability of realisation exists) before 1972, half have situated it before 1975 and one quarter believed that the "break-even" probability of realisation would exist only after 1988. For 10 out of the 59 items a reasonable consensus resulted.

Third round: The letters announced to the participants the substantial consensus for the 10 items and invited "dissenters" to state their reasons. At the same time, 17 items out of the 39 for which no significant consensus had been achieved were presented anew, with an invitation to the participants to state the reasons for widely dissenting estimates of the time of realisation. In general, a narrower range of time estimates resulted.

Fourth round: The same procedure was followed as for the third round. The range of time estimates was narrowed down further. 31 items were included in the final list of those for which reasonable consensus had been obtained.

2. The cross-impact matrix method

This technique whose introduction is credited to Helmer and T.J. Gordon is used to take explicit account of the interaction among many developments that have been forecast. The procedure requires the analyst to ask about each development that has been forecast, "If A happens, how would B be affected?" The question is asked in regular sequence about each development with respect to every other. The method does not produce a correct answer itself, but provides a notational system and a procedure for facilitating their answer.

The procedure is employed after developments have been forecast by the Delphi method. These forecasts do not explicitly take account of the possible relation of each event to the others on the list. Some events on the list might be mutually exclusive or mutually reinforcing, without those possibilities having been taken into account.

To use the cross-impact matrix method, one sets down the individaul developments in matrix form, with each one listed across the top and down the side. The analyst then matches each of the forecast developments in sequence against each of the others to assess its effect on the other. Notations are made in the cells to reflect the nature of the relationship, the direction of causality. When these questions have been answered, the analyst may elect to alter the probability he assigned to the occurrence of B,C,D,...N. Sometimes, a revision of other developments may persuade the analyst to revise his estimate that A will occur, and a revised estimate that development C will occur might require a revision in, say, K and T. In other words, the matrix used in this way may show the forecaster that he is dealing with a highly interactive system and compel him to take explicit account of the main interactions. Whether he understands these interactions enough to do so validly is quite an important question; but the method does at least require him to challenge the assumption that the events are independent.

This technique can be "played out on a computer;" however, to do so, one must establish quantitative relationships among the individual factors and accept the view that the interaction among pairs of variables is constant at all levels--a highly dubious position.

Perhaps the chief value of the cross-impact matrix method is that its use presses the forecaster to develop an explicit model, identifying the variables he considers important and specifying the nature of their interrelationships.

If this method were used in a thorough-going way, one would develop a matrix model of the causal factors in social change, specifying the interactions among the individual factors believed to exist. As has been said at many points, it is not clear that we will ever know enough to develop such a model. Still, this device does provide a convenient notational device and procedure for making the attempt.

The nature of this technique is made more vivid by the following example. Suppose that a Delphi study produced the following probabilities that four developments would be achieved by the year 1990:

Development (D)	Probability (P)
D1. Reliable one-month weather forecasting	.4
D2. Limited weather control	.2
D3. General biochemical immunization	.5
D4. Crop damage from weather eliminated	.5

To employ the cross-impac method of forecasting, one would organize these factors in the following kind of matrix. By employing the matrix, the analyst would be forced to look systematically at the potential interrelations of these developments:

Given the occurrence of this development:	Then probability of: D1	D2	D3	D4
D1		- -	- -	↑
D2	↑		- -	↑
D3	- -	- -		- -
D4	- -	- -	- -	

Thus, the occurrence of D1 would facilitate D4; similarly, D2 facilitates both D1 and D4. Conversely, the probability of D4 occurring is enhanced by the occurrence of D1 and D2; and, D1 facilitated by D2. D3 is unrelated to the other developments. Thus, the cross-impact matrix can summarize a causal network.

3. The scenario[1]

Even more than the Delphi and the Cross-impact matrix techniques, the Scenario provides opportunity for the forecaster to exercise his intuition. It is so flexible and qualitative that it can barely be considered a formal technique. Rather, it represents a format and a style for recording one's expectations that may both strengthen the forecaster's ability to exploit his full understanding and illuminate the forecaster's thinking for his audience.

The scenario originated in the tense world of the "Cold-war" foreign policy think-tanks. Members of those think-tanks had the assignment of exploring the implications of alternative policies and potential actions by rival powers. Some found the scenario an extremely convenient device for this purpose. (On the other hand, some are almost paralyzed by the looseness and unstructured character of the technique.)

A secnario is not unlike a piece of science-fiction writing. The writer, almost as if he were creating some imaginary characters who then act according to their nature, will set down the key conditions that prevail and inject either his own assumed policy or attribute an action to a rival nation or army. From that point on, the conditions assumed "take over."

It is possible to create a scenario by a very conscious, explicit and contrived method. One could develop a model, determine what causal sequences he expects, identify the key decision points, uncover the alternatives for each participant, etc. He could then state many of the possible combinations of

1. For discussions of the scenario technique, see H. Kahn and A.J. Wiener, The Year 2000 (New York; The Macmillan Company, 1967) pp. 5-6, 262-264.

events and outcomes in the form of a "story-line"--a scenario. When used in this way, the scenario is simply a literary method of expressing information--one that may be more interesting, illuminating and suggestive to the reader. The scenario is much more important when viewed as a medium for self-expression--a device into which forecasters can pour their best thoughts, one that elicits their involvement and imagination; indeed, it can be considered a method that fosters intellectual discovery.

IV. MODELS OF FUTURISM

Underlying futurists' forecasts and discussions of the future are their theories of social change. Whether explicitly stated or not, futurists employ models to develop their views of the future and the validity of their views depends very heavily on the richness of their models. And, perhaps because this field developed with the spread of "systems analysis" and the emphasis on model-building, many futurists employ explicit models.

We will not discuss the models that futurists employ in their discussions of individual sectors. Many of these models are highly developed and specialized. Our main concern is with their models of social change. These are not highly developed and often are not explicit.

A. Models of social change

Especially in their discussions of broad social change, futurists' models represent drastic simplifications of reality; they could hardly do otherwise. The forecaster must select out of almost a limitless number of variables a manageable number that he considers central for his purpose. Having done this, the forecaster would want to: assign weights to the different variables; indicate the functional relationship between social change and the independent variables that he considers important; and, identify those variables which interact, possibly defining the nature of that interaction. Explicit models of

the type described have not been developed by any futurist to my knowledge, except for individual sectors. To try to infer futurists' models from their discussion of social change is highly treacherous, though by this method some of the theories held by any futurist can be gleaned. However, no formal and highly structured models can be inferred, especially because they very likely were not present.

It is nevertheless possible to develop from the literature on futurism a list of the variables that futurists consider of primary interest in appraising the future. Unfortunately, we cannot determine the relative importance assigned to each or the degree and nature of interactions that they believe exists among variables. Indeed, we face some difficulty in even defining what is meant by each one. Still the list of crucial variables is of considerable interest and potential value. Exhibit 1 presents a list of 15 factors derived from the names of sub-committees established by the Commission on the Year 2000. Subsequently, eight working groups were established; these are indicated in Exhibit 2.

Exhibit 1

Sub-Committees of the Commission on the Year 2000[1]

1. Governmental structure: the adequacy of the existing federal-state-city structures in a "national society"; the problem of regional compacts; the distinction of public and private activities.
2. Centralization and bureaucracy: in the society, in organizations, in cities
3. The influence of number: density, privacy, and interaction.
4. Biological controls: genetics and personality
5. The structures of intellectual institutions.
6. The adequacy of resource and energy sources
7. Population and the age balance.
8. The control of the natural and human environment

1. Taken from "The Sociologist and the Study of the Future," Henry Winthrop, The American Sociologist, May 1968, p. 139.

9. The knowledge "explosion" and its consequences (in the curriculum of education, in the meaning of training, and so on).

10. Human capital: the location and husbanding of talent

11. The consequences of meritocracy

12. The inclusion of the Negro in the society

13. The use of leisure

14. The planning process and its varied forms

15. The state of the international system.

One wonders about the reasoning behind the shift from the 15 committees to the following eight working groups. Can the inference be drawn that the variables dropped were considered substantially less important than those retained? Actually, some combination occurred, so that the pruning of variables was less than one would infer from the drop from 15 to 8 committees.

Exhibit 2

Problems Assigned to Working Groups by Commission on the Year 2000[1]

1. Government
2. Values and Rights
3. Intellectual Institutions
4. The Life Cycle
5. The International System
6. The Social Impact of the Computer
7. Science and Society
8. Business Institutions

An examination of Exhibit 2 must occasion some surprises. Missing are such demonstrably important--indeed crucial--areas as: population, resource and energy sources, urban blight, human engineering (unless Science and Society embraces all aspects of science.), ecological problems, civil rights, leisure, human adjustment to change, and the adaptability of institutions to change.

1. Daniel Bell, "The Commission on the Year 2000," Futures, Sept. 1970 p. 19. Bell refers to nine working groups but lists only these eight.

Included on the list of eight subjects are at least two that might occasion surprise: business institutions, the life cycle and perhaps the social impact of the computer--though the last is sufficiently broad and ambiguous to include some key issues. One wonders, for example, whether business institutions are regarded mainly as initiators of change, as inhibitors, or as implementors.

Exhibit 3 lists the factors that some futurists have named as significant elements in social change. Even this long list is not complete, but it indicates the main variables which some futurists have emphasized in their writings. It therefore presumably indicates the factors that determine the state of any society and which presumably will determine its state in the future. The number and complexity of these factors explain why social forecasting may be considered impossible on its very face.

What are the key questions that futurists usually ask about each factor involved in social change? The following six questions would appear to be particularly pertinent:

1) How quickly does the factor change? How volatile has it been in the past and what is expected in the future?

2) Are the changes expected favorable or unfavorable?

3) Is it possible to speed up or impede the developments forecast?

4) Do experts agree about what will happen to the factor?

5) With what other important elements is this factor interrelated? On what developments does it depend? What other phenomena does it influence?

6) Is the factor a brake on social change or a factor that accelerates it?

The limited state of present understanding of social change is expressed bluntly by Donald N. Michael.[1] Mr. Michael refers to Raymond A. Bauer's Social

1. D.N. Michael, The Unprepared Society (New York: Basic Books, 1968.)

Indicators and says, "This book makes amply clear that, for the most part, we literally don't know what we are talking about when we attempt to quantify complex cause-effect relationships among societal processes." (Michael, p. 9)..."Partly the difficulty of forecasting results from inadequate or nonexistent data about those aspects of society that one needs to measure in order to predict. More fundamentally, it is a matter of inadequate or nonexistent theory about the nature of complex social processes: we know relatively little about what to measure or observe in order to predict well." (p. 10).

B. Models of different types of change

Apart from models of society that attempt to explain social change, one finds models of different types of change. One very useful set of distinctions that Professor Leach employed in his study of Burma distinguished among phenomena, according to the manner in which they change; specifically, he finds phenomena that:

1. Change very slowly if at all--language, climate, certain customs;
2. Those that change in regular patterns, usually linearly--age distribution of population;
3. Those that conform to cyclical patterns of change;
4. Discontinuous and unexpected change.

One could extend Leach's distinctions somewhat by proposing subclasses.. The following questions about most phenomena would suggest further possible classes:

1. Is the phenomenon capable of change at all? Although virtually nothing is immutable, some things are almost unchanging for all intents and purposes.
2. If the phenomenon can be changed, what prior conditions must be met if change is to occur? How long a time do these prior conditions require? What forces facilitate and what forces obstruct its change? When one asks such questions about such economic institutions as the monitary system, labor legislation, requirements to be licensed as a physician, dentist, lawyer, engineer, accountant, etc., we see that these are virtually unchanging institutions when one forecasts for periods of 25 years or so--in the absence of some emergency.

Exhibit 3

I. People

A. Medicinal Science--birth defects, disease
B. Human engineering--regulation of emotion
C. Learning ability, skills,
D. Values
E. Aggression--cooperation
F. Adaptability to change
G. Structure of ties among family members
H. Sexuality--and its effects
I. Population
J. Drug Problem
K. Privacy

II. Man-Made Institutions--their adaptability, their responsiveness, their representativeness

A. Public (Problem of shift in proportions of public vs. private consumption)
1. Government: caliber, authority, sturcture, attractiveness as source of employment.
2. Law and order: responsiveness to economic, social and particularly racial pressures.

B. Private
1. Mainly business: (a) wholly private; (b) public utilities.

C. Middle ground: 1) church, 2) schools and 3) hospitals.

III. The City

A. Size: 1) center-city, 2) suburbs, 3) inter-urban situation

B. Quality of life: 1) availability of time, 2) noise, 3) congestion; 4) opportunities for social interaction.

C. Safety of streets: 1) elimination of poverty, 2) technology of crime prevention.

D. Traffic and transportation

IV. Ecology

A) Air; B) Water; C) Waste Disposal; D) Parks

V. Technology: Hardware

A) Metals; B) Power; C) Military Technology; D) Chemistry;
E) Computer; F) Electronics; G) Laser/maser; H) Synthetics-plastics.

VI. Education/Information/Science (Software)

- A. Basic scientific developments--new fundamental knowledge.
  - 1. Anti-matter
  - 2. Human Engineering--child rearing; deviates
- B. Speed of information accretions
- C. Ability to summarize, compress, communicate new knowledge

VII. Resources (Natural)

- A. Supplies of natural resources
- B. Substitutes for natural resources
- C. Man-made water

VIII. International Amity

- A. International cooperation in various spheres
- B. Disarmament
- C. Aid to under-developed nations
- D. War

IX. Transportation

- A. Speed
- B. Cost
- C. Safety

X. Weather Control

XI. Recreation, Arts and Culture

XII. Social Invention

- A. Interest in social invention--partly spurred by futurism
- B. Receptivity to new ideas
- C. Spread of knowledge that will facilitate it.

3. Is it theoretically possible that this phenomenon would continue to change indefinitely at the same rate as it has changed in the past? Can we see some "ceiling" that limits the upward change, or some absolute minimum? Of course, answers to such questions are perilous, for most limits have turned out to be movable. Still, the phenomenon that continues to grow unabated save for minor spurts and starts, is the exception rather than the rule. Population change in the last Century has been enormously more rapid than it was five centuries ago; it is nevertheless naive to assume that current or recent trends will persist for a very long time. Although the rapid population growth found in most of South America and the Middle East could continue indefinitely, a continuation of such increases after those areas have already reached conditions of devastating over-population is virtually impossible. Especially if the means are available to abort pregnancies easily and early--as most futurists would predict--it is most unlikely that any nation would strangle itself by population increases beyond some point far short of the theoretical maximum.

4. Is the phenomenon one that reflects the wishes and values of the people at large, or is it determined by some institution? Those that are subject to arbitrary and quick decision by, say, government, business, educational insituttions, etc. are likely to change more swiftly and sharply than those reflecting individual consumer choice.

5. Is the phenomenon one that can be reversed readily in direction? Or, does it change in ratchet-like manner?

6. Does the phenomenon reflect a response to a series of underlying forces or is it essentially the result of a singel influence?

7. Does change come to be considered periodically--as in sessions of a legislative body, an annual plan, etc.? Or, does it occur more or less uninterruptedly?

V CONCEPTS THAT AID IN THE INTERPRETATION OF LONG-RANGE FORECTSTS

As indicated, no long-range forecast is either accurate or inaccurate on its face. Some seem more plausible than others, but if the future is going to diverge so much from the past, our appraisals of forecasts are likely to be unreliable, for they must apply standards of what was reasonable in the past. On the other hand, some concepts that relate to the nature of insitutional change help in an assessment and interpretation of change; they also assist in appraising long-range forecasts and in the production of forecasts.

A. Concept of "institutional mix"

Almost every aspect of society represents a highly heterogenous mix. For example, schools differ in size, location, age, caliber of instruction, methods of instruction, underlying educational convictions and student objectives; governments differ in progressiveness of principles, methods, caliber of personnel, responsiveness to population's needs, information about unfilled needs and ability to attract qualified personnel; retail stores differ in size, location, merchandising strategy, mode of operation, institutional form, degree of vertical integration; any religion differs in its number and hostility of its separate sects, the religious committment of its followers, etc. This pattern is repeated endlessly in industry, where we find some large modern progressive firms and some almost at the opposite extreme; hospitals, penal systems--indeed, just about everything--conforms to this pattern of diversity.

An examination of the basis for this diversity is instructive. In part, it reflects differences in the awareness, intelligence, responsiveness, willingness to assume risks, etc. of individuals. In larger part, it seems to reflect differences in objective circumstances that make it wise for some to retain the older forms that adopt newer ones; the new modern institution is not always the most efficient; modern technology often adds more to costs than to benefits, especially for some who are partly locked into the old.

In most sectors of society when some innovation has occurred, we find that it is accepted first by only a few--the most venturesome. On the basis of their favorable experience, others imitate them; these too usually are risk-takers and usually include those that are so situated that they can readily alter their methods. In time, others, including some that are conservative, switch to the new method as their situation makes a shift easy. Only after a long time has passed will the conservative adopt the new method. By this time another innovation

often will have occurred and they will remain "behind the parade." Some do not change at all; they just fade away, for they are incapable of much adaptation. They survive, retaining the old methods as long as they are able.

As illustrative of this phenomena, consider the field of food retailing in the area of the U.S. where it is most highly developed--in New York City and its environs. Co-existing are almost breathtaking modern emporiums with incredible variety, modern fixtures, attractive displays, impeccable cleanliness, etc. at one extreme with hucksters selling fresh fruit and vegetables, "momma and poppa" stores that are smaller than the average living room, dark and dirty with a most minimum assortment; and, of course, many gradations occur between the two extremes.

Accordingly, when one meets a forecast of some dramatic new development promising far greater productivity or yielding new benefits, one must expect an expansion in the mix of institutions or activities that will be found and decide which elements in the mix will be moved aside to make room for the new. New developments are followed by a mix rather than a complete replacement of the old by the new.

This concept leads one to expect a relatively slow course of change; certainly, not all things, people or institutions change at once. On the other hand, the speed with which new developments displace old arrangements is becoming more rapid.

B. The inflation analogy and the nature of change

A rapidly rising price level would not cause much difficulty if all other monetary quantities increased in exact proportion. If incomes, contractual obligations, debts, etc. all rose by the same proportion (some would say absolute amount), then everyone would be equally well off, or virtually so. In fact, of course, such proportionate change does not occur. Almost everybody is either ahead or behind during an inflation in various compartments of his financial life.

He may gain because his housing is subject to an unchanging 10-year lease but lose because he own bonds with a fixed dollar coupon; his salary may rise in proportion to the general cost of living, but he may need extensive medical services, whose cost may rise faster than his income.

The analogy between an inflation and a period of rapid social change rests on the notion that the main ingredients of a society are interrelated; people's knowledge and behavior must be changed to accomodate a change in technology; changes in values ordinarily require adaptation in working arrangements. If one finds that the various elements of society do not change in some harmonious manner--changes in one sector being adapted to and facilitated by other sectors--one finds friction, misdirected effort, inefficiency, discontent, with resulting tension, dissent or violence.

Accordingly, one wants to look to those sectors of society that are most volatile--most likely to change dramatically--and those that are highly stable. The second group could slow down the first. Also, one would in particular want to insure that the processes affected by the volatile sectors of the economy were responsive to change, and thus facilitated it.

C. Brakes on Change

We can well understand that strong pressures push in the direction of generating change. Often the financial rewards it offers are very great. Also, creative people obtain large psychic rewards from developing new ideas and having them implemented. But, change encounters a variety of resistances that should be recognized. One would want to be reassured, in considering any specific forecast, that account had been taken of these resistances.

In most cases, even as certain individuals profit from change, others are injured by it. Although the opportunities for individauls and organizations to obstruct change seem to be no match for pressures toward change, some are able

to slow it down. We really know very little, for example, about the power of firms who would suffer as the result of a technological change, to slow its adoption--or to prevent its introduction for a considerable time. Nevertheless we must expect a significant difference in the rate of change when all concerned welcome it and when powerful organizations oppose it.

Even where change is welcomed in principle, many factors make its acceptance surprisingly slow. In the first place, those who will make the change must learn something new and unfamiliar. Learning is required by both those who would make the change (produce new equipment, design a new marketing system, etc.) and those who would use it. In this process, mistakes are often common and damaging. Not infrequently, good ideas seem poor because of these mistakes, or because it appears that great difficulties must be overcome to adopt the new idea.

Second, a new idea tends to undercut those individuals who are associated with the old--often threatening influential people with a loss of job or status--while elevating others. Those threatened often resist and oppose the change; if very serious injury is threatened they can develop great power and can prevent change almost indefinitely. The power of vested interests, whether they be in business, government, educations, the church, professional associations, sports, etc. is well known to anyone who has tried to have them change their ways.

Third, new ideas often require an investment of resources. These are usually limited. Not every firm that knows of and wishes to adopt a new imporved technology possesses the necessary means.

Fourth, use of the new and unfamiliar imposes risks of loss. Nothing is guaranteed to succeed and few organizations have not suffered losses on what seemed "sure things."

Fifth, change often requires the acceptance of an offensive principle or value. Sometimes a technological development would benefit the few who are able to make use of it at the expense of a large number of people. The principle

of allowing injury to many for the advantage of a few can arouse opposition from the large number who are neither helped nor hurt. (Much of the opposition to the SST seems to rest on that kind of reaction. Many who oppose the SST nevertheless strongly endorse change in principle.)

Sixth, most change is frightening to some and very uncomfortable for many, partly because they cannot confidently predict its effects and partly because it is unfamiliar. Few people like to see an increase in the number of things they do not understand and cannot control. Their personal (emotional) security is threatened and maybe even their self-esteem. Much of this pattern of response is unconscious and is felt by the very individuals who press for innovation and decry obstruction to change.

Enough has been said to indicate that a big gap exists between the emergence of a new improved option and its effective implementation. Obstacles, resistance, outright opposition, a lack of resources, unwillingness to take financial and other kinds of risk are not uncommon barriers to beneficial change. In some situations, they not only prevent the adoption of an improved option but discourage innovative persons from even trying to conceptualize new and better ways of doing things.

VI THE PACE OF CHANGE IN THE FUTURE

One can find evidence to support widely different conclusions about the pace of change in the future. One conclusion that emerges from the literature on futurism, without a single dissent, is that change will be far more rapid in the future. That conclusion does not indicate whether society is on a rocket or on a metroliner.

Students of social change literally examine hundreds of society's aspects. Still, only by analyzing <u>all</u> of society's significant features, which includes many that are not ordinarily considered and by taking account of the inter-

relations among them, the limited resources available to implement change and the many resistances to change, can one form a reliable assessment of future change. However, futurists are highly selective, generally emphasizing relatively few aspects of society, they could therefore easily convey an erroneous conclusion.

Let us try to make a case for the thesis that change, albeit more rapid than in the past, will not revolutionize our society in the next 30-50 years. One might make a first pass at this issue by looking at the recent past. A modern-day Rip Van Winkle with a good memory who revisited New York City after having slept for 20 years really would not find it difficult to get around the city. He might miss his stop on the old familiar subways because he was distracted by women wearing mini-skirts, which might represent the most dramatic change since he took his long nap. Even if he had napped for 40 years, he would have very little trouble in finding his way around downtown New York. He would find styles of clothes and cars substantially changed, but he would have been conditioned to expect that from conditions before his nap. People would be speaking and thinking in much the same way as he remembered and their goals would not seem to be much changed.

Should Rip visit a college classroom, a church, a government bureau, a meeting of the City Council (or Congress), he would observe conditions very similar to those of forty years back. In their essentials, relations between employer and employee, husband and wife, teacher and student, voter and office-candidate, parent and child will not have changed radically.

On the other hand, if Rip were to visit some of the open fields surrounding New York City in 1950, he would find that a near revolution had taken place. He would find there some towns that had been built up and reduced to near-slums during his nap. Similarly, if he observed the planes overhead, the frozen foods in supermarkets, the drug addicts on the street, the range of antibiotics in drug stores, and read about ghetto unrest, crime in the streets, open-heart

surgery, computer developments, etc., he would feel that he had awakened to a new world.

Neither of these extreme views is reasonable. Certainly, one must be wary of the "gee whiz" approach to the future--the tendency to concentrate on and take as typical those things that are changing in a revolutionary way. We must not overlook the fact that many people apparently think, behave, feel, react and live in much the same way as they did many years back. Nations cannot easily pull down their major buildings, destroy suburbs, retrain teachers, reindoctrinate religious figures, brainwash political leaders (just think of the average age of the members of Congress), eradicate prejudices, etc. Even if technological advance were to permit an enormous number of major improvements, even the richest nations in the world lack the resources to implement all of them.

A modern industrial society can certainly change rapidly, but is most unlikely to undergo a rapid and total transformation, even over a fairly long time. It may be useful to think of the U.S.S.R. in this connection. The Russian Revolution occurred more than half a century ago and was followed by a period of intensive effort by determined and ruthless leaders to build a dramatically new society. Not all would assess their effects in the same way, but it seems more remarkable that so much remains of what went on before the revolution than that so much has changed.

If the world endures until the year 2000, it will probably retain most of its basic features. Some of these features will be substantially less important than they are today because new features will emerge and exert greater influence. In other words, we will continue to have a mix of almost everything. Those features that are now most important will probably be quite important in, say, 30 years, though less important than they are now.

Also, one must wonder about the effect of the speed of change on the willingness of decision-makers (including government) to adopt change. Beyond some point, business investment is discouraged by rapid changes in technology and especially any unsettling of values, shifts in political power, etc.--all common concomitants of rapid change. And, one must reckon with the danger that very rapid change and social turmoil might lead to efforts to control and limit change by those who feel threatened by it. As has been argued already, the pace of future change will be, at least in part, what we desire it to be.

Nuclear power could suddenly create a future that is totally different from the past by ending human life. Another development that is a more likely source of sudden and drastic change--for, hopefully, nuclear bombs will not be used in anger--is the polarization of political outlooks and basic values combined with an unwillingness to compromise or "live and let live."

By concentrating on particular facets of society, one can easily be dazzled by past change. When one views the totality--how people think, feel, behave, etc.--one might take a different, though certainly not an opposite, view. The computer, the atomic bomb, supersonic-speed aircraft missiles, open-heart surgery, transistors, space travel and such things have been with us for over a decade, but who would say that they have collectively made life in 1970 unrecognizably different from what it was in 1955? On the other hand, how could one assume that in thirty years conditions will be much the same as now?