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NOTE ON REVISIONS AND ADDITIONS TO CTCM:

The '5' in File No. 100-F-5 indicates updating to June 7, 1970.
The '9' in File No. 99-F-9 indicates updating to October 25, 1970.
The '10' in File No. 98-F-10 indicates updating to March 28, 1971.
The '11' in File No. 98-F-11 indicates updating to July 4, 1971.

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p. 8, table by
John Platt

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TWO SETS OF PAGE NUMBERS:

Each page will be labeled with the volume and issue numbers of CTCM and with a "File Number." One may rearrange the pages of the cumulated issues by file numbers to put the sections in the order of the proposed book.

EDITORIAL NOTES:

The first or prime question on which this series is based is the survival of human civilization on the planet Earth. The second question is about the quality of human life on this crowded planet. To get at these questions I shall make hypotheses on the basis of the process of "technological meditation," which will have to be tested, and verified, modified, or rejected when the evidence is collected.

I make two basic hypotheses in regard to the survival of human civilization:

- CRITICAL
PATH OF
EVOLUTION
- (I) There is some critical path about which the evolution of human civilization must stay close or else the present leading countries will collapse, leaving the evolution of civilization to be carried on by some other culture.
- COLLAPSING
COUNTRY CAN
DESTROY LIFE
BY RADIATION
- (II) The problem is compounded in that the major countries can destroy human life on this planet in the process of their societies collapsing. This means that we cannot be satisfied with letting a major power collapse like the disintegration of ancient Rome. A collapsing civilization must either be brought down gently or transformed to get it on the critical path of successful evolution to the next stage of more human organization. Since the development of atomic fission bombs and hydrogen fusion bombs, a collapsing major country could trigger a nuclear war that could contaminate the biosphere with sufficient radioactivity to destroy human life on this planet.

Then I add two hypotheses on how we can solve these problems:

- HOMEOSTATIC
CYBERNETIC
FEEDBACK
LOOP SIMULATION
- (III) The most fundamental approach to understanding the social problems of the world is the cybernetics feedback loop or homeostatic approach. This approach will gradually be extended by various simulation techniques using computers as a prime tool. This approach has some drawbacks in that many of the human factors are difficult to simulate in a formal way, so that there is danger that simulations may omit important factors.
- ENTROPY-LIKE
PROPERTIES OF
SOCIAL SYSTEMS
- (IV) There is a complementary method, namely that of estimating the values of entropy-like properties of the social systems. These techniques may give fuzzy answers, but will tell us whether we are going in the right direction. Attempting to define entropy-like properties of social systems brings into focus the necessity for equivalent completeness theorems which remind us not to forget the more subtle human factors.

Although I have not specifically emphasized population control and ecological balance in the above statements, they both enter hypotheses (III) and (IV) above. They are specifically listed with the appropriate ratings of estimated time to crisis and estimated crisis intensity in Dr. Platt's table in section 1.1.3.

For the immediate present this series of papers will concentrate on material relative to hypotheses (I) and (IV). The development of an understanding of what are the viable critical paths of social evolution will give us clues as to how we can solve the problems of participatory democracy listed with 10^8 crisis intensity for the period 5 to 20 years time to crisis by Dr. Platt. To simulate in detail the functioning of our social-political-economic system by a thorough homeostatic cybernetic feedback loop simulation system might require the order of magnitude of \$6,000,000.00 to complete. The analysis of partial systems by use of the entropy-like properties of certain aspects of the social systems would cost about \$6,000.00 per segment. I believe that I can accomplish more by helping define what needs to be done on a few analyses costing about \$6000 each, rather than tackling the problems of financing and planning for a \$6,000,000 project.

Now I shall review briefly what is included in this issue. Section 1.1.2 on what stage of development displays graphically the rise and fall of twenty civilizations abstracted from Toynbee's Study of History to give us a perspective on the range of life spans of civilizations. Section 1.1.3 on national priorities reproduces Dr. John Platt's table classifying problems and crises by estimated time and intensity. My reaction to Dr. Platt's proposal is given in Section 1.1.4 on the computer and Esalen. I agree with his rating of problems, but feel his proposal of a gigantic scientific task force must be modified to include an interaction between the computer-intellectual method and the Esalen-encounter method.

In Section 2.1.2 I discuss in more detail the significance of the curves of discoveries and technological inventions in respect to the force, power and communication eras of civilization.

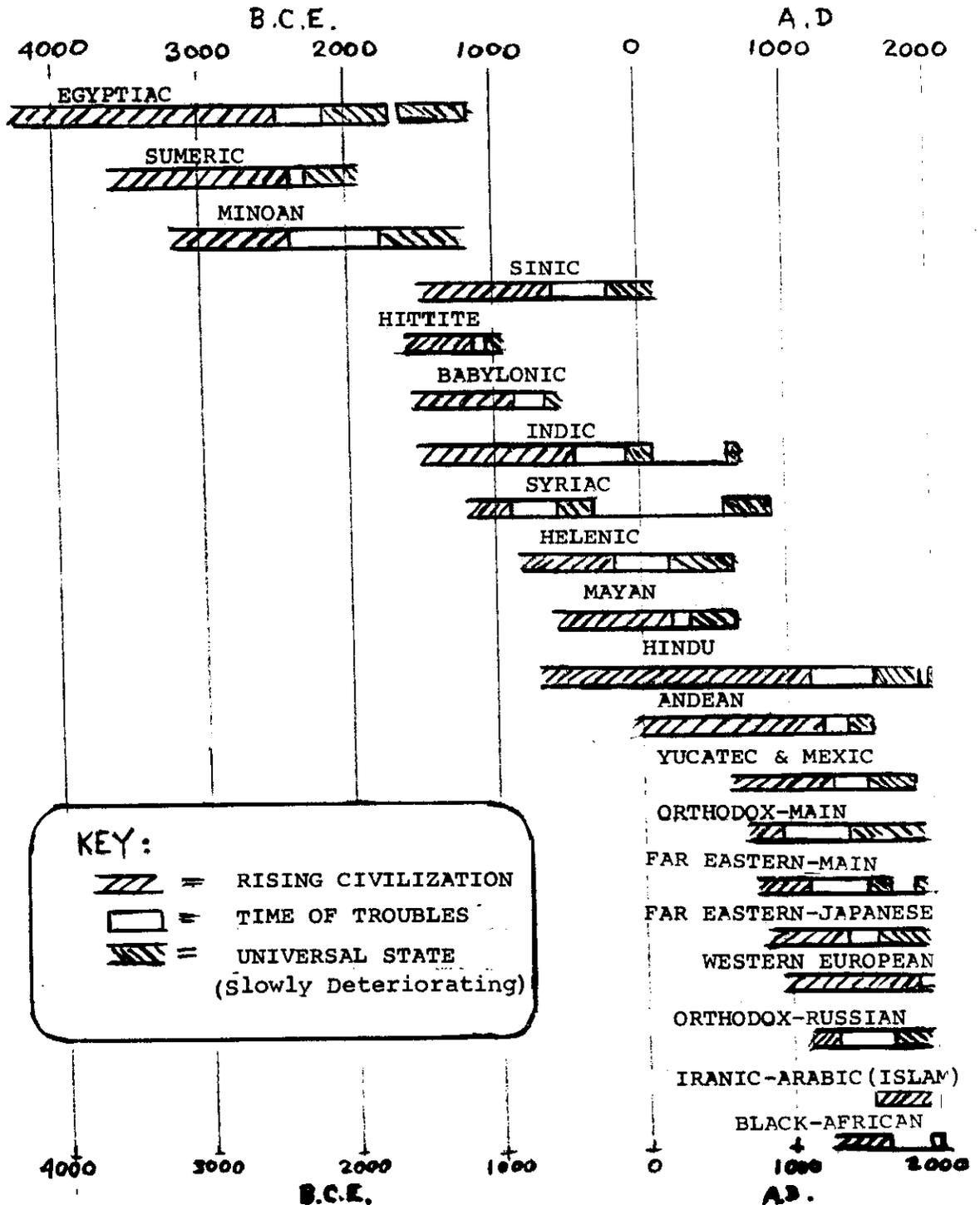
Since I have not been able to fill in many points in the matrix for testing hypotheses in Section 2.1.4 p. 3 and Section 2.5.1 p. 9, I have started an informal listing of questions and responses in Section 2.5.3. In order to give a perspective of what other people are doing, I have started Section 3.9.4 to list important books, reports, projects, and NSF grants, etc.

Back issues available of CTCM and of selected issues of Socio-Engineering Problems Reports are listed in Section 3.9.9.

POLICY ON LETTERS TO THE EDITOR

One page per single issue (or two pages per double issue) are reserved for printing letters to the editor which relate to articles in previous issues or to the material outlined in CTCM Vol. I, No. 4-X, October 1970.

The historian Arnold Toynbee has tabulated the stages of development, rise, and decline of the major civilizations that have existed on our planet. He has observed patterns of development that are typical for the life cycle of a great civilization. The rise and fall of the major civilizations analyzed by Toynbee are shown on the chart below, plus Black-African which was not on Toynbee's main list.



This chart was constructed from a summary of data in Tables I - V in D. C. Somervell's abridgment of Arnold J. Toynbee, A Study of History, vols. I - VI, Oxford University Press(1946). I have not attempted to update the chart for recent events such as the development of the Chinese People's Republic and the developing independent Black Nations of Africa. Toynbee had already classified Western European Civilization including the United States as well into the 'Time of Troubles' period. Unless we use our knowledge of how to analyze social problems and simulate possible solutions by utilizing the capabilities of our cybernetic systems, the conclusion from Toynbee's analysis is that we may be heading for a new "universal state" or a "Neo-Babylonian Empire" --- like the later years of the Roman Empire, or the Mongol Golden Horde of Ghenghis Khan's descendants, or the Turkish Ottoman Empire.

We have the great advantage of being the first major civilization in crisis that has the knowledge of how the earlier civilizations failed to live up to their ideals. We also have the further advantage of having both the capability of simulating social processes through use of our knowledge of cybernetic systems and the computing power to make practical calculations of alternative simulations. (For a current example see Jay W. Forrester, "Counterintuitive Behavior of Social Systems," Technology Review, January 1971, pp. 52-68)

Will we use these skills, knowledge, and technology? It is unlikely that the existing establishment institutions will do much with these capabilities except where these same skills and technology can help build the new universal state. For a discussion of the outlook for America, see the recent article by Professor Bertram M. Gross on "Friendly Fascism."(*)

If you want your civilization to survive in a way that maintains respect for human dignity, you must learn something about the evolution of human societies and learn something about cybernetic systems and technologies so you can do something constructive about it. The hippies, Weathermen, Black Panthers, and many others correctly perceive the signs of the New-Babylonian Empire emerging. However they need more sophisticated analyses to develop a successful opposition strategy.

If you want your civilization to survive and to become more democratic and to provide better opportunities to all its citizens, you must learn about how the optimum balance between stability and diversity can be quite different at different stages of development of civilization. Is your bureaucracy still in the pre-industrial stage, or has it advanced to either the capitalist stage or the alternative socialist development stage, or has it entered the post-industrial stage? Correct determination of the stage of your bureaucracy is a necessary prerequisite for developing the right strategy for a program to enhance human freedom.

Further, I shall discuss an hypothesis that has not yet been adequately tested, on the form of evolution of systems which has relevance for physical systems, chemical systems, biological systems, psychological systems, and social systems. Basically there appears to be a spiral form of development that, provided one can find the right coordinate system, exhibits a similar form on all the above levels of phenomena. See CTCM Vol. I, No. 1-2, pp. 8A-8B, 11-13. (File Nos. 100, p. vii-viii; Nos. 121, pp.1-3)

* Bertram M. Gross, "Friendly Fascism: A Model for America," Social Policy, Nov-Dec 1970. Summarized in Current, Feb 1971, pp. 13-25, as "A 'New-Style' Fascism in America?"

A recent article in Science* listed the problems facing the United States in a table based upon the crisis intensity and the estimated time to the crisis. After nuclear or RCBW escalation the following were listed at the top for the crises of the next five years: Administrative management; Slums; Participatory democracy; and Racial conflict. The article in Science proposes a great mobilization of scientists to attack these urgent problems.

* John Platt, "What We Must Do?" Science, 28 Nov 1969, pp. 1115-1121.

Dr. John Platt of the Mental Health Research Institute at the University of Michigan has tabulated the major problems facing our civilization. Table 1 on the next page is from his paper in Science. He says that the human race is on a sharply rising "S-curve" of change. He thinks that if we could learn how to manage these new powers and problems in the next few years without killing ourselves by our obsolete social structure and behavior, we might be able to create a new and more effective social structure that would last for many generations. He further states that the trouble is that we may not survive the next few years.

Dr. Platt thinks that the problem requires something very similar to the mobilization of scientists for solving crisis problems in wartime. He believes we need large numbers of scientists forming something like research teams or task forces for social research and development.

I agree with Dr. Platt's priorities, but I am concerned about how his proposed task force of scientists would be set up. The prototypes for task forces of scientists come from World War II, where the problems were essentially in the realms of physics, chemistry, and engineering where the scientists were outside of the subject matter of their research. In this case the scientists who might be put on this task force are a part of the social system whose symptoms of disease they are supposed to be studying. I am afraid that such a task force might tend to study only the properties that could be

precisely represented by computer simulations to the neglect of many important aspects of the social problems. We might say that there is a danger of the task force using only a "Computer-Intellectual" approach. I shall discuss this potential imbalance in such research task forces in another chapter. At present the important thing is that Dr. Platt has compiled the problems of our civilization in a very significant way through his matrix of grade of crisis intensity versus estimated time to crisis.

Table 1. Classification of problems and crises by estimated time and intensity (United States).

Grade	Estimated crisis intensity (number affected X degree of effect)		Estimated time to crisis*		
			1 to 5 years	5 to 20 years	20 to 50 years
1.		Total annihilation	Nuclear or RCBW escalation	Nuclear or RCBW escalation	• (Solved or dead)
2.	10 ⁶	Great destruction or change (physical, biological, or political)	(Too soon)	Participatory democracy Ecological balance	Political theory and economic structure Population planning Patterns of living Education Communications Integrative philosophy
3.	10 ⁷	Widespread almost unbearable tension	Administrative management Slums Participatory democracy Racial conflict	Pollution Poverty Law and justice	?
4.	10 ⁸	Large-scale distress	Transportation Neighborhood ugliness Crime	Communications gap	?
5.	10 ⁹	Tension producing responsive change	Cancer and heart Smoking and drugs Artificial organs Accidents Sonic boom Water supply Marine resources Privacy on computers	Educational inadequacy	?
6.		Other problems—important, but adequately researched	Military R & D New educational methods Mental illness Fusion power	Military R & D	
7.		Exaggerated dangers and hopes	Mind control Heart transplants Definition of death	Sperm banks Freezing bodies Unemployment from automation	Eugenics
8.		Noncrisis problems being "overstudied"	Man in space Most basic science		

* If no major effort is made at anticipatory solution.

A recent article in Science(*) listed the problems facing the United States in a table based upon the crisis intensity and the estimated time to crisis. (Table is reprinted in CTCM-File No. 113) I agree with the definition, priorities, and times to crisis, but not with the plan of how to solve the problems. I am concerned that the proposed massive task force approach might be subject to "co-optation" by the "warfare-welfare-industrial-communications-police complex" or the new American friendly fascism discussed by Professor Bertram M. Gross.(#)

Solutions to these problems are more likely to be found by developing a method of cooperation between what I would abbreviate as the "Computer-Intellectual Method" and the "Esalen-Encounter Method," which would be less susceptible to "co-optation." Further I feel that this method of development of cooperation between two different approaches is more likely to succeed, when tried on an informal local level with the principal work done evenings and weekends, where not subject to control by the establishment. An important ingredient of this type of cooperative research is that a few members of any research team must be working at least four days a week on main-line engineering or computer-science projects in order to have the conditions suitable for what I call "technological meditation" to occur(%). There are also other conditions, such as the nature of the scientists background and how they learned mathematics, that can inhibit or promote the process of "technological meditation." (@)

To return to the hazards of massive task forces of scientists doing research on our major sociological problems, let us examine the work of Dr. Herman Kahn, formerly of RAND Corporation, and more recently at the Hudson Institute. His books such as On Thermonuclear War, Thinking About The Unthinkable, and On Escalation: Methaphors and Scenarios are prime examples of the use of pseudo-science to help support an escalation of military activity in Viet Nam, instead of attacking the real social problems of the world.(§)

* John Platt, "What We Must Do," Science, Vol. 166, pp. 1115-1121, 28 Nov 1969. Reprinted as "What We Must Do: A Mobilization of Scientists," Ekistics, Dec 1969, p. 450. Also summarized in Current, sometime in 1970.

Bertram M. Gross, "Friendly Fascism: A Model for America," Social Policy, Nov-Dec 1970. Summarized in Current, Feb 1971, pp. 13-25.

% Frederick Bernard Wood, "Technological Meditation," CTCM, Vol. I, No. 1-2, pp. 19-21(CTCM-File No. 215), Jun-July 1970.

@ Joaquin E. Murrieta(pseud.), Letter from Lost County, Calif., in "The Tool-Maker's Dilemma," MANAS, Vol. XVIII, No. 17, April 28, 1965, Manas Publishing Co., P.O. Box 32112, El Sereno Station, Los Angeles, Calif. 90032, pp. 6-7.

§ A more recent book of Dr. Kahn's, The Year 2000, gives a better balanced analysis. However, the projections are more in the nature of extrapolations, rather than the needed structural analysis of social evolution. It is probable that many of Dr. Kahn's analyses are correct for a "Power Era" situation, but social evolution has moved sufficiently far into the "Communication Era" such that power era analyses aren't valid. (See CTCM-File No. 212).

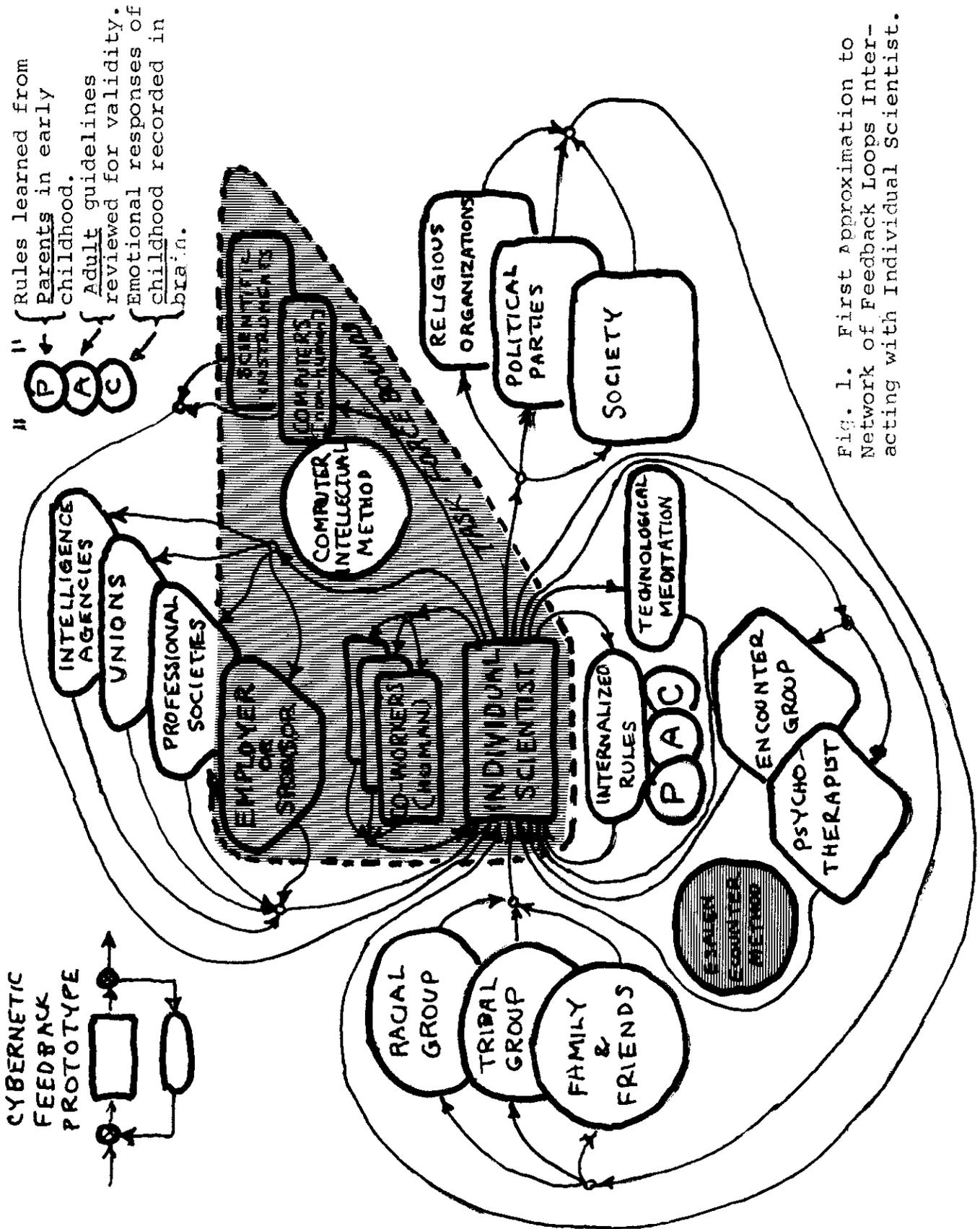


Fig. 1. First Approximation to Network of Feedback Loops Interacting with Individual Scientist.

To improve the chances of research on social problems being free of direct and indirect bias, we must establish a perspective of what items influence the scientist working on social problems. To help understand these problems I have drawn Fig. 1 as a first approximation toward showing the systems interaction between an individual scientist and his environment. I have developed this system as a composite of many negative feedback loops. A simple negative feedback loop from cybernetics is shown as a prototype in the upper left-hand corner.

The individual scientist reacts to the different segments of his environment and receives feedback from his family, employer, and society plus a number of other elements in society as indicated in the diagram. If these subtle influences are not understood, the social scientist may be inhibited from making impartial judgments. The internalized rules the researcher has stored in his brain need to be examined so that he knows which are copies of rules picked up from observing his parents in early childhood, which are guidelines that have been properly reevaluated, and which are really recordings of the associated emotional feelings during his childhood.

The main section of this diagram, shown in vertical cross-hatching, represents the elements that would be officially considered in a task force attack on urgent problems. This is presumed to be derived from our country's previous success in setting up task forces to design new military weapons. I have inserted a white circular label in this section marked "Computer Intellectual Method" to indicate what I think would be the predominant approach, if a large-scale task force was set up in response to Dr. Platt's definition of the urgent problems.

All the elements outside the vertical cross-hatched section need to be considered too. This is important to insure that the computer simulation models set up by the scientists are not seriously distorted by the rules absorbed by the scientists from their parents in early childhood. They need also to understand how their emotional experiences during early childhood disturb their choice of data. One way that research workers can develop an independence from most of these distorting influences is by psychotherapy under the direction of a psychiatrist. Alternatively considerable benefits can be obtained through other procedures such as transactional analysis, encounter groups, group therapy, and/or psychodrama. I have grouped all these under the label (horizontal cross-hatching) "Esalen Encounter Method."

There is a book written by a psychiatrist which explains one approach to psychotherapy, namely transactional analysis, in a way that is easier for engineers and physical scientists to understand compared to classical psychoanalytic theory -- "I'M OK -- YOU'RE OK"(*) This transactional analysis looks at the recording of one's past experience (during early childhood) as consisting of three parts, namely the 'Parent', 'Adult', and 'Child' parts.

* Thomas A. Harris, M.D., I'M OK-YOU'RE OK - A Practical Guide To Transactional Analysis, N.Y.: Harper & Row(1969)

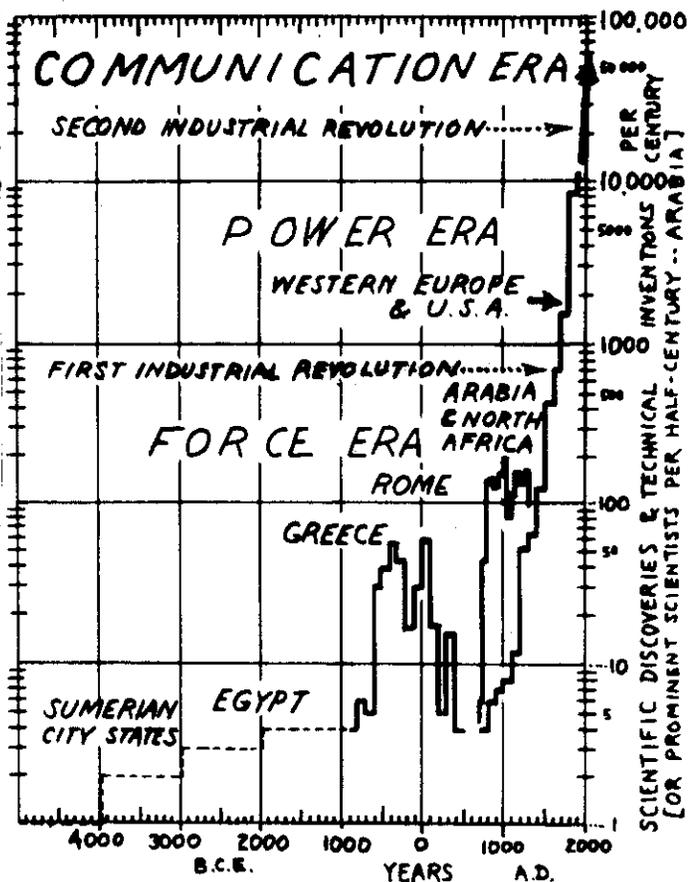
The block marked "Technological Meditation" in the diagram represents an important feature about which little is known. It appears to be an important ingredient for the development of thematic hypotheses on social processes. There also seems to be a critical ecological time balance involved in the processes of technological meditation. An engineer working five days a week on computer-communication systems and one day a week on sociological systems may have a near optimum time distribution for the spontaneous development of "technological meditation." It might turn out that two days a week on sociological research with four days a week on computer-communication systems would produce more results. There is some indication that working on both sociological research and engineering systems concurrently is an essential ingredient of technological meditation. We have to be careful that we do not destroy the delicate balance by well meaning attempts to increase the research on urgent social problems. For example, if an employer in a generous mood of social responsibility told a few engineers in his employ to drop their engineering work and devote their full time to sociological research, it might not result in much more advance in the solution of the social problems. However there is some indication that if the employer told the same engineers to take one day off with pay to work on the social problems, that more progress would be made due to the overlapping of the concurrent engineering and sociological research through the form of common concepts in information theory and cybernetics which were brought into focus by technological meditation.

If we sincerely want peace and freedom for the human beings on our planet, we must examine the sociological and technological conditions of the world. When ISAIAH talked about beating swords into plowshares there was no immediate practical hope of such events being feasible in a civilization based on the technology of "FORCE." When the tools of production evolved to another level, namely the "POWER ERA" it was possible for religious leaders to get some concrete action to abolish slavery. As slavery was a characteristic of the Force Era, wars of destruction using power era weapons are a characteristic of the Power Era.

If human civilization is still in the Power Era, all righteous opposition to the U.S. action in Viet Nam is likely to be fruitless. However, if we are more than halfway into the next era -- called by some the "COMMUNICATION ERA" -- the policies optimal for the previous eras are no longer valid. Then our problem is to find what strategies are valid for the communication era, and proceed to apply them.

This view of history does not condemn the present leaders of our country as wrong, but says they are following the correct policies for a past era, and perhaps they haven't perceived the changes in the dominant tools of production in human society.

The characteristics of the three eras of human civilization are summarized on the next page.



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Fig. 1. Discoveries and Technological Inventions per Century.

Note: In the June 1970 version of the above figure, I called the third era "Information Era." Now I think that possibly "Communication Era" is a better label. Back in 1945 I described the era we were entering as the "Noösphere" -- as defined by W. I. Vernadsky of the USSR Academy of Sciences (American Scientist 33:1, Jan 1945). However there are theological aspects of Teilhard de Chardin's use of the concept "Noösphere" which are difficult for me to assimilate. I changed to use "Information Era" to label this new era. Now I think that the label "Communication Era" implies a more humanistic view. There are some people who label this new era as the "Cybernetic Era."

TABLE: THE THREE ERAS OF HUMAN CIVILIZATION:
 FORCE, POWER, AND COMMUNICATION.

<u>ERA</u>	<u>Characteristic of Major Tools</u>	<u>Notes on Social Implications</u>
Approx. Time Span		
FORCE	Force Amplifying 7000 Years Devices such as levers, pulleys, bows and arrows. Transition: First Industrial Revolution.	Led to the division of labor into agricultural workers, craftsmen, and standing armies. Also the first large cities at major river deltas.
POWER	300 Years Power Amplifying Devices such as the steam engine, electric motor, gasoline engine, diesel engine, atomic bomb, nuclear power generation, and hydrogen bomb. Transition: Second Industrial Revolution.	Led to the abolition of slavery on the basis that use of power amplifiers could produce more than slaves and that educated technicians were needed to maintain the power amplifiers.
COMMUNICATION*	25 Years Intelligence amplifying devices such as RADAR, SONAR, electronic computers, television, automated factories and chemical refineries, and communication satellites.	When half of the cost of an automobile consists of data processing and expediting of parts orders in connection with production control, it is safe to say that we are well into the the Communication Era. This communication era gives us the tools with which we could communicate with the Viet Cong, Cubans, Red Chinese, and many others to give people technical assistance in a constructive way without the need for military action. Force could be restricted to UN police action in the communication era.

*called "INFORMATION ERA" or "CYBERNETIC ERA" by some philosophers.

The basic ideas involved in the characteristics of the transitions between these eras are discussed briefly in the following reference:

Silvano Arieti, Editor, American Handbook of Psychiatry, N.Y.: Basic Books(1959), Vol. Two, page 1747, sec. on Information Theory in Chap. 87 on Mathematics and Cybernetics.

A more technical discussion of the concept of "intelligence-amplifiers" can be found in:

W. Ross Ashby, "Design for an Intelligence-Amplifier." Automata Studies, pp. 215-233, edited by C. E. Shannon and J. McCarthy, Princeton University Press(1956), Annals of Mathematics Studies Number 34.

In CTCM I/3-4 p. 15 (File No. 214) I planned a table for testing hypotheses. It was my intent frequently update the table with numbers and other symbols indicating degree of correspondence of each hypothesis with the known facts. I have found that it takes many cycles of letters or discussion with people to arrive at a conclusion suitable for marking in the table. To give the readers of CTCM some progress reports on what is happening in regard to the testing of hypotheses I have decided to issue a less formal report on the questions that have come up in regard to the hypotheses of this series.

In this section of CTCM I plan to list each major question that comes up in regard to the hypotheses of this series and first list my preliminary response to the question followed by later reports on what more definitive tests I have been able to make of the hypotheses in response to the question.

Question 1: (CTCM Vol. I, No. 3-4, p. 17) (File 232) Bryan Bergson objects to the "Thermodynamic Imperative."

Preliminary Response: I have prepared a modification to Lindsay's "Thermodynamic Imperative" and further state that it requires some kind of model to use with the "Thermodynamic Imperative" in order to apply it to a practical case.

The modification and a sample model are given in CTCM Vol. I, 3-4, p. 19-22. (File 232)

Question 2: Bryan Bergson still objects to the "Thermodynamic Imperative," but now proposes a first step in testing the hypothesis. He suggests that I publish a sample calculation of entropy change for a particular type of steam engine so that we will have a reference on the use of entropy from physics of engineering as a base from which to discuss the analogy of using entropy in social systems.

Preliminary Response: I now plan to prepare and publish such an example in some issue of CTCM as soon as practicable.

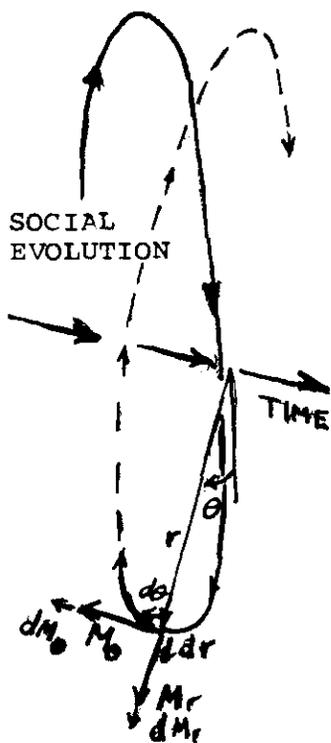
Question 3: Dr. Helmut Richter, Frankfurt a M., Germany, after reading an earlier draft of the material on the "Thermodynamic Imperative" that was published in the SSRS Newsletter, Bala Cynwyd, Pa., 19004, January 1969, objected to the maximization of ORDER. He says that we need to find something to maximize which for want of a better term might be called Harmony. (See CTCM Vol. I, No. 3-4, p. 18) (File 232).

Preliminary Response: If we defer translating "entropy" into more easily understood terms such as "order," and proceed to develop a communication theoretical model, and then try maximizing entropy, under some conditions we find that this leads to a balance between diversity and conformity. This balance between diversity and conformity may be a step toward what Dr. Richter calls "harmony." A preliminary discussion is contained in CTCM Vol. I, No. 3-4, pp. 19-22 (File 232). I have prepared a more detailed example, but expect it will be some time before there will be space in CTCM to print it. To solve this long time delay, I am considering reprinting some issues of SEPR's that are relevant to questions like this when there is likely to be a long time delay in printing a formal response in CTCM.

Question 4: A reader of my prospectus issue, Vol. I, No. 4-X, asks wouldn't it be more useful for you to get a job more directly working on the simulation of social systems at some university of research institute, instead of working in the computer industry?

Preliminary Response: I have two reasons for doing this work on evenings and weekends in addition to my computer-communication systems work. (1) I believe that there are still benefits to be derived by the process of "technological meditation" which I described in CTCM I/1-2, pp. 19-21; and (2) The sociological uncertainty principle requires that I stay within the system that I am observing in order to make observations with the limits of accuracy that the uncertainty principle allows.

Further Response: In regard to item (2) above, I am groping with the development of a sociological uncertainty principle, similar to the uncertainty principle in physics. Many years ago when I audited some sociology courses at Harvard, I learned that most large business, military, and political organizations in the history of civilization effectively prevented the accurate analysis of their problems for fear that an analysis of their problems would lead to the then present leaders being displaced, such that the failure to have a good analysis of their problems led to the downfall of the organization. I believe that if we can find the correct analogy to the uncertainty principle in sociology, that the useful evolutionary life of large organizations can be extended.



From Pittsburgh Staff, An Outline of Atomic Physics, N.Y.: Wiley(1937), p.153, we have the uncertainty principle in physics:

If a coordinate x is measured with an error of the order dx , an uncertainty dM_x in our knowledge of the corresponding component x of the momentum M_x is introduced by the very process of measurement. The uncertainties dx and dM_x are connected by the relation $dx \times dM_x \sim h$

where h is Planck's constant, and the symbol \sim denotes approximate equality.

Uncertainties connected by the relation:

$$dx \times dM_x \sim S$$

where S is an as yet undetermined constant of social systems having an analogous role as that of Planck's constant.

I feel intuitively that we can speak similarly of the coordinates and momentum in respect to the social evolution of a large organization or civilization as is illustrated in the sketch on the left. I have observed a number of economists and sociologists try to analyse social institutions with a precision greater than allowed by the sociological uncertainty principle and either disrupt the institution or get themselves thrown out. I feel that if they observed the uncertainty principle that they could have accomplished more in providing constructive criticism to the organization they were analysing and have stayed at a useful observation point in the social system.

COMMUNICATION THEORY in the CAUSE of MAN

Section 3.9.4: Book and Report Reviews.

CTCM Vol. I, No. 7-8, p. 17
File No. 394-F-11 p. 1

The function of this section is to provide short reviews of significant books, reports, and journal articles relevant to the application of General Systems Theory, Cybernetics, Information Theory and related fields of Communication Theory to the strengthening of democratic institutions on our planet.

Frederick Bernard Wood

Kenneth Watt and The Staff, Environmental systems group, Institute of Ecology, University of California, Davis, California. "A Model of Society," Simulation, April 1970, pp. 153-164.

Plans for a mathematical model of human society suitable for simulation studies of the consequences of rapidly rising population densities. California has been chosen as the model for this project. Four sets of systems diagrams are included in this paper which is a summary and an updating of an April 1969 report. These diagrams include: a basic conceptual model; a decision flow chart; an initial expansion of the basic methodological model; and a set of flow charts for possible effects of air pollution. Tentative conclusions dispute the widely held opinion that the energy efficiency of society is rising. This article concludes with the statement that there is a failure in some circles to face up to the fact that the total worldwide amount of industrial activity plus transportation that is possible per unit time is dictated not only by the pollution problem, but also by the maximum possible amount of heating of the biosphere which is possible before various type of geo-physical disaster occur. 16 references.

Simulation is the technical journal of Simulation Councils, Inc., P.O. Box 2228, La Jolla, California 92037. Subscription included in members dues. Nonmember price: \$28 per year, \$3 per copy.

The Office of Interdisciplinary Research, National Science Foundation, Washington, D.C. 20550. "A Report on Activities and Programs," Nov 1970. Describes IRRPOS program grants summarized as follows:

Oak Ridge National Laboratory; "The Environment and Technology Assessment": \$1,496,000.

University of California at Davis; "Environmental Decision-Making in the Lake Tahoe Basin": \$97,800.

University of California at Davis; "Land Use and Energy Flow Component of a Model of Society": \$448,000.

University of Denver, (Denver Research Institute); Denver: "Public Policy Intervention in Inter-Industry Flows of Goods and Services to Reduce Pollution": \$81,000.

Kansas State University, Manhattan: "Political and Scientific Effectiveness in Nuclear Materials Control": \$231,000.
Applied Physics Laboratory, The Johns Hopkins University, Silver Spring: "Fire Problems Research and Synthesis": \$370,796.
Harvard University, Cambridge: "Environmental Systems Program": \$589,800.
Michigan State University, East Lansing: "Design and Management of Environmental Systems": \$647,000.
Cornell University, Ithaca, New York: "National Energy Needs and Environmental Quality": \$189,250.
State University of New York at Stony Brook: "Urban Science and Engineering": \$503,100.
University of Illinois: "Interdisciplinary Study of Environmental Pollution by Lead": \$221,800.
Colorado State University: "Impace on Man of Environmental Contamination Caused by Lead": \$418,300.
Summer 1970 workshops at M.I.T. and University of Colorado.
Exploratory and planning grants to: Johns Hopkins University, Rand Corporation, George Washington University, Montana State University, Clarkson College of Technology, and Policy Institute of Syracuse University Research Corporation. See NSF Report for details.

"Buckminster Fuller's WORLD GAME," by Gene Youngblood, March 1970 Whole Earth Catalog \$1, pp. 30-32. (Whole Earth Catalog published by Portola Institute, 558 Santa Cruz, Menlo Park, California 94025)

Article describes Buckminster Fuller's developing \$16,000,000 computer complex and display system for simulating and displaying alternative scenarios of the problems of the world. This complex at Southern Illinois University at Carbondale is being used to display past trends and to project future trends of the problems of mankind to enable us to simulate possible solutions to the problems of mankind. World Game Seminars have been conducted and are planned at various centers in the United States and Canada.

For further information, write to Tom Turner, Director World Game, Southern Illinois University, P.O. Box 909, Carbondale, Illinois 62901. Tel: (618)-457-8064.

John McLeod, "A Statement of Personal Beliefs and Intentions," Simulation, July 1969.

A proposal for a World Simulation that would allow us to study the overall dynamic behavior of the global system. Plans to establish a committee of experts on computer simulation to review what has been done and what needs to be done in the way of developing computer simulations of the world systems and the various sub-systems.