SEPR No. 195

'Outline & Preface for a Book:

'HOW TO USE CYBERNETICS TO BEAT THE BURAEUCRACY'."

Preface for "How to Use Cybernetics to Beat the Bureaucracy"

My wife and I have two sons, aged 22 and 1 who are strugling with the problems of our civilization. As I compare their experiences with my youth, I find that something has happened to our social institutions in one generation. The present capitalist institutions do not treat individuals with the respect that I learned to expect in our American democratic society of a generation ago.

Our older son has learned to fight for respect for his ideas by going to top of the college administration, government agency, or corporation. He has learned to organize support for his projects. I have confidence that he can organize a well planned attack on any problem he is concerned with, and he will call me, if assistance is needed in locating references.

Our younger son has prepared more scientific discussions, documented by appropriate references to accepted authorities on the problems he is concerned with However in his submiling ideas through established channels he has been shot down. On a university project he could not locate an appropriate faculty sponsor. On a project at XYZ Corporation where he had a summer job, he submitted an important proposal through his manager, on to the department manager, to the assistant laboratory manager, to the laboratory manager, and requested it be sent on the corporation divisional headquarters. In due time he was informed by laboratory manager that divisional headquarters found his ~~project~~ proposal not to be a significant problem. He was further informed that he was immature

and needed to gain more experience, before pushing such proposals.

A generation ago, when I was a student, I was concerned over the ultimate effect on our American Democracy of certain policies of the National Association of Manufacturers. I wrote my objections to the N.A.M., and they implied the American people didn't understand and most folks didn't care. From one of my professors I learned that the president of XYZ Corporation also had objections to the policies of the N.A.M. He put his objections into action by withholding XYZ Corp's contribution to the N.A.M. until the N.A.M. got a vice-president of XYZ Corp's largest commercial customer to threaten to switch orders to a competitor.

From that incident I learned that my objections to N.A.M. policies were valid. I also learned that the president of XYZ Corp. was fighting for what he thought was ethically right until financial pressures forced him to give in.

Now a generation later, when XYZ Corp. is now in ~~the top ten~~ Fortune's top ten and has no fear of the N.A.M., its bureaucracy tries to convice a student that his ideas are invalid and immature, when probably the student's ~~his~~ proposal is more valid than the arguments advanced by the corporation bureaucracy.

I thought long and hard about how can I help my younger son without interfering -- perhaps I can find some better "tools" for him to use in his struggles I was writing a book on communication theory. Maybee I can can convert theory to something more practical for him.

By the time I get organized our son may off on another project, so I had better develop something more universal that he can also use on future projects. Also there is principle developed my Immanuel Kant (1724 - 1804)

EPR 6-A

> "There is therefore but one categorical imperative, namely, this: Act only on that maxim whereby thou canst at the same time will that it should become a universal law"

Kant further interpreted this principle as a practical imperative as follows:

> "So act as to treat humanity, whether in thine own person or in that of any other, in every case as an end withal, never as a means only"

I therefore feel that whatever I develop ought to be designed to be of general use to the present generation of young people in addition to being a more powerful tool for our son. These techniques should be useful to American youth to fight the capitalist bureaucracy, to Russian youth to fight the socialist bureaucracy, to the Chilean youth to keep their government moving toward their ideals, to Chinese youth to evaluate their political party, to the youth of the developing African nations to evaluate their progress, to the youth of Europe to measure social progress, to the youth of the Arab countries to measure human freedom, and to the youth of Israel to measure their governments respect for huma

freedom.

I shall refer to Norbert Wiener's fundamental books: Cybernetics and The Human Use of Human Beings and Shannon & Weaver The Mathematical Theory of Communication & shall also refer to H. S. Tsien's Engineering Cybernetics for which there exist a Chinese edition published in Peking G.T. Guilbaud of France's What is Cybernetics?; D.A. Bell (Birmingham, England) Intelligent Machines; Colin Cherry (London) On Human Communication; Jagjit Singh (New Delhi) Great Ideas in Information Theory Language and Cybernetics; and A.I. Berg (Moscow) Cybernetics at the Service of Communism.

Now I am writing this book for the Layman, so you don't have to look up the above references to understand this material. However I am including enough technical material in the appendices of this book so one can check the status of these hypotheses.

In this book I shall show how one can use concept from cybernetics, and the related field of Information Theory, to analyze how close your particular bureaucracy, whether it be capitalist or socialist or communist or some other variety, is living up to the ideals around which it was developed. I shall show how we can balance the degree of diversity with requirement for stability in a social system.

To get started I shall use the first point in our young Sons proposal "What XYZ Corp Can Do"

EPR
191

SEPR No. 195
Ref. SEPR 170-

This outline is version six in a series of book outlines:

Version Zero: "The Concept of Social Engineering" Manuscript, 31 pp. notes (1947), draft (12/49), filed as SEPR Nos. 57 & 58.

The status of the manuscript of "Communication Theory in the Cause of Man" is reviewed briefly as follows:

1st Version: Outline in SEP No. 65(9/24/61-12/18/61) "Frontier Problems of Engineering Sociology" (10pp)

The background is reported in SEP No. 64(9/10/61-11/23/62) "Thoughts on the Relationship Between: (1) Engineering Science & Mathematics, (2) Social Science, and (3) Political & Religious Groups.(6PP)

Some notes on the circumstances of the development of the outline are given in SEPR No. 64-A(8/19/65-1/31/67). (1p.)

A set of 53 illustrations was drafted in May 1962 as SEP Nos. 81-85(5/17/62) 53pp.

A set of SEP's relative to the different sections of the outline was assembled in two 1½" ring binders. Proposals were prepared for the Guggenheim Foundation and National Institutes of Health as SEP Nos. 65-C and 65-D(GM-11277-01).

Another description of the book project was prepared as SEP No. 65-E for presentation to the A.I.E.E. Cybernetics Committee in 1963.

The book project was temporarily abandoned in favor of writing shorter articles using the material. This resulted in the presentation of papers at the AAAS Convention in December 1963, Cleveland, Ohio.; International Congress for Social Psychiatry, in August 1964, London, England; Symposium on Social Impact of Cybernetics, Georgetown University, Washington, D.C., November 1964; AAAS Convention, December 1965, Berkeley; and American Humanist Association, April 1966, Asilomar, Calif.

2nd Version: A second version, a shorter unit, consisting of a substantial chapter of a proposed book on the social impact of cybernetics was prepared. The publisher deleted my chapter and advised me that they decided to only publish the more philosophical and less technical chapters they had assembled for the book. This draft is identified as SEPR No. 93-J. (1/31/66) 55pp. (11/19/64-2/21/65)

3rd Version: A revised outline of a more complete book was prepared in January 1966 as SEPR No. 65-G, 10pp/ consisting of a preface and outline. Work started on filling in drafts of sections by cutting and pasting parts of previous SEPR's. Incomplete parts of this draft are in the brown clamp type binders.

4th Version: A revised outline was prepared as File No. 100-C (5/2/67-----). Parts of version #3 were transferred to this copy and additional section were drafted. Some inconsistencies were encountered, particularly in material derived from SEPR No. 91, "Four Philosophical Tools for Improving Our Insights Regarding the Problems of Disarmament" (11/12/63) 23pp.

To resolve these problems, work on the text was stopped and all mathematical anlyses in all SEPR's were reviswed and all corrections and limitations filed in "Master File of Entropy Distributions" File 91-H(approx 50pp.)

An incomplete draft of the 4th version is filed as File No. 100-C(file copy only).

5th Version: A revised outline was developed as File No. 100-D (1/8/68), in which the material on the roots and segments of Western Civilization was restored to its orginal place in the outline. Rough drafts of over half of the chapters have been salvaged from earlier drafts or new SEPR's for future editing into a more uniform style.

6th Version: As a result of discussions in 1968, I changed the title and reorganized the sequence. The new title is:
"HOW TO USE CYBERNETICS TO BEAT THE BURAEUCRACY."

Revised Outline for Book: (6th Version)

Working File Nos.

"HOW TO USE CYBERNETICS TO BEAT THE BURAEUCRACY"

195-A This proposed book is dedicated to the individuals who want to be more creative by pushing the bureaucracy, whether capitalist or socialist, to live up to their ideals and to come closer to the potentials for human communication that are within the reach of man for the stage of evolution that human society is in.

Refs

134-A Book One - Practical Applications

132-B Part I: What's Your Problem? 140-

101-B 1. In what stage of development is your bureaucracy? 140-

102-B 2. What has cybernetics got to do with it? 140-

103-B 3. How can the layman use the results of research in cybernetics? 140

133-B Part II: Cybernetics and Specific Problem Areas/ 140

104-B 4. Civil Rights and Evolution. 14

105-B 5. Distribution of Electronic Computing Power. 14

106-B 6. Public Space Allocation for Libraries and Public Bulletin Board Space. 14

107-B 7. Evaluation of Alternative Military Policies. 14

108-B 8. Planning and Checking Disarmament Negotiations. 14

109-B 9. United Nations Guidance of International Economic Development 14

110-B 10. The Role of the Corporation in a Capitalist Society. 14

111-B 11. The Role of the Socialist Party or Communist Party in a Socialist Society. 14

135-B Book Two: Philosophical Fundamentals. 14

134-B Part III: Multidisciplinary Concepts. 14

112-B 12. Problems of Specialization. 14

113-B 13. Three Eras of Civilization. 14

114-B 14. Earlier Attempts at Synthesis 14

115-B 15. Science and Hypotheses. 14

Frederick Bernard Wood, Ph.D.

SEPR No. 197
October 20, 1968

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Discussion Notes

"HOW TO USE CYBERNETICS TO BEAT THE ESTABLISHMENT"

Ndes for dissussion of the hypothesis:

The aims of the Society for Social Responsibility in Science of a "tradition of personal moral responsibility" are not feasible, unless supported by a carefully thought out procedure for measuring significant characteristics of social and political structure such that the impact of technology on society can be measured.

SOCIETY FOR SOCIAL RESPONSIBILITY IN SCIENCE

. . . a body of scientific workers organized to foster throughout the world a tradition of personal moral responsibility for the consequences to humanity of professional activity, with emphasis on constructive alternatives to militarism.

The logic of this disussion is as follows:

(1) Only a small percentage of scientists and engineers derive a sense of personal moral responsibility from organized religion.

(2) Therefore it is necessary to find a measure of social progress by which the effect of different choice in the application of technology to society can be evaluated.

(3) When individual engineers and scientists can perceive the measurable impact of different decisions they can develop of feeling of their personal relationship to sociological conditions.

(4) The most obvious candidate for a measure of social progres or regress is R.B. Lindsay's principle of "The thermodynamic imperative". (Discussed by John J. Ford in Charles R. Dechert, The Social Impact of Cybernetics (Notre Dame, 1966, pp 161 & 189; also Simon & Schuster, 1967)

(5) To use the "thermodynamic imperative" it is necessary to have a communication theory model with which to couple a real social system to the principle of the "thermodynamic imperative".

(6) A start on developing such communication theoretica models has been reported by F. B. Wood, SEPR No. 92-C, "Estimating the Degree of "Democracy" and "Dynamic Justice" in States and Countries by Use of the Mathematics of Telegraph Message Transmission Probabilities" (July 29, 1964).

(7) An example of how the employees in an engineeri development laboratory of a large corporation could stand up for their rights as individual engineers to discuss sociological problems by use of such a mathematical model from Cybernetics is illustrated in (SEPP) File No. 191, "Review of a Proposal of Employee XXX of July 1947 on 'What XYZ Corp. Can Do?.." (July 20, 1968, 19

(8) The present structure of large corporations, accordin to studies at the Center for the Study of Democrat Institutions (Santa Barbara), has eliminated most

middle class managers and professional people from 'producer' type political activity. This situation in turn inhibits most engineers and scientists from developing any personal moral responsibility.

(9) Norbert Wiener has correctly defined these problems in Cybernetics : The Human Use of Human Beings; and I Am A Mathematician. However his broad definition of the scope of 'Cybernetics' does not define sufficiently the inter-relationship between the concepts of 'entropy', and 'feedback' with the many aspects of social and economic systems already analysed by traditional social science. Therefore it is necessary to clarify these relationships to show how 'Cybernetics' can supplement the traditional social sciences.

(10) A table of major concepts relevant to the different levels of phenomena from

a) quantum level,
b) electromagnetic wave level,
c) fundamental particle level

⋮

l) family group,
m) tribal group,
n) nation group,
o) Corporate group,
p) United Nations group.

is proposed as an aid to clarify the appropriate role of concepts from 'Cybernetics'.

(11) With 'Cybernetics' put in proper perspective in relation to more traditional studies, it will be easier to more fully use the potential of

concepts in 'Cybernetics', particularly in measuring the degree of 'democracy', and the balance between order and diversity in social & political systems. With such measuring procedures, it would be easier for individual scientists and engineers to develop a sense of personal moral responsibility.

Thus the appropriate use of concepts from 'Cybernetics' can help the individual scientist and engineer beat the pressures from the establishment (or bureaucracy) which inhibit the development of personal moral responsibility.

Frederick B. Wood
10-20-68

Ref. for item (9):

John J. Ford in a chapter in Charles R. Dechert, The Social Impact of Cybernetics (Notre Dame, 1966) pp.161 & 189) says:

> "A sweeping technological and intellectual revolution is transformijg contemporary society. It is not confined by national or geographic boundaries. The abilities, thoughts, and beliefs of men everywhere are being reshaped by forces which are the result of applied rationality. Norbert Wiener connoted the pattern of these changes with the word "cybernetics," a neologism which has become a general reference term for the contemporary revolution in industrial societies and a portent of the future for developing nations.
>
> But the producers of these changes are neither witting revolutionaries nor avowed cyberneticists; they are scientists and engineers doing their jobs. To most of them cybernetics signifies, perhaps, a cult but not a scientific or engineering discipline nor even a branch of philosophy. Some popular writers view the result of such work as a new 'spectre that is haunting the world.'
>
> "That intervention by intelligent beings can decrease entropy in physical systems was demonstrated by Leo Szilard with mathematical rigor in 1929. Perhaps the availability of techniques for rational intervention in international society are more than just 'pious hopes' even at the present time. Certainly the need and rationale for their use rare becoming clearer day by day. For example, Lindsay and Margenau have formulated an ethical principle based upon the concepts of thermodynamics and Kant's categorical imperative. This principle, called the "thermodynamic imperative," may constitute the principal ethical implication of cybernetics.
>
> > "All men should fight as vigorously as possible to increase the degree of order in their environment, i.e., consume as much entropy as possible, in order to combat the natural tendency for entropy to increase and for order in the universe to be transformed into disorder, in accordance with the second law of thermodynamics. (Lindsay, "A Scientific Analogy: The Thermodynamic Imperative," The Role of Science in Civilization (N.Y.: Harper & Row, 1963)"
>
> The social and ethical implications of cybernetics for the future could have a salutary effect on the nature of social system dynamics."

Ref. for item (6): -6-

FOR RELEASE TO THE PRESS ON AUGUST 19, 1964

The First International Congress of Social Psychiatry

London, United Kingdom August 17-22, 1964
Meetings at The Quintin and Kynaston Schools, Marlborough Hill,
St. John's Wood, London, N.W.8
Office of General Secretary, 7 Hollycroft Avenue, London, N.W.3

A paper presented by Frederick B. Wood, Ph.D., an electrical engineer from Campbell, California, U.S.A., using the methods of General System Theory to show how some concepts used in electrical communication and computer technology help refocuss attention upon individual human values.

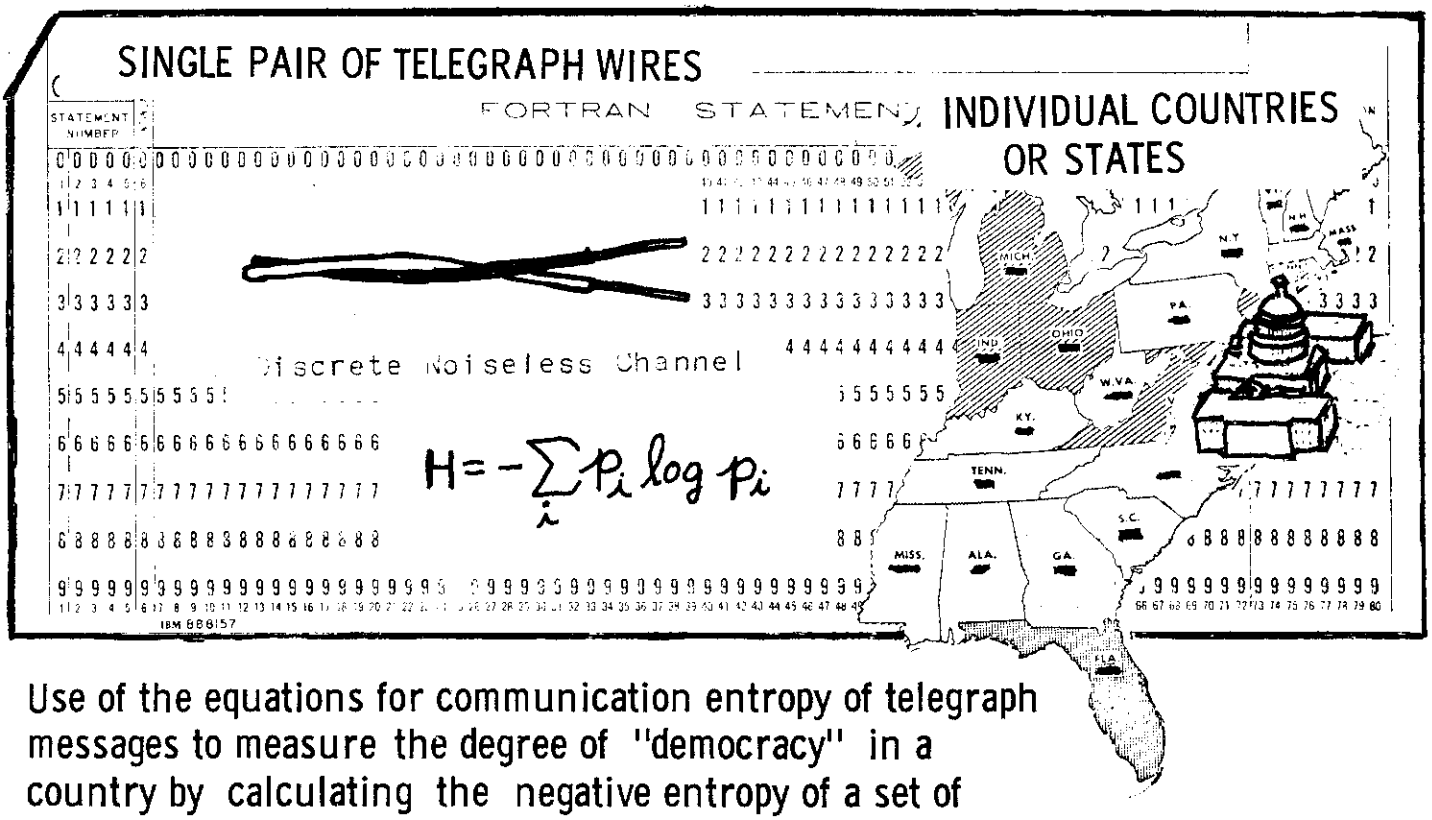
Technical Title of Paper:

A GENERAL SYSTEMS THEORETIC MODEL FOR THE ESTIMATION OF THE NEGENTROPY OF SOCIOLOGICAL SYSTEMS THROUGH THE APPLICATION OF TWO ISOMORPHIC ELECTRICAL COMMUNICATION NETWORKS.

Popularized Version of Title:

ESTIMATING THE DEGREE OF "DEMOCRACY" AND "DYNAMIC-JUSTICE" IN STATES AND COUNTRIES BY USE OF THE MATHEMATICS OF TELEGRAPH MESSAGE TRANSMISSION PROBABILITIES.

Dr. Wood applies two different electrical communication networks which have properties isomorphic with certain properties of social systems when viewed from the standpoint of Information Theory to the calculation of a property called "negentropy" which is a measure of "democracy" in the first example and is a measure of "dynamic-justice" in the second example.



Use of the equations for communication entropy of telegraph messages to measure the degree of "democracy" in a country by calculating the negative entropy of a set of human freedoms.

When a set of human freedoms relating to speech, religion, publication, sex, education, absence of job discrimination, home ownership, voting, trial by jury, and right to establish small business or farm are treated like a set of telegraph messages such that the corresponding probabilities are substituted into the formula for negative entropy, the relative measure of democracy for six different hypothetical countries come out as follows:

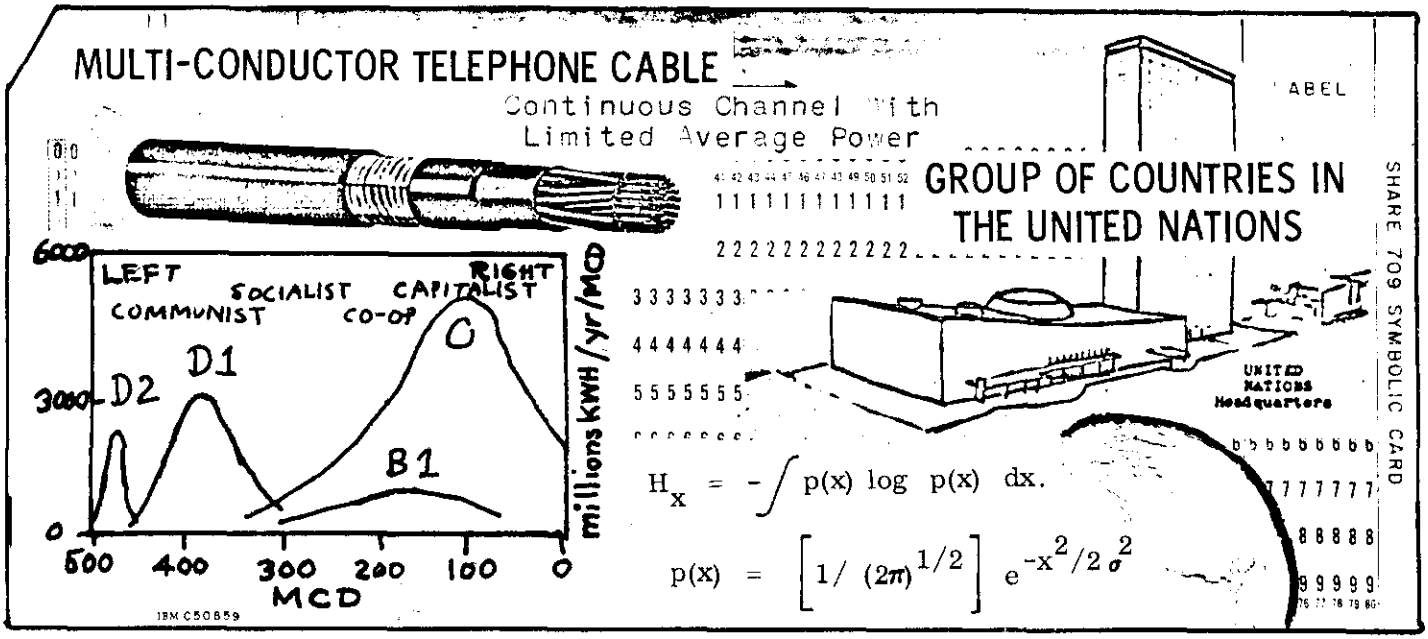
Country A, Ideal Democracy	16.61	Country D, Oligarchy	6.31
Country B, Democracy	16.52	Country E, Caste System	3.25
Country C, Partial Democracy	13.89	Country F, Dictatorship	2.98

These calculations do not constitute a proof, but indicate that the hypotheses regarding the application of electrical communication theory equations to sociological systems can tentatively be used until contradictatory examples are found.

The second case leads to the following hypothesis:

This balance between individual and group needs is important to the development of the field of Social Psychiatry

The negentropy of the probability distribution of political ideas in a sociological system can be approximated by the negentropy of the message distribution on a telephone cable for the continuous channel with limited average power. The assumed scale of political ideas is taken as a "measure of collective direction" or MCD. The resultant negentropy is considered as a measure of "dynamic-justice" -- a balance between maximizing democracy and maximizing organization to keep the system stable. The telephone cable pair if considered isomorphic to the sociological system, when the limiting average power in the cable is considered equivalent to the per capita power production in the sociological system.



FREDERICK B. WOOD
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SAN JOSE, CALIF. 95150

Use of the integral form of the equations for measuring the communication entropy of telephone signals on a telephone cable to estimate a measure of "dynamic-justice" of a country by calculating the negentropy of the distribution of political ideas tolerated in the country.

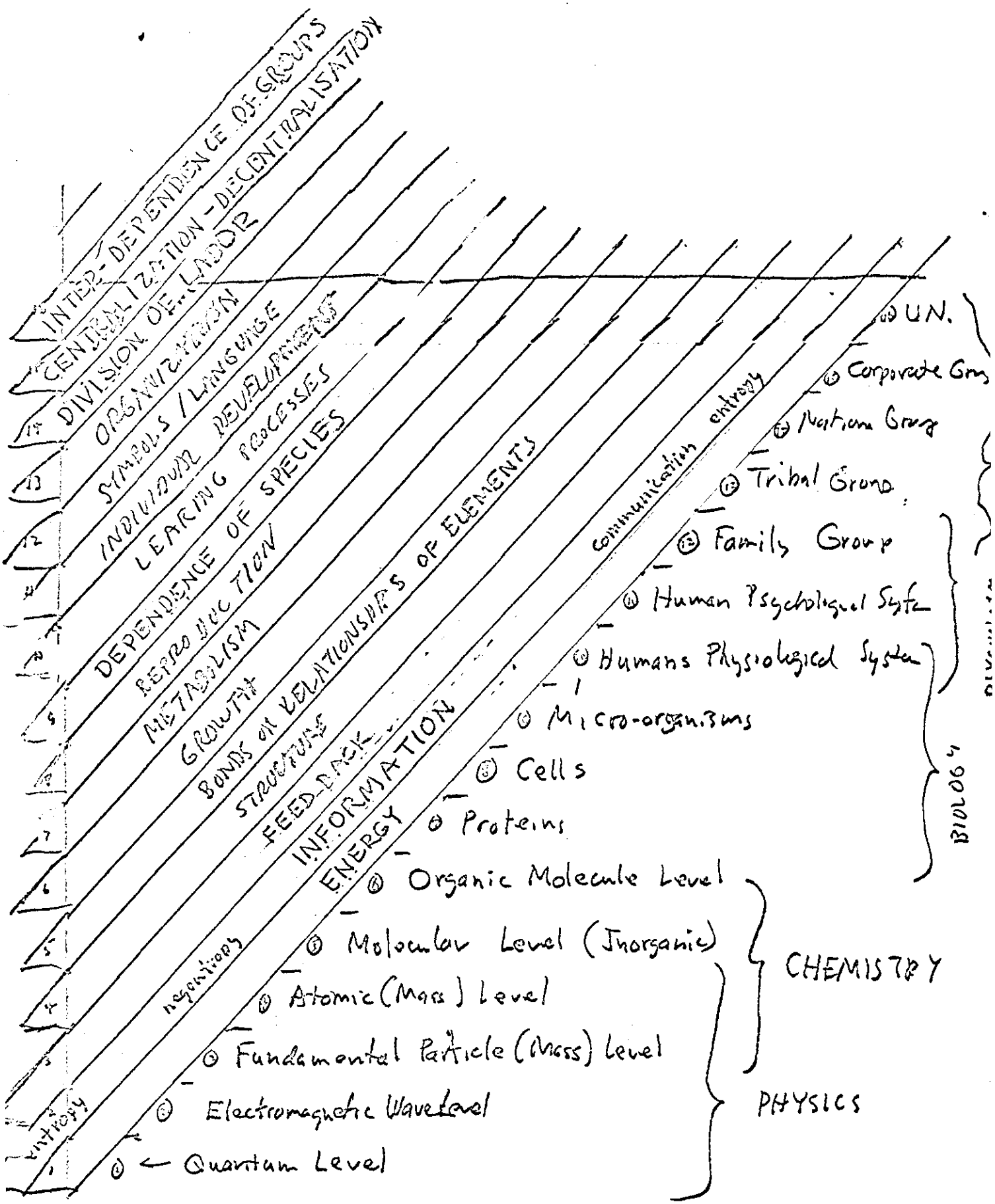
Dr. F. B. Wood, ~~P.O. Box 85, Campbell, California 95008~~, U.S.A.

Norbert Wiener in his book The Human Use of Human Beings(1967 edition, pp. 19-21) says:

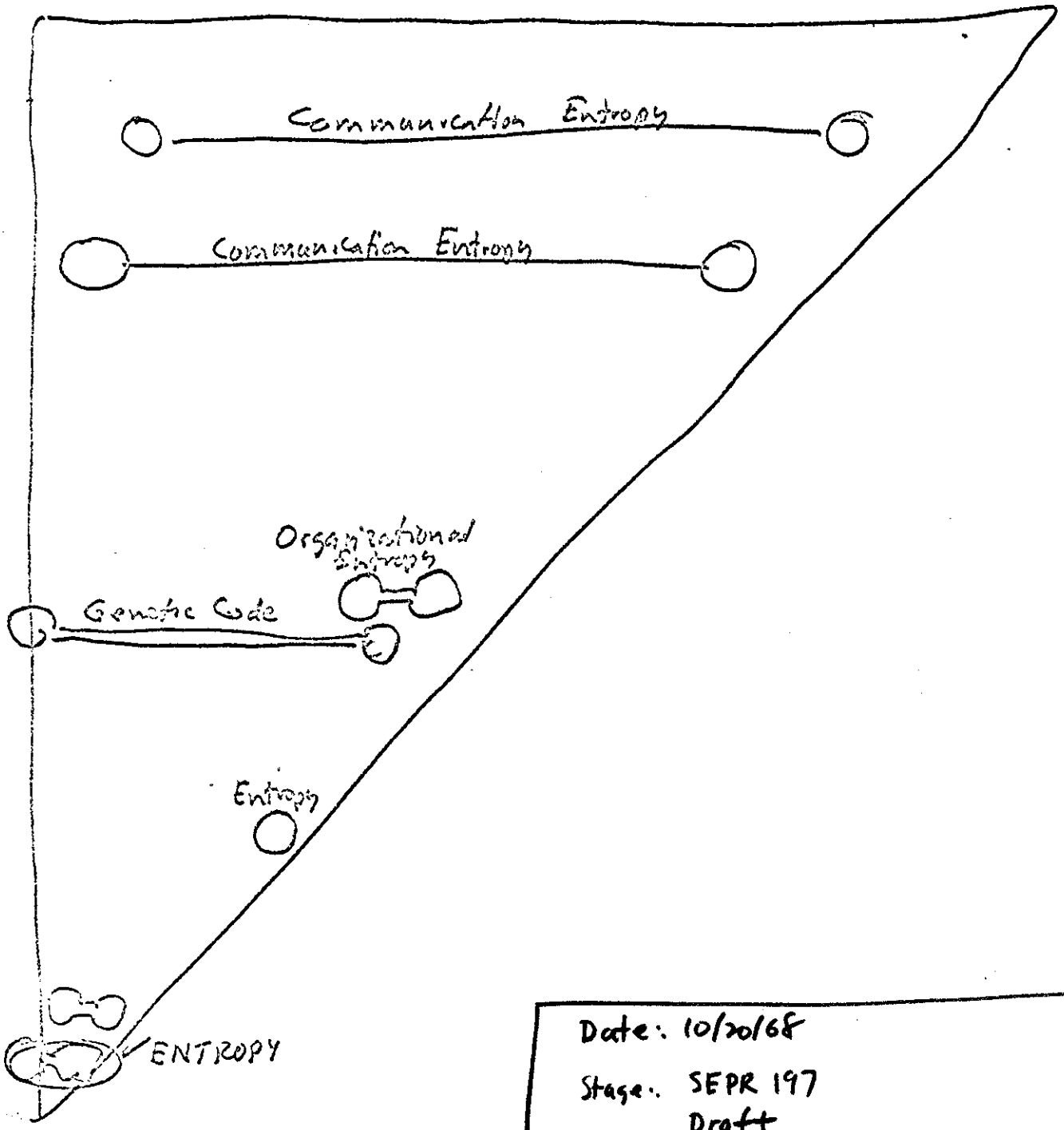
> "This book is devoted to the impact of the Gibbsian point of view on modern life, both through the substantive changes it has made in working science, and through the changes it has made indirectly in our attitude to life in general. Thus the following chapters contain an element of technical description as well as a philosophic component which concerns what we do and how we should react to the new world that confronts us.
>
> I repeat: Gibb's innovation was to consider not one world, but all the worlds which are possible answers to a limited set of questions concerning our environment. His central notion concerned the extent to which answers that we may give to questions about one set of worlds are probable among a larger set of worlds. Beyond this, Gibbs had a theory that this probability tended naturally to increase as the universe grows older. The measure of this probability is called entropy, and the characteristic tendency of entropy is to increase.
>
> As entropy increases, the universe, and all closed systems in the universe, tend naturally to deteriorate and lose their distinctiveness, to move from the least to the most probable state, from a state of organization and differentiation in which distinctions and forms exist, to a state of chaos and sameness. In Gibbs' universe order is least probable, chaos most probable. But while the universe as a whole, if indeed there is a whole universe, tends to run down, there are local enclaves whose direction seems opposed to that of the universe at large and in which there is a limited and temporary tendency for organization to increase. Life finds its home in some of these enclaves. It is with this point of view at its core that the new science of Cybernetics began its development.*"

*See footnote about those skeptical as to the precise identity between entropy and biological disorganization. ....also A.LLwoff: Biological Order(MIT Press, 1962)

Ref. for item (10):



Ref. for item (11):



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