A Working Paper Draft

SOCIO-ENGINEERING PROBLEMS
NO. 65-A

"COMMUNICATION THEORY in the Cause of MAN"

Sub-Title: Frontier Problems of Engineering Sociology

This is a revision of SEP NO. 65, to which reference should still be made in regard to the basic outline.

No. 65
- I. Introduction
- II. Specialization & Irresponsibility
- III. Information Theory & Sociology
- IV. Cybernetics & General Systems Theory
- V. Human Values & Analogies of Communication Theory

No. 65-A
- Supplement on Decision Paths.
- Supplementary Bibliography.

5/17/62

Frederick B. Wood

P.O. Box 85, Campbell, California, U.S.A.

ADVANCED SYSTEMS DEVELOPMENT

SAN JOSE, CALIFORNIA

March 7, 1962

TO Dr. Allan Kahn

SUBJECT Notes for Society for General Systems Research

Copies of a memorandum for the March 8th meeting of the Bay Area Group of SGSR and Socio-Engineering Problems No. 65 are enclosed for your information. Nothing is submitted for publication review at this time. On page two of the March 3rd memorandum enclosed are illustrations of how I minimize the occurrence of problems requiring review for possible conflict with company policy.

My role in SGSR may be more that of a catalyst to bring appropriate social scientists, engineers, and philosophers together in a way that carries out Dr. James R. Killian's proposal in his AIEE speech of February 2, 1959.

The numbering system of Socio-Engineering problems, referred to in enclosed proposal, starts with material originally written in the period 1940 - 1947 and is only approximately chronological. Many of the notes are still handwritten rough drafts, but have numbers assigned for convenience in organizing new ways to utilize the material.

This hobby of mine also has bearing on an important problem in the area of engineering creativity, namely, whether the dilemma of specialization can be broken in a creative way by structuring ones off-job community-service type work in a way that utilizes analogies of the mathematical and physical concepts occuring in one's engineering work.

F. B. Wood

Manager of Coding

FBW/me
Attach 2
c. c: R. B. Johnson
R. M. Bennett

P.O. Box 1061
Campbell, Calif.
March 3, 1961

To: Members of Society for General Systems Research who indicated they are coming to the March 8th meeting at Dr. McClelland's house, or who asked for copies of material scheduled for discussion at the meeting.

Dr. Marvin Cadwallader, Sociology Department, San Jose State College
Dr. Melvin Calvin, Department of Chemistry, University of California
Dr. Juan P. Cantou, 1515-19th St., San Francisco, 7, Calif.
Dr. Lemoyne John Courtright, 490 Post St., San Francisco 2, Calif.
Dr. Charles A. McClelland, Institute for Communication Research, Stanford
Dr. Robert C. North, Studies in Conflict and Integration, Stanford Univ.
Dr. Daniel Teicherow, Grad. School Business Admin., Stanford University

The enclosed proposal for a Book on "Frontier Problems of Engineering Sociology" is circulated for comments as a potential project for the Bay Area Systems Group to work on. Dr. McClelland has advised me that there will be some time at the March 8th meeting to have some discussion of this material in addition to the paper being distributed by Dr. McClelland.

This proposal is an extension of my 1959 social responsibility paper and comes partly in response to a challenge to engineers made by Dr. James R. Killian, Jr., three years ago at the American Institute of Electrical Engineers, Winter General Meeting in New York City. (Ref: New York Times, Feb 3, 1959, p. 14 and Electrical Engineering April '59, p. 298-301.) The engineering profession, he said, has a mission and obligation to:"

"Employ the art and science of engineering with zest and audacity to achieve a world in which people everywhere may lead free and abundant lives; . . . . . .

"Harness those engineering aspects which enhance the quality of society

"Recognize and seek rising requirements for excellence in education, the work and the professional standards of engineering; to create sound and correct public understanding of the work and function of engineers as professional men; to break down barriers separating engineers from sciences, humanities, and social sciences; to use the great opportunity inherent in engineering and science to promote international understanding and goodwill. . . . . .

Lancelot Law Whyte in Accent on Form (An Anticipation of the Science of Tomorrow), Harper and Bros.(1954), p. 11, lists the primary ideas developed by Western thought together with the name of the historical innovator where one man either gave precision to the idea or greatly extended its use:

NUMBER	Pythagoras
SPACE	Euclid
TIME	
ATOMS	Democritus
ENERGY	
ORGANISM	Aristotle
MIND	
UNCONSCIOUS MIND	Freud
HISTORICAL PROCESS	
(FORM)	
(STRUCTURE)	

I feel that L.L. Whyte's concept of mankind's struggle to understand and define the concept of "form" can give us clues on how to examine the potential analogies of the concepts of cybernetics and information theory as more universal tools to help us understand ourselves, society, and nature. We may have to extend the practice of distributing "incomplete papers" properly labelled as to what stage of development the hypotheses are in order to expedite cooperative studies.

I think that at least some parts of the enclosed outline on "Frontier Problems in Engineering Sociology" are of primary interest to the Society for General Systems Research. I would appreciate comments on:

(1) the validity of the objectives,
(2) the reliability of the references,
(3) the practicality of the proposal, and
(4) how can cooperation of different engineers, scientists, and philosophers be organized to procede on such a project?

In the outline I have given references for all sections, except where the material might be more controversial or involve questions of policy. For example I have given no references for "Sec 13:Capitalist and Socialist Systems." However I am pleased to hear that Margaret Mead has a proposal suggesting "a restatement of the Soviet and American socio-economic-political system s in cybernetic terms" to enhance the possibilities of fruitful communication between the U.S.S.R. and the U.S.A. (Ref: SGSR-ITEMS, Nov. 1961)

Since my engineering work is for a computer manufacturer, I have initially omitted any specific details from:
"Sec. 15 Computing Power as a Tool for Democracy" and
"Sec. 16 Computer-Data Communication Systems and Economic Systems,"
first, because the code of ethics of the National Society of Professional Engineers requires that precautions be observed to insure that any publication will not interfere with the interests of the engineer's client or employer, and second, even after proper review as above, many readers might consider a computer-engineer as biased. Therefore it might be appropriate to find some independent scientist or independent group to investigate particular applications.

I look forward to discussing these ideas with you at the March [illegible] meeting.

Sincerely yours,

Frederick B. Wood

cc.: G. M. Weinberg

A Proposal for a Book on

"FRONTIER PROBLEMS OF ENGINEERING SOCIOLOGY"

Frederick B. Wood

Residence: 2346 Lansford Ave., San Jose, California, U.S.A.
Mailing Address: P.O. Box 85, Campbell, California, U.S.A.

Abstract

The proposed research project is aimed at developing a set of hypotheses in the area of "Engineering Sociology" that would be useful to individuals and groups interested in the goals of "international order" or "peace and freedom." It is planned to review the related contributions of certain specialized philosophers from different countries toward a higher stage of civilization in the search for better ways to meet human needs. Then it is proposed that the possible contributions of analogies from Cybernetics and Information Theory be reviewed as to how they might contribute toward realizing what L. L. Whyte calls the "unitary principle."

Date:	9/24/61	11/12/61	12/12/61	12/18/61
Stage*:	D	E	Fa	F

*Stages are defined in SEP No. 20(6/9/61)

7530/6650

"FRONTIER PROBLEMS OF ENGINEERING SOCIOLOGY"

INTRODUCTION

This is an outline of a proposed research project aimed at developing a set of hypotheses in the area of "Engineering Sociology." A reference to Lester Ward's Applied Sociology of 1906 is appended, because of the similarity of some of the conditions of 1900 and 1961, namely that the state of knowledge is at a point where a new synthesis can be made.

At this stage I use the phrase "engineering sociology" for a double reason: (1) engineering because such a new synthesis would be developed for applied use (or engineering use) by the people in their own common interest, and (2) engineering because the analogies of cybernetics and information theory come from engineering as by-products of physical-engineering work.

The starting point of this research project would consist of two parts:

(I) The review and synthesis of component parts of the philosophies of Western Civilization.

(II) The review and reorganization of earlier issues of Socio-Engineering problems to form a "unitary" point of view relying heavily upon cybernetics and information theory.

* As of this date numbers 43-44, 49-50, 53, 59-61, 63-64 have been roughly sketched in outline form, but have not been written yet.

Objectives

From the Engineers' Council for Professional Development we have the following definition of an engineer:

> "The engineer may be regarded, therefore, as an interpreter of science in terms of human needs and a manager of men, money, and materials in satisfying these needs." (1)

Considerable attention has been applied to the second part, namely the development of engineers as managers, but little attention has been focussed upon carrying the question of human needs. Therefore this book would concentrate upon the phase of "interpreter of science in terms of human needs."

The aim of producing such a book is to bring to the educated layman who is interested in peace and freedom, a grasp of the theoretical tools of engineering and science that might be useful as analogies in developing projects for peace.

The objective is to meet the challenge of the

Noosphere (Vernadsky) (2,3)

without the "alienation" described by Pappenheim,(4) Fromm, (5) and Marx (5,6) through expediting the "unitary principle" of L.L. Whyte,(7) through utilization of the analogies of

Cybernetics (and Information Theory)

as forseen by Wiener,(8,9) and extended by Deutsch,(10) without waiting for the present generation to die (Max Planck),(11) and further salvaging the synthetic concepts of Comte and

Ward[12] as a guide to the process of transition to the third stage of Rosenstock-Huessy:

credo Ut intelligam (Anslem) - truth is divine and has been divinely revealed

cogito ergo sum (Descartes) - truth is pure and can be scientifically represented

respondeo etsi mutabor (Rosenstock-Huessy) - truth is vital and must be socially represented.[13]

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I expect to soon prepare a more detailed outline, but would appreciate any preliminary comments or criticisms you can make.

References: LIST A

1. "Engineering as a Career - A Message to Young Men, Teachers, and Parents." Engineers' Council for Professional Development, 29 West 39th St., New York, N.Y. 1942, P.6. (SEP No.6, p.2)

2. W.I. Vernadsky "The Biosphere and the Noösphere" (1943) American Scientist 33:1, p.10, Jan 1945 (SEP No.18-A, p,g-3)

3. William L. Thomas, Jr. with the collaboration of Carl O. Sauer, Marston Bates, and Lewis Mumford. Man's Role in Changing the Face of the Earth, Chicago: University of Chicago Press (1956) pp. 86, 104, 106, 107, 109, 110, 801.

4. Fritz Pappenheim The Alienation of Modern Man (An interpretation based on Marx and Tonnies) N.Y. Monthly Review Press (1959)

5. Erich Fromm Marx's Concept of Man with a translation from Marx's "Economic and Philosophical Manuscripts" by T.B. Bottomore. New York, Frederick Ungar Publishing Co.(1961)

6. Karl Marx Capital

7. L.L. Whyte The Next Development in Man (1941-43) N.Y.: The New American Library (Mentor Book: M50), 1950. See also: L.L. Whyte Everyman Look Forward N.Y.: Henry Holt and Co. (1948)

8. Norbert Wiener The Human Use of Human Beings - Cybernetics and Society 2nd Ed. Doubleday Anchor (1956)

9. Norbert Wiener "Eight Years of Cybernetics and the Electronic Brain" The Pocket Book Magazine No. 2, pp. 44-60 (1954).
Note also other interesting articles in "PB" such as "The World's Greatest Scientific Needs".

10. Karl W. Deutsch "Communication Theory and Social Science" American Journal of Orthopsychiatry 22, pp. 469-483 (1952)

11. Max Planck (quoted in ref. 10)

12. Samuel Chugerman LESTER F. WARD, Durham, S.C., Duke University Press (1939)

13. Eugen Rosenstock-Huessy Out of Revolution: An Autobiography of Western Man Translated from German, N.Y.: Morrow (1938); London: Jarrolds (1940)
LC 38-30579 (SEP Nos. 6, 34, also 9-A)

Frontier Problems of Engineering Sociology

Table of Contents (Proposed)

Preface: This will describe a series of experiences of the author from which these thoughts have developed.

Note: This material is organized so that it can be edited for production as a book or as a series of magazine articles.

Part I: INTRODUCTION

1. Introduction. This will be a short statement of the relationship of the different parts of the book. Diagrams based on extensions of the checking chart(14) will be used.

2. The State of Western Civilization. The dilemma, challenges, and previews of the future of the following authors will be reviewed:

Germany/France/England- Comte(12) Marx "Philosophical manuscripts....(5)

USA- Ward "Sociology....(12)

France- Simone Weil "The need for roots....

Germany- Eugen Rosenstock-Huessy "Truth is vital and must be socially represented....(13)

Spain/France/Germany/USA- Pappenheim "The alienation of modern man....(4)

USSR- Vernadsky "The noosphere....(2,3)

England- Whyte "The unitary principle....(7)

China/France- Teilhard de Chardin "The future of man...(3,16)

Germany/USA/Mexico- Fromm "The Art of Loving...(17)

Tables and charts representing the above ideas.

Part II: PROBLEMS OF SPECIALIZATION AND IRRESPONSIBILITY

3. The Dilemma of Specialization. Illustrated discussion of the problem. (18)

4. A Checking Chart. A chart for use in developing social responsibility. (14)

5. Partial Derivatives of History. (19)

Examples of:

6. A Checking Chart. Chart used to develop unitary principle in science and life. (14)

7. Special Responsibility of Engineers. (20)

Part III: INFORMATION THEORY AND ENGINEERING SOCIOLOGY

8. Channel Capacity. (21)

9. Ideology as a Coding Problem.

10. Distribution of Negentropy in Political Organization. (22)

11. Balance of Obligation and Rights -- Organization and Freedom. (15,23)

Part IV: CYBERNETICS AND GENERAL SYSTEMS THEORY.

12. Feedback Loops (24)

13. Capitalist and Socialist Systems.

14. Social Planetaria (25)

15. Computing Power as a Tool for Democracy.

16. Computer-Data Communication Systems and Economic Systems.

Part V: HUMAN VALUES AND ANALOGIES OF COMMUNICATION THEORY

17. Potentials of fruitful contact between competing economic and political systems using analogies from cybernetics and information theory. (26)

18. Conservation of Human Values: Information Theory Provides theoretical principle and bounds; Cybernetics the form of institution to carry out the goals.

19. Summary: The Unitary Principle/The Next Development of Man

Supplement: Lester Ward's "Applied Sociology"

(A Review of Some Selected Items from Applied Sociology*)

Preface: III-IV

Contents

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*Lester F. Ward Applied Sociology - A Treatise on the Conscious Improvement of Society by Society. Boston: Ginn & Co. (1906)

See also: Samuel Chugerman LESTER F. WARD - The American Aristotle (A Summary and Interpretation of His Sociology) Durham, S.C., Duke University Press (1939)

References: LIST B

14. Frederick B. Wood, unpublished notes in Socio-Engineering Problems Nos. 1, 14-A, 20(list), 22-A, 23-A, 24-A, 25-A, 26-A, 27-A, 28, 40(list), 41, 45.

15. Simone Weil The Need for Roots (1943) Translated from French. L'Enracinement (1949) N.Y.: G.P. Putnam Sons (1952) Boston. The Beacon Press (Paperback, 1955).

16. Pierre Teilhard de Chardin The Phenomenon of Man (Paris: Edition du Seuil, 1955) Trans. N.Y.: Harper & Brothers (1959): Harper Torchbook Edition (1961) (Note Harper Torchbooks: The Bollinger Library; The Academy Library; The Science Library; and The Cloister Library)

17. Erich Fromm The Art of Loving N.Y.: Harper & Bros. (1956) (Note: Vol. 9 of World Perspectives, a series planned and edited by Dr. Ruth Nanda Anshen) See also L.L. Whyte Accent on Form An Anticipation of the Science of Tomorrow World Perspective Vol. Two.

18. Frederick B. Wood, unpublished seminar paper "History of Electromagnetic Theory" (1946). SEP No. 13-A)

19. SEP. No. 9-A & 10-A.

20. F.B. Wood "The Social Responsibility of Engineers and Scientists" 1959 Proc. WJCC

21. SEP. No. 29-A & 39

22. SEP. No. 19-A

23. Jerome Rothstein Communication, Organization & Science Indian Hills, Colo: The Falcon's Wing Press-(1958)

24. SEP. No. 3 & 46

25. SEP. No. 2

26. Margaret Mead, manuscript to be published in Science See statement in ITEMS, Nov. 1961, of Society for General Systems Research , 787 United Nations Plaza, N.Y. 17, N.Y.

SUPPLEMENTARY REFERENCES

Anon. "The Psychological Revolution" MANAS vol. XIV, No. 33, Aug. 16, 1961 Phase I - Psychotherapy; Phase II "Spiritual". Refers to Ira Progoff "Psychology as a Road to a Personal Philosophy" and Bruno Bettelheim - The Informed Heart.

SP-SDF "we have a vision....a deep faith." Erich Fromm, William O. Hart, William C. Davidon, Betty Lou Burleigh, and Murray Kempton.

Supplement on Decisions Paths.

I plan here to include reference to Dr. North's techniques of analysing tensions and to Dr Osgood's GRIT proposal. Then I aim to integrate this material into the main outline.

Supplementary Bibliography

Gerard Piel SCIENCE IN THE CAUSE OF MAN N.Y: Knopf (1961)

Nicolas Rashevsky MATHEMATICAL BIOLOGY OF SOCIAL BEHAVIOR Chicago: Univ. of Chicago Press (1951)

Ludwig Von Bertalanffy PROBLEMS OF LIFE, N.Y: Harper Torchbooks (1952, 1960)

Colin Cherry ON HUMAN COMMUNICATION Technology Press (1957)

Philip Wylie AN ESSAY ON MORALS N.Y. Rinehart(1947) New preface (1951). Cardinal Edition (1961)

J.R. Pierce SYMBOLS, SIGNALS AND NOISE: The Nature and Process of Communication. N.Y.: Harpers (1961)

James R. Newman WHAT IS SCIENCE? Simon & Schuster (1955); Washington Square Press (1961)

Donald N. Michael CYBERNATION: The Silent Conquest A Report to the Center for the Study of Democratic Institutions. (1962)

Kenneth E. Boulding "Where are We Going -- If Anywhere?" Liberation April 1962, pp 17-21.

M. George Zaninovich "Patterns of Dimensional Behavior within The International System: The Sino-Soviet Example." Stanford University, Dept. of Political Science Dec 3, 1961.

Louis Fein "Computer-Related Sciences (Synnoetics) At A University in 1975." Datamation Sept 1961, pp. 34-41.

"The Irresponsibles" Jour. Applied Physics, v. 11, Oct 1940, p. 625.

"A Way of Total Peace" Jour. Applied Physics, v. 11, Dec 1940, p. 749.

B. F. Skinner SCIENCE AND HUMAN BEHAVIOR N.Y.: Macmillan (1953)

Charles E. Osgood "Reciprocal Initiative" LIBERAL PAPERS Doubleday [illegible] (1962)