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SOCIO-ENGINEERING PROBLEMS REPORT NO. 41

A series of manuscripts on the social relations of engineering and related philosophical questions dealing with the interaction of science and society. Distribution is limited to reviewers and discussion groups for criticism prior to consideration for possible publication.

"PROPOSED SOCIAL ENGINEERING RESEARCH PROGRAM."

Abstract

This is a reprint of a proposal of October 24, 1945, Part of this material was used in preparing SEP No. 1.

This proposal first reviews the role and concern of physicists at the end of World War II in relation to the problems of our civilization. The proposal consists of three recommendations for research:

- (A) The pilot investigation of some particular invention to explore the possible relationship between physics, engineering and sociology. (Some progress on this part can be found in SEP Nos. 3, 5, 7, 9A-11A, 27A-27C, and 29A. The reports are listed in more detail in SEP No. 20, and a specific example in the field of computer-data communication is mentioned in SEP No. 20-B.)
- (B) The development of an outline of the principles of social engineering\*based upon available knowledge of the social sciences through the proper identification of working hypotheses. (Some preliminary organization of material along this line is given in SEP No. 19A, 65D, and 81-85.)
- (C) Experimental use of the above principles in the solution of local problems. (No specific progress to report yet.)

\* My terminology has progressively changed such that the title of the completed work would have been the following in order:

- "Social Engineering,"
- "Frontier Problems of Engineering Sociology,"
- "Communication Theory in the Cause of Man."

Date: 10/24/45 11/27/61 6/30/63

Stage: Proposal Stage c, SEPR No. 41  
SEP No. 41 Reprint

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**PROPOSED SOCIAL  
ENGINEERING RESEARCH PROGRAM:**

**Prepared by:**

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**October 24, 1945**

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During the past four and a half years I have been working at the Radiation Laboratory at M. I. T. on secret and confidential work related to the development of radar. Many of us who have worked on government research projects during the War are gravely concerned over the present unpreparedness of our country's political leaders in regard to solving the social problems connected with the availability of atomic energy. Although much has appeared

in the newspapers recently regarding the attitude of the  
scientists, the most effective work/toward preservation  
of freedom in fundamental research and its disclosure in  
the field of physics has not been released for publication  
for reasons of political diplomacy. Many physicists  
believe that the development of a defense against the  
atom bomb is a problem of social organization and human  
relations. The Army and Navy are having some difficulty  
in recruiting as many scientists as they would like to  
have for peace time military research. I believe that  
a majority of the scientists who have been working on  
government military projects during the war are more  
interested in fundamental scientific research and  
application of our scientific knowledge to peaceful use  
for the benefit of humanity.

Physicists in general hope to return to fundamental  
research in Physics, but realize that they must devote  
part of their time to educating the public in regard  
to the physical laws which must be considered in the  
solution of social problems. Some feel that the Social  
Sciences are not sufficiently advanced to meet some of  
the urgent problems which confront our civilization.

I have heard of a few physicists and chemists deciding  
to enter  
to fields such as Psychology and Religion to help those  
fields advance.

Some physicists and engineers are curious as to  
what assistance the sociologists are prepared to give

in the solution of important social problems. Is Social Engineering a well established branch of Sociology? Should not Social Engineering be established as a profession having a similar relationship to Sociology that Electrical and Mechanical Engineering have to Physics?

I propose the following research program with the expectation that considerable change will have to be made because of my relative ignorance of what has already been accomplished in the field of Sociology. To give you an idea of what portion of the current literature relating to these problems I am acquainted with, I am listing the following representative books and articles:

- (1) The Condition of Man by Lewis Mumford, 1944.
- (2) The Biosphere and the Noosphere by W. I. Vernadsky, Member of the Academy of Sciences of the U. S. S. R.; vol. 33, no. 1, Jan. '45, American Scientist, pp 1-12.
- (3) Mediation in Cultural Perspective by Horace S. Fries, University of Wisconsin; July '45, Amer. J. Econ. and Sociol., pp 449-
- (4) Radar, A Report On Science At War released by the Joint Board on Scientific Information Policy for: Office of Scientific Research and Development, War Department, and Navy Department; 15 August 1945, USGPO.
- (5) Atomic Energy for Military Purposes by Henry D. Smyth, Princeton, 1945.

Research Program in Social Engineering through Electrical Engineering and Sociology:

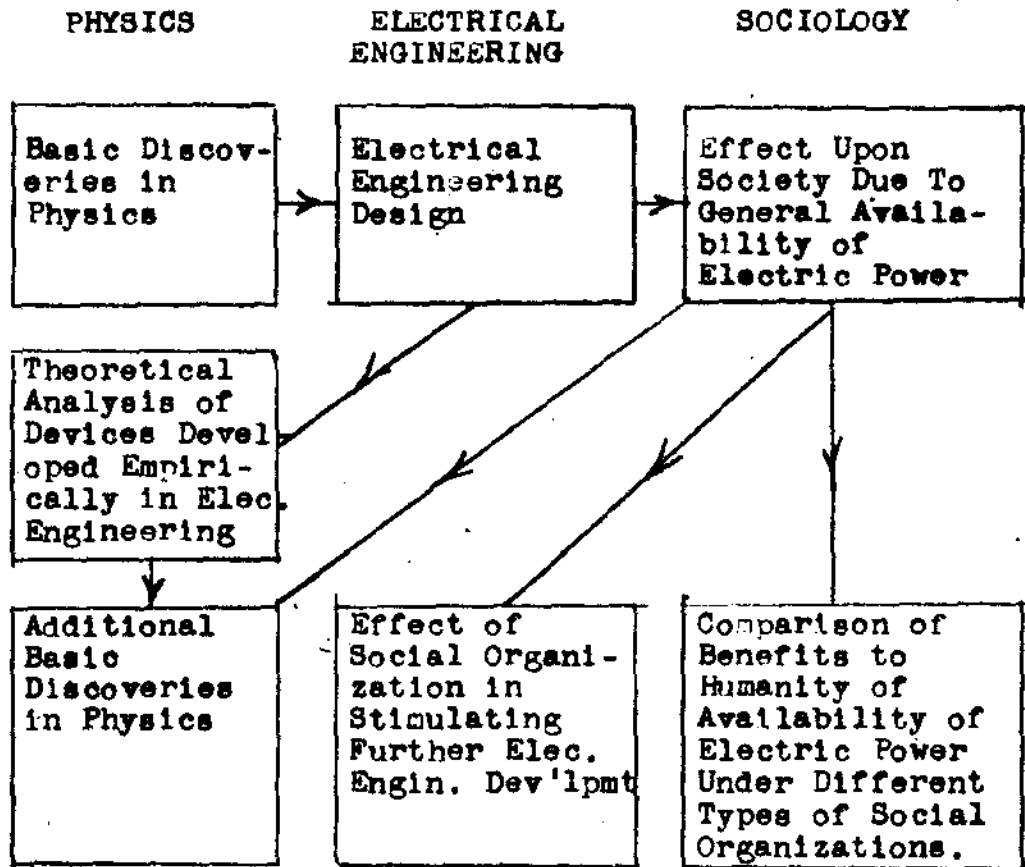
Part A: Analysis of a specific invention for investigation of the relationships between Physics, Electrical Engineering, and Sociology.

Part B: Development of an outline of the principles of Social Engineering.

Part C: Experimental use of the principles of Social Engineering in the solution of

local community problems.

Part A might consist of a study of some specific invention such as the electric motor<sup>1</sup> or transformer<sup>1</sup> in regard to aspects suggested by the following outline:



<sup>1</sup> Note: Selected for this proposed study, because a sufficient length of time has elapsed since the invention for sociological effects to be observed.

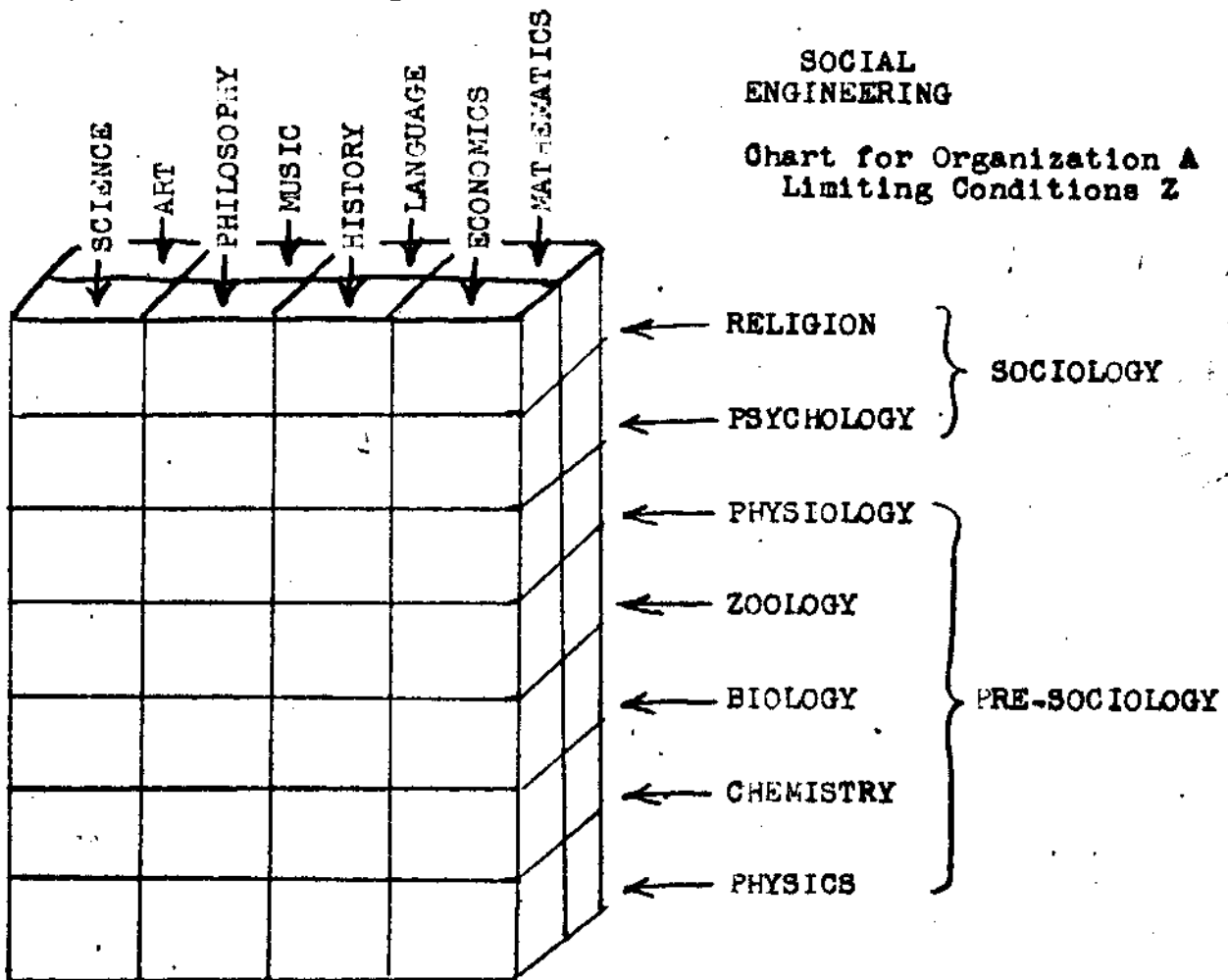
It is proposed that the results of this investigation be stated primarily in terms understandable to engineers and physicists, so that they may better understand the social implications of their work. A further step in this project might be to prepare a more popular abstract for

not  
laymen. I have/used the term "Sociology" prior to a few months ago, instead I was referring to Economics, Psychology, Religion, etc. Concurrently with Part A, I propose to study sufficient material on the principles of Sociology and related special fields to avoid unnecessary disregard of definitions, conventions, etc., of the Social Scientists.

Part B might be the development of an outline of the principles of Social Engineering. This might start with an attempt to find the relationship of the principal fields of knowledge to the problems of mankind. Perhaps some chart or table analagous to the Periodic Table of the Elements in Chemistry and Physics could be developed for Sociology and related fields. However any such charts or tables should be used with caution lest one make a mistake similar to that which some physicists made when they thought the knowledge of Physics would be complete when the few remaining blank spaces in the Periodic Table could be filled. The following "Skyscraper" type chart is proposed as a useful tool in the analysis of the inter-relationship of different fields of knowledge in respect to society.

The horizontal fields of knowledge are arranged in order of increasing complexity; with the study of energy and the basic particles of matter as the foundations in physics; the study of the

relations between the fundamental particles and energy to make compounds of the elements in chemistry; the study of more complicated compounds which form living matter in biology; the study of more complicated living things such as animals in zoology; the study of man as the most advanced of the animals in physiology; the study of man's mental processes in psychology; and the study of the more complex of man's mental and emotional processes in religion.

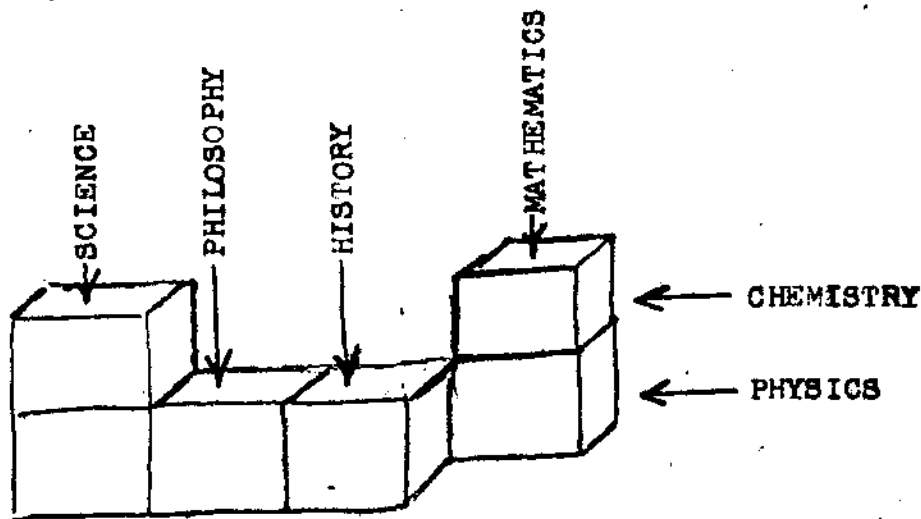


The selection and arrangement of the vertical fields is designed to fit a particular set of data and to help a particular organization to understand progress in its particular field of interest and at the same to appreciate what must be done by other organizations in other fields

to arrive at real solutions to some of the problems which face our civilization.

The third group, not shown on the "skyscraper" model, are those fields of knowledge which are formed by the intersection of vertical and horizontal columns and/or combinations of parallel columns. For example:

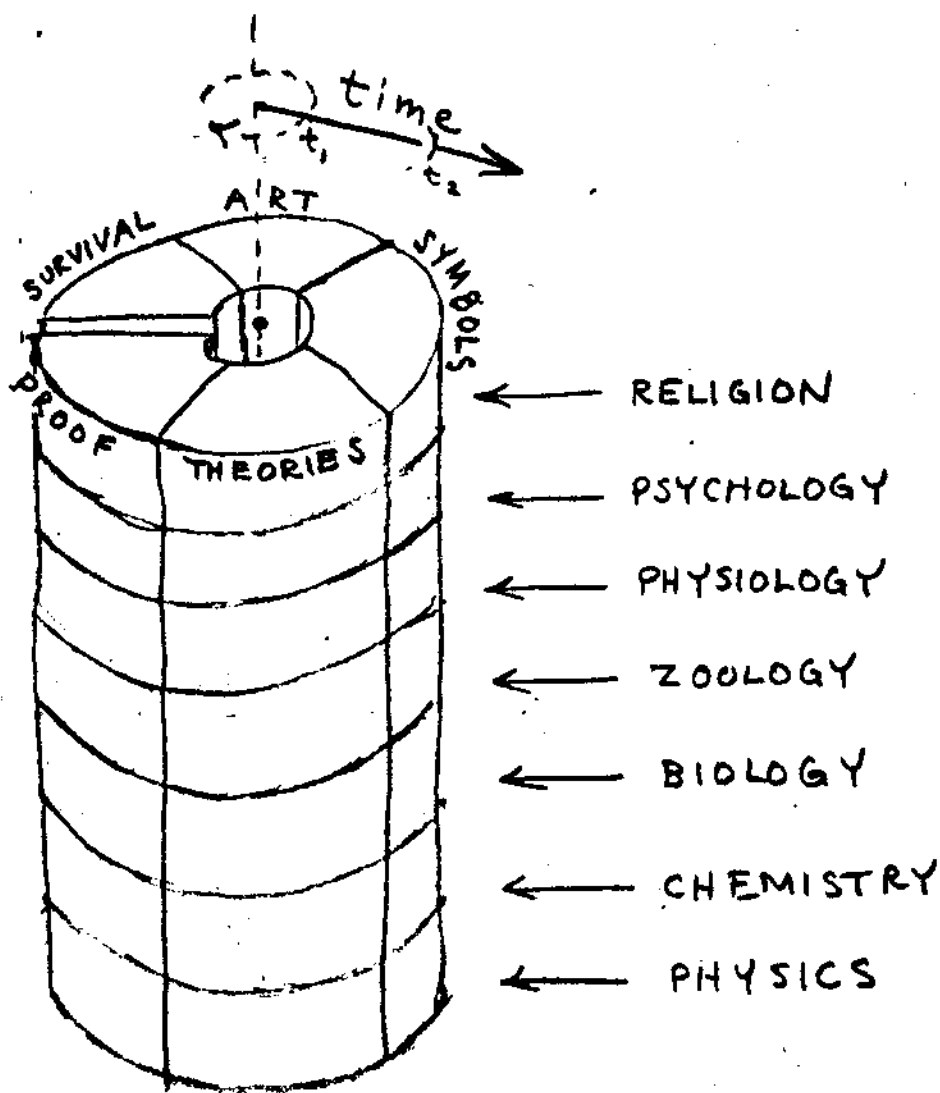
ASTROPHYSICS might be represented as follows:



Perhaps these three dimensional charts suggested above for Part B should be used in Social Engineering in a manner similar/<sup>to</sup>that in which Dr. Fritz Kunkel uses symbolic cones in the "We" Psychology.

A variation of the chart shown on page 6 that might be more useful in some types of Social Engineering problems is illustrated as follows:





Part C would be the laboratory work of the research project, consisting of experimental use of the principles of Social Engineering learned in Parts A and B in the solution of local community problems. If I should develop some new ideas, I would prefer to see them tried on a small scale with a small group of people before such ideas are attempted on a national or international scale. I am confident that our political and industrial leaders will be able to work out stop-gap solutions to

the most urgent problems facing society, but I am afraid that many errors will be made that will have to be corrected in later years. I wish to help people to make these revisions through evolutionary processes instead of violent processes. The basic problem of the part of project might be to translate the applicable information available in all fields of knowledge into practical use by supplementing the existing social institutions to expedite evolutionary processes. This part might be started by organizing a Community Advisory Planning Board or assisting Chambers of Commerce, Labor Unions, Religious Organizations, etc., to work together in the discussion of social problems.