Stage H
of A to T.

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"THE CONCEPT OF SOCIAL ENGINEERING: PART I: INTRODUCTION, EVOLVING IDEAS, & PRELIMINARY FOUNDATIONS."

Contents

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SOCIO-ENGINEERING PROBLEMS REPORT NO. 57

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.

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Introductory Note

These introductory notes are added to explain questions that may arise as to why this project was never completed.

(1) In the period 1945-1947, I received advice from various academic specialists at different universities suggesting that such studies were not practical or were premature. One sociologist stated that it was not always possible to scientifically examine the civilization to which one belongs. Another sociologist said that he avoided doing research on the major problems such as world peace, because honest research might lead to scientific conclusions that would conflict with the prevailing ideology. An economist said that he had cut himself off from the best sources of economic data, because his honest economic analyses did not please certain sectors of the power-elite. A sociology professor who had announced a seminar on the relationship between the social and physical sciences indefinitely postponed conducting the seminar, because he felt the time was not ripe for such a study. Today (7/8/63) I wonder if the attack by the Tenney Committee (California Senate Un-American Activities Investigating Committee) against the University of California Extension Division in regard to a conference on postwar problems was a factor.

(2) I made some progress in attacking the problems outlined in SEPR No. 41 through an Electrical Engineering seminar in 1946-47.

(3) Partly due to the influence of the Federation of American Scientists, the University of California conducted an

interdisciplinary seminar on international economic problems in regard to the control of atomic energy. This seminar resulted in a proposal that might have opened the way for Russian agreement to a gradual introduction of international control of atomic energy under auspices of the United Nations. We were discouraged from publication or further development of the ideas. A representative of the U.S. State Department was reported to have said "publication of that report would be a stab in the back to American foreign policy." Since I was primarily working for a degree, I didn't want to get involved in changing American foreign policy at that time.

(4) I decided to shift whatever I did in the area of the interaction of engineering and sociology to the status of a hobby. Soon I found a few other people with similar interests. However I found it necessary to part company with one engineer who didn't seem to understand democratic procedures, constitutional law, and other legal safeguards for freedom of thought and speech. At different times I either organized or worked with various informal committees on "social engineering" questions.

(5) I soon found that any group discussing important social issues would soon run into problems with "real" or "imaginary" communists. The extension of legislative un-American activities investigations, expansion of federal loyalty-security procedures, university loyalty oaths, and state loyalty oaths scared people away from such discussion groups so that if there were a few communists around, they (the communists) would have

a large share of the vote in the committee.

(6) Some committees were disabled by the fear of "imaginary" communists, while others may have been taken over by "real" communists. One local committee to which I referred some questions appeared to slow down in its activities. I asked several people who had been active what was the matter, and they said "the communists have taken over." However they could offer no proof. I decided to investigate the situation in my own way to determine what social process was taking place, without acquiring any confidential information as to who was or wasn't a communist. I established the policy that I was doing research on the social processes, and did not want to know whether any particular persons were communists or not. In regard to the committee alleged to be taken over by the communist, I visited a member of the county executive board of the Communist Party, who was publically known as a communist, and explained to him my mission. I told him that several church leaders who had been active in the aforementioned committee had dropped out because they imagined the communists had taken over.

I explained to him how I felt that the committee had been doing important work, and that the "imagined" or "real" take-over by communists was destroying an important function in the community. I then asked him, if, without revealing any confidential data on Party membership, the communists had taken over the committee. He said he would have to look into the

matter. In a few days I saw him again, and he said "yes we (communists) have taken over the committee." I then said wouldn't it be wiser for you communists to work on some other problem, instead of disrupting committees the church people are prepared to handle. He agreed to ask his Party members to withdraw. However he said they had no intention of taking over the committee--it just happened step by step as church leaders had difficulties in finding enough people to fill vacancies on sub-committees.

(7) I found it increasingly difficult to get all sides to questions. The Regents loyalty oath at U.C. removed the best opponents or critics of Marxism. I found it difficult to find reliable books and articles criticizing dielectic-materialism, so I was not able to pursue carefully some of the references to Marxism in the attached report.

(8) For a while I dropped any further development of my ideas on "engineering sociology" in order to survive amid the developing stream of totalitarian trends in America. In a way the predictions of Cord Meyer in Peace or Anarchy (1947) appeared to be taking place. pp. 53..."...Wherever the economic direction of the military machine of the state rests, it is certain that most citizens will be able to exert less and less control over the political and economic decisions that determine the nature of their existence. The practise, if not the forms, of democracy will have to be sacrificed to the end of military efficiency. The attempt to prepare for

another war will defeat with equal finality both the efforts of those who wish to return to the legendary age of competitive private enterprise and the labors of those who have looked ahead to an economy planned for the welfare of the majority and responsible to its will."

"All movements and communication will have to be hedged about by a host of security restrictions."

"As responsibilities increase for the preparation of war, generals and admirals will become the creators of policy."

.....

"History does not encourage one to believe that the rights and freedoms of a democratic government can long survive a dominant military influence." The emphasis on unquestioning obediance and respect for authority which war demands is not compatible with the belief in the worth of the independent individual which underlies the first ten amendments to the Constitution."

(9) I had numerous arguments with members of the United World Federalists. I agreed with their objectives and with Cord Meyer's analysis of the problems, but I felt that their attempts to argue and legislate would be fruitless, unless they developed a model of the interaction between groups and nations. It sometimes appeared that we were leaving the development of models by default to the U.S.S.R.

(10) In 1949 I got a copy of Annals of the New York Academy of Science (Vol. 50, Art. 4. pp 187-278) on "Teleological Mechanisms." (Oct. 13, 1948).

I found the concepts of feedback systems very fascinating. However the pressure of preparing for my Ph.D. qualifying examinations caused me to drop any extra activities for a while.

Frederick B. Wood

7/8/63

Not Released for Publication.

SOME NOTES
ON THE
CONCEPT OF SOCIAL ENGINEERING

December 1949

Frederick B. Wood

NOTICE

The material included herein is
prepared as a set of working hypotheses
which are always subject to review and
are intended to berevised as evidence
is obtained so that they will be consistent with
nature and history to the extent that
the author has tine to investigate them.

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SOME NOTES ON THE CONCEPT OF SOCIAL ENGINEERING:

I. Introduction.

The term"social engineering" has been used previously in three contexts. In the literature of the period 1910± material was published in the United States on Social Engineering[1], which is usually classified under Christian ethics. The school of philosophy known as logical positivism uses the term "social engineering" in a formal way to classify the practical application of the social sciences.[2] The term social engineering has also been used in a loose way to describe the development of socialism in the U.S.S.R.

1. "Social Engineer in America," Review of Review, July 1909; Tolman, W. H. Social Engineering, McGraw-Hill , 1909:, Earp, E. L. The Social Engineer, N.Y.: 1911.

2. International Encyclopedia of Unified Science, vols I, II Foundations of the Unity of Science, (ref. to soc. engin. probably in v.II part 1, Foundations of the Social Sciences.

None of these three uses of the concept of social engineering have much promise of direct application to the conditions peculiar to the development of the United States of America. The author has for some years been concerned with the problems of our civilization. In 1935 it was confusing to find such disagreement among scholars as to the nature of history--whether the history of mankind is a general development upward, with fluctions along the way, or whether it is a series of repeating cycles. In the light of this confusion, it was thought wiser to devote more attention at that time to questions that can be more easily tested by experiment,

such as the application of physics through electrical engineering to the design of electrical equipment.

An acceptable definition of and electrical engineer in 1937 was:

> An electrical engineer is one who studies electrical phenomena for the purpose of applying this knowledge to practical use.

In selecting the vocation of electrical engineering is was necessary to ask:

> 'Will I be doing something that will benefit society?' This consideration is particularly important when we see the economic system not functioning properly and a trend away from democracy in many parts of the world. Some people have even suggested that science should take a vacation while people learn how to use to the best economic advantage the contributions of science to industry. I do not agree with this tenet. Technical science should be advanced as much as possible and the scientific method should be applied to economics and sociology.
>
> The standards of living of the American people have been raised by the development of electricity. These benefits have been very unevenly distributed between the unemployed and the millionaires otf this country. I believe that electrical engineers should take the responsibility of studying the economic aspects of their work besides the technical work.

In 1940 it was observed that:

> There is a fight between the ideal of democracy and the ideal of rule by force. The American people have the emphasis on liberty but have neglected their responsibility. Individuals have done their own work, enjoyed entertainment, but have neglected active discussion of the vital problems facing the world.

During the 1940 presidential campaign it was apparent that neither the Republicans nor the Democrats had a philosophy adequate for the situation, but that the leaders of the Democratic Party at least had the courage to fackle the problems facing the U. S. America needed a philosophy of history as a guiding principle in the development of new institutions to remedy the inadequacies of the old.

II. Evolving Ideas of the Period: 1940-1945.

The following was considered to be a reasonable approach to the development of an adequate philosophy suited to needs of the American people.

> General study program: The present world situation is due to the people's failure[1] to analyse the basic economic and psychological problems (or a failure to heed the advice of those who have made useful analyses.)
> A. Studythe American economic and political situation. Include critical cross analyses and contributions of various fields.
> B. Develop a view of the situation. Develop an ideal plan with progressive steps: ...balanced program that is workable....withalternate plans for alternate conditions.
> C. Determine what the particular problems are and who is working upon them.
> D. What is the function of the church?

1. See subsequent qualification.

Of the various developments and alternatives considered in 1940 and 1941, the following are of particular significance:

> 1. List principles of democracy and Unitarianism. Ask all questions possible. Attempt to answer in simple terms and logic that are based on primary facts and observation. Do not quote authorities of any kind.....
> 2. Outline philosophy of history showing progress and not criticizing systems as bad, but show how a social system was necessary for progress in its time. Develop view of whole.
> 3. In the light of these principles and the above philosophy, chart a course for America(and the world.) Avoid freezing into fixed patterns. Develop a dynamic program that does not buck progress nor accelerate more than the social order can stand. It should develop a more stable social order and yet provide for social change.
> 4. Suggest techniques of social change where the new does not blot out the old, but in which the functions of the old are analysed and provisions are made for the continuance of the necessary functions.
> 5. Outline a natural philosophy of science. Show the possible place of religion and correlation of all fields of endeavor.....Note: I believe in freedom accompanied with responsibility. Why? Each individual is different, having contributions to make to society. To allow freedom

to all, restrictions must be established to effectively prevent a few people from having freedom without responsibility, resulting in coercion of their fellow men.
.....

Social Action for Engineers: 1. Find out what basic problems confront our society.
2. Find out who are competent authorities in sociological fields, such as economics, political science, philosophy, history, social institutions.
3. Discuss issues and refer technical questions to authorities in the field in question. An engineer should recognize that in a democracy, everyone should discuss the major issues and that each person cannot be an authority in all fields, making it necessary to rely on testimony of experts in coming to decisions. However the experts should organize their testimony so that the average person can see the general process of reasoning or the assumptions and interpretation of results....

...each individual should be permitted to develop to his best capabilities. Each should assume his responsibility that his freedom carries with it..... In a community of free people it is necessary for the establish a system for discharging their responsibilities for common enjoyment of their freedom....

Approach to problem of science of religion as a part of natural philosophy: Certain fields of knowledge developed before the period of "modern science" so that the symbols used are of a different nature than in science. For example take psychology. Much psychological data have been observed in the distant past and are considered common knowledge. Using physical science as a reference point, psychology can be referred to as a young science,. However the phenomena (and data) are old and have been observed in the past, but have not been correlated in a scientific manner or based upon physical law. In the process of scientific development, separate islands of analysis, each with its own symbols develop. Gradually these "islands" are tied together by natural philosophy. In developing each field of study, one should not wait until the true nature of the phenomena based upon physical law can be developed, but symbols should be adopted that are validated in practice (even though they are not "scientific.")

An example of this is Dr. Kunkel's "We" Psychology.... Perhaps we may see a similar situation in religion. Symbols and symbolical practices have developed which were validated in history. Perhaps one of the reasons for cleavage between science and religion is that this relationship is not acknowledged. In the case of the "We" Psychology, I expect that when more is known about physico-psychology, symbols should be revised for that branch of psychology.....

Similarly one should expect reorganization in religion as more is known about the fields upon which religion is based. i.e. (physics)--(chemistry)--(biology)--(physiology)--(psychology)--(religion).

Perhaps the religious symbols and institutions at some time represented the discovery of fundamental laws of religion, but in form not recognizable in the present scientific symbolism.

The present situation requires the changing over of symbols for correlation in a natural philosophy that will give greater authority to the ideal social order to follow the development of democracy. Since the war effort takes brain power off of pure science a precise integration of scientific fields including religion cannot be expected immediately, but each necessary field must be cross-examined with brain power available. A general procedure may be to make charts of natural philosophy with sections colored, etc., to show progress.

Faith in Natural Law:[1] I believe that all phenomena including religion, psychology, physics are interrelated by natural law. Even though each field has its own laws it will ultimately be discovered that all are s bdivisions of fundamental law. Statistical laws are included.

Matter and energy are interchangeable. To our present knowledge the fundamental unit of matter is the electron. Matter and energy are described incertain cases by Maxwell's equations, quantum theory, wave mechanics. Biology must be built upon the laws of physics and chemistry. Psychology and religion are more complex and built upon ultimately biological law (or order.)

1. Note: This faith in natural law, existence of order in the universe, or whatever one wishes to call it, makes it possible to develop a science of society. This hypothesis is abundantly verified by nature and history (i.e. by experience.)

Specific problems: 1. To determine a course of action to give the people of the world the tools (techniques of study and social reorganization) with which to reconstruct the society in which they live. 2. To show the way to a sociological science. 3. To give them faith in the future. 4. To develop international understanding.....
5. To show people how we may develop <u>individual character</u> and reform local affairs.
.....

In 1944 the author again gave some attention to these questions which had been neglected during the critical phases of World War II.

> The Moral Law: There exists moral law in this universe even though it may not be as clearly understood by man as physical laws. Many of the world's great religious leaders have seen these laws in varying degrees of clarity and translated them into the language of their time and social group. Even though each man's interpretation is somewhat different, we find two fundamental laws verified by many leaders in many groups.
>
> The first is that one must love the truth with all his heart and all his mind. While the second follows that one must love his neighbors as himself. On these two laws can be constructed the deatiled moral laws proclaimed by the prophets of many different religious and ethnic groups.
>
> In our dealings with our neighbors whether they be next door or on another continent and regardless of what religious faith they may hold, we have in these two fundamental laws, a scale by which to measure the validity of our decisions and actions. We should examine our actions in business, politics, and international relations by comparision against these moral laws. From history and current experience we have seen and are seeing that even though a few may temporarily profit through violation of these laws, that the loss to humanity is greater than the gain to the transgressors.

This line of thinking was pursued further in 1945 as indicated by the following:

> Our Responsibility: We must <u>love</u> the <u>truth</u> with all our hearts and with all our minds; we must respect that which is known today of the natural law, but we must not be insensitive to new discoveries. We must <u>love</u> our <u>neighbors</u> as ourselves. Of these two laws, the second is as necessary as the first, but does not suffice without the sustaining strength of the first. Upon these two foundations we build on the good of the past toward the awakening horizon of the future.

> What Shall I Do About It? .....I question whether I can adequately do my part in solving the social problems of the day, if I continue specializing in electrical engineering, while leaving the social problems to my spare time. I am considering doing some study after the war on the problem of establishing the "Brotherhood of Man" in our time. This resolves itself into two parts. The first is the

philosophical approach to the interdependent relationship of all men to one another in the world. The second is to study, propose, and try out improved practical techniques of cooperation between men so that people can really say that they love their neighbors as themselves.

When the Pacific War is over, I propose to do some studying on two inter-related subjects. The first would be more theoretical consisting of research in some special combination of physics, chemistry, zoology, biology, physiology, psychology, and religion. The second part would be more practical, comprising research in the field of economics on the problem of utilizing that which is gained in the first problem for the benefit of man.....

By October 1945 the following 'Research Program in Social Engineering through Electrical Engineering and Sociology' had been evolved:

.....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.

Part A: Analysis of a specific invention for investigation of 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.

.....If new ideas should be developed, 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 corrected in later years. I wish to help people to make these revisions through evolutionary processes instead of violent processes.

The following table of steps in the verification of hypotheses was suggested as a rough guide to keep the work consistent with the scientific method. To realize the complexity of checking numerous working hypotheses with the different types of phenomena of significance it is instructive to examine Professor Panofsky's "Table of the experimental evidence of the special theory of relativity".[1]

1. See Appendix

A=Searching for background reference material.
B=Brief reading of background material.
C=Study of background material.
D=Summarizing of previous research workers' results.
E=Definition of immediate problem.
F=Tabulation of references for specific problem.
G=Brief study of the problem.
H=Formulation of preliminary hypotheses.
I=Checking of preliminary hypotheses for agreement with known data.
J=Collection of new data.
K=Checking of hypotheses with cultural valuesiin art, music, poetry, etc....
L=Critical testing and revision of hypotheses.
M=Preliminary report writing.
N=Circulation of preliminary reports to others for criticism.
O=Revision of reports.
P=Publication.
Q=Experimental use with small groups.
R=Review of value of hypotheses as tried in practice.
S=Preparation of popularized versions for public use.

III. Development of Preliminary Foundations for Social Engineering, 1946-1949.

In 1946 the projected research program had developed into the following parts which are to a certain extent overlapping:

I. Help establish the "Brotherhood of Man"in our time.
   A. Philosophical approach to establish the inter-dependent relationship of all men to one another in the world.
   B. Study, proposal, and trying out of improved practical techniques of cooperation between men.

II. Research program in Social engineering through electrical engineering and sociology.
   1A. Analysis of a specific invention for investigation of the relationships between physics, electrical engineering, and social science.
   2F. Review of the philosophy of science.
   3D. Development of a philosophy of engineering.
   4E. Summary of the fundamental principles of social science.
   5B. Development of an outline of the principles of social engineering.
   6C. Experimental use of the principles of social engineering in the solution of local community problems.

III. Formal study pr gram. (study for Ph.D. in electrical engineering.)

IV. Informal study program. (study of the social sciences.)

V. Practical experimental program. (working with organized groups of people.)

The above program with slight rewording can be seen to fit also the following classification:

(I)Problem of society: To improve methods of human cooperation.
(II)Problem of particular social organizations: To consider whole problems with the essential components.
(III-V)Problem of the individual:

AA. Electrical Engineering. The work for the M.S. included among other things the following courses:

Differential equations
Theory of Probability): Courses covering the fundamental basis for mathematical analysis of physical and social phenomena.

Electromagnetic waves
Bessel functions): Basic to the masroscopic world (large-scale phenomena compared to microscopic world of quantum mechanics) and to electrical engineering in particular.

History of Electromagnetic Theory (seminar): The relationship of the development of electromagnetic theory to society. The idea of studying a particular invention was changed to a particular branch of physical theory. In the preparation of this the concept of cooperation of scientists was elaborated[1], which leads to concrete form through organizations such as the A.A.Sc.W. and N.C.A.S.P.

1.The History of Electromagnetic Theory, (1947), Appendix.

International Economic Problems(1)Discussion of international control of atomic energy. A sample study of a "particular invention". Restrictions of material appropriate for discussion in formal academic work necessitate the transfer of such problems to independent organizations. N.C.C.F.Am.S. carried on such studies but became inactive through trying to deal with scientific questions without getting involved with the more general political problems such as the"Truman Doctrine."

Thesis: Coupling of Power from a Resonant Circuit to Waveguide or Load at Microwave Frequencies.

Preparation for Ph.D. has so far included:

Theory of functions: Fundamental basis of integration in mathematics, with applications in electrical engineering. A possible by-product might be the extension of the Lesbegue integral to develop a "formal" theory of social integration.

Quantum mechanics: The basic laws of the microscopic level of physics. There has been some discussion of the philosophic interpretation[1] of quantum mechanics. The study of quantum mechanics suggests some indirect analogies regarding the nature of truth in social phenomena[2].

1. Hans Reichenbach, Philosophic Foundations of Quantum Mechanics, U.C. Press (1944); Bergmann, An Empiricist's View of the Sciences....articles in Sci.Mon. and Am.J.of Physics.
2. Note: There is a possibility that 'truth' in a complex society does not consist merely of isolated facts, but that to give a 'true picture' of a situation one must include a complete group of elements and that there may be different levels of truth. In this sense, much of what is published in American press is only one component of a group and leads to erroneous conclusions.

Differential equations: General solution of the principle types of equations found in physics and engineering.

Classical electricity and magnetism
Special theory of relativity): Detailed development of electromagnetic theory. Modification of macroscopic mechanics for velocities approaching the velocity of light.

BB. Philosophy of Science.

Many scientists in America are either ignorant[1] of philosophy or they consider themselves as logical positivists.

1. They usually have some philosophy, even though they don't recognize it as what the professional philosophers are talking about.

A broad but sketchy study of the history of science has been conducted. The spirit of scientific inquiry appeared among the Ionian Greeks about 600 B.C. and flourished as a materialist philosophy developed, but the development of science died out after Aristotde at about the same time as a non-materialist philosophy was re-established by the upper classes in Greek society[2].

2. Benjamin Farrington, GreekScience, I and II, Penguin Books: A142 and A192.

When science began to flourish again to proceed way beyond the early Greek science, the philosophy of the scientists was predominantly mechanistic materialism. As the mechanistic conception of the physical world broke down with the quantum theory of radiation (Planck), discovery of x-rays, and special theory of relativity some of the leading scientists embraced the philosophy of empirio-criticism and subsequent developments of logical empiricism or logical positivism. The use of logical positivism meant that these scientists were withdrawing from investigation of some regions of the real world to concern themselves more with logival forms of scientific laws.

The information which the author has examined to date indicates that the philosophy of logical positivism[3] tends to retard the application of science to the solution of social problems by dealing with "sensations" instead of real objects.

3. Note that the recent book by Vannevar Bush and popular article in Life are examples of the distortion of the scientific method by the philosophy of logical positivism. There is a large area of the physical sciences where it doesn't make much difference what philosophy is used, so that difficulties encountered by Dr. Bush in social and philosophical problems in no way detract from his great achievements in physical science and engineering.

In the period following 1900 there was a philosophy which was consistent with the new developments of physical science. This philosophy was the "dialectical materialism" of Marx and Engels. In 1908 V. I. Lenin[4] ably demonstrated the usefulness of dialectical materialism in understanding the crisis in physics of that time.

4. V. I. Lenin, Materialism and Empirio-Criticism (1908)

There are indications that dialectical materialism may have a broader validity than is generally conceded. It is unfortunate that due to censorship by various direct and indirect means that it has not been rigorously criticised in American academic circles. Perhaps some people are afraid that the truth will change their status. Regardless of what we may think of the political tactics of the Communist parties we must give them credit for making available under severe handicaps the writings of Marx, Engels, and Lenin.

There exist certain contradictions in physics which are still unsolved, such as .....

A philosopher-scientist by the name of Christopher St.J. Sprigg (pseud. Caudwell)was exploring the possibility that developments in physical science are molded by the social system in which the scientists themselves live, so that it is necessary to make a start at solving the social crisis in order to make progress in solving the crisis in physics[12]. Unfortunately Christopher Caudwell and some of his contemporaries were killed in Spain about 1938. However most of his incomplete manuscripts which he had left behind were saved and have been published in England.

12. Christopher Caudwell, The Crisis in Physics, London(1939)

Although there is much evidence to indicate that dialectical materialism offers great hope for the future in guiding mankind toward a better understanding of nature and how to utilize the laws of nature to make a better world, in practice the representatives of entrenched privilegge have in many instances succeded in forcing dialectical materialists into desperate struggles for survival instead of moving forward in the fulfilment of the goals of their philosophy.

CC. Philosophy of Engineering.

The early development of engineering was principally for military purposes, followed by a branch called civil engineering and later the particular branches of mechanical, electrical, etc. At present the Engineers' Council for Professional Development which is sponsored by the principal engineering societies in the U.S.A. including the A.I.E.E. and I.R.E., has published the following definition of engineering:

> 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.

Even though "human needs" are officially referred to in the I.R.E. constitution, the actual consideration of the meaning of the above definition is only superficially considered at present. To arrive at an adequate analysis of "human needs" requires a consideration of the actual problems that the common people face, together with the ap propriate philosophy and social sciences, instead of a simple analysis of price that people are willing to pay in dollars for some engineering equipment.

DD. Fundamentals of Social Science.

Although the object of sociology is to learn about society, so improvements can be made, the attempt to copy the methods of physical science seem to take over the inadequacies of physical science instead of the more powerful techniques. What is needed is a philosophy that is consistent with both physical and social phenomena. The early sociologists Auguste Comte, Herbert Spencer, and Lester Ward in their pioneer work did maintain a sound general outlook in spite of their particular errors. Some of the more recent sociologists have searched for social laws by sifting statistical data while the more important problems are not so readily solved by such direct methods.

Pendell has prepared a sociology text in which the related materials of physics , chemistry, geology, biology, economics, and psychology are assembled together.[1] Oliver J. Lee has edited a manuscript grouping the laws of change in various fields together[2]. Frederick Engels has developed the laws of change discovered in social phenomena[3] by Karl Marx into a more general set of laws of change in nature. His incomplete manuscript and notes have been published since his death[4].

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1. Elmer Pendell and cooperating sociologists, Society Under Analysis and Introduction to Sociology, (1942) "This book had its inception in the conclusion that the time has come for a closer rapport between the physical sciences and the social sciences."
2. O. J. Lee, editor, Trends and Equilibria in Nature and Society, Northwestern University (1945)
3. Frederick Engels, Herr Eugen Dühring's Revolution in Science (Anti-Duhring), London (1878)
4. Frederick Engels, Dialectics of Nature, written between 1872 and 1882, published about 1934 in Moscow, and in New York in 1940. This is rather difficult to interpret unless one knows the history of science during the intervening period.

Many particular specialized fields in the social sciences have achieved considerable success. The present atmosphere of hysteria in the U.S.A. discourages social scientists from tackling many of the more important problems, because they might provoke controversy.

Seminar on International Economic Problems(2):
(Note: These ideas are not necessarily those of the sponsors.)
The conflict between capitalism and socialism was investigated with considerable attention to the philosophical basis[1]. The philosophy of operationalism[2] of P. W. Bridgeman was taken as representative of modern physical science. This position is probably representative of the relatively small number of American physical scientists who have written upon philosophical subjects, but does not consistently do justice to the potentialities of science.

It was found that the philosophy of Locke [3] resulted in satisfactory conclusions regarding economic and property rights in the agricultural England of his time--- his analysis provided the basis for guaranteeing to the individual worker the tools of production needed to earn a living so that he could be independent.

1. F. C. S. Northrup, The Meeting of East and West (An Inquiry Concerning World Understanding), N.Y.(1946)
2. P. W. Bridgman, The Logic of Modern Physics, (1927)
3. Note: Although Locke's philosophy has basic devects in the light of our present scientific knowledge of the universe, in Locke's time the defects did not make any difference in the issues Locke was concerned with. Western Society has gone astray with Locke's philosophy on two counts: (1) The basic defects (i.e. idealism) retarded the development of the social sciences (2) The application of the theory of property rights valid in an agricultural society, in an industrial society accomplished opposite of the objectives of Locke himself (freedom for individuals to develop.)

The misapplication of Locke's theory of property rights, permitting large industrial organizations to be owned by people other than the individual workers, is a source of serious trouble. The scientific and industrial revolutions have made large industrial organizations necessary, but have not shown how to change the legal concepts and institutions to assure that workers and consumers have control over the means of production.

EE. Coordinated Principles of Social and Physical Engineering:

As mentioned previously the two principal contending systems of philosophy upon which social and physical engineering could be coordinated are: Logical-positivism and dialectical materialism. Most of the available evidence seems to confirm that fundamentally dialectical materialism is a more consistent representation of nature, although in practice there is still much confusion. The application of dialectical materialism to social change was originally formulated on the assumption that the advanced capitalist countries would be the first to reach conditions requiring a change toward socialism. However history has shown us that the less advanced countries have been the ones to change to socialism first. The threat (and actual use in some instances) of force by the capitalist countries against the socialist countries forces the socialist countries to make social changes at a speed greater than one could reasonably expect human beings to stand without a considerable amount of disorientation and confusion of many individuals. The brandishing of force by the capitalist powers also helps the more aggressive leaders reach higher places in the socialist states.

The practical problem before us is to develop an anlysis that will fit the conditions in the United States. Unfortunately most existing Marxian analyses of economic development of the U.S.A. are tempered too much with the languages and techniques suitable to past situations in other parts of the

world, so that they are correct on many fundamental points, but are in error or irrelevant on sufficient minor points to render them useless except to a patient scholar.

The U.S.S.R. and the U.S.A:

The leaders of the U.S.S.R. have a sound basic philosophy, but have had to work under much greater handicaps than would have occured if the first transition from capitalism to socialism came in a Western European country as originally envisaged by Marx. Some of the major handicaps are as follows:

(1) Starting from a dictatorial semi-feudal society instead of an industrial society where the forms of politiaal democracy were started.

(2) Severe shortage of educated personnel. (note: some people ascribe the phenomenal industrial development of the U.S.A. as more a product of the almost universal educational system in the U.S.A. than being related to the economic system of capitalism.)

(3) Severe shortage of industrial and engineering plant and equipment.

(4) Conditions of "capitalist encirclement" in which the capitalist countries of the world combined forces to blockade, invade, and issue false propaganda against the U.S.S.R. in the early years[1] and the "cold war" at the present time.

1. Michael Sayers abd Albert E. Kahn, The Great Conspiracy against Russia, N.Y:(1946)

Under the conditions of capitalist encirclement it became more difficult for the leaders of the Soviet Union to permit splits within their own ranks, for fear that the existence of rival factions would make it easy for foreign powers to plot action against socialism.

In the 1930's as the Nazis came to power in Germany and similar groups came to power in Italy and Japan, the leaders of the Soviet Union had to choose between continuing toward the goals of a classless society while risking the possible annihilation planned by Hitler or temporarily neglecting some of their ultimate objectives in favor of a program that would make the Soviet Union a strong military power. The historical record indicates that the Soviet Union attempted to follow the first alternative by seeking the cooperation of the League of Nations in action to prevent Nazi Germany from starting a war. The League failed to agree on any action, so it appeared quite likely that the Soviet Union would have to defend itself alone against Nazi Germany, which left no alternative but the second and less desirable policy of increasing their military preparations. In fact the record shows that the British leaders wanted the Nazis to attack the Soviet Union in the hope that both the Soviet Union and Nazi Germany would be exhausted by such a war.

.....

In the light of their experience it was difficult for the Soviets to know whether there was a genuine appreciation of their position by the people in power in the U.S.A. and England during the joint effort of World War II or whether the leaders of the U.S. and England were cooperating with the U.S.S.R. temporarily for the purpose of reducing the

American and English casualties necessary to defeat the Nazis. As the campaign in Europe made succesful progress and prominent American business and financial leaders talked of fighting the Soviet Union next, it became necessary for the leaders of the U.S.S.R. to carefully weigh the possibilities of this war talk having real significance.

Apparently until July 1945 they hoped that the American war talk was of no significance and they announced plans for international cooperation in publication of scientific research and international exchange of scientists[1].

1. For summary of speech of Kapitsa June 23, 1945, see Eric Ashby, Scientist in Russia, p.136, Pelican Book A186.

However the use of and timing of the atomic bomb[2] at Hiroshima by the U.S.A. without adequate cooperation with our ally the U.S.S.R. apparently caused prompt reconsideration of the significance of the "war talk" in the U.S.A.

2. P.M. S. Blackett, Fear, War, and the Bomb: Military and Political Consequences of Atomic Energy, N.Y: 1949

This followed by many things , a few of which follow, could in the light of the practical experience of the leaders of the U.S.S.R. mean nothing other than that business and financial leaders of the U.S.A. hope to convince the American people to fight a war against the Soviet Union:

The president's demand for universal military training.

Prompt dropping of O.P.A. controls.

Plans to retain U.S. military bases encircling the U.S.S.R.

Proposal for international control of atomic energy which retains major advantages to the U.S.A. during transition and offers possible way for capitalist countries to block the most useful applications of atomic energy in socialist countries.

Continuance of the U.S.A. to make atomic bombs.

General anti-communist hysteria whipped up by newspapers and congressman.

Statement by the president of the U.S.A. that he objects to communism anywhere in the world.

U.S. support of reactionary governments every where possible in the world.

Anonyomous articles for which the U.S. Department of State does not deny authorship in which plans are discussed for containing "Soviet expansion" and for helping possible situations leading to internal troubles in the U.S.S.R. in the hope that Soviet government might collapse from internal difficulties.

The Marshall Plan.

The "Truman Doctrine" with military aid to Greece and Turkey.

The Atlantic Pact.

(Note the precise wording of the above listed items have not been accurately checked with sources as yet by the author but are believed to be close enough for the purposes of this paper.)

Each of the above and like actions could only be expected to cause the Soviet Union to impose more stringent security measures in anticipation of a continuing campaign against the U.S.S.R. by the U.S.A. This situation makes it all the more important to the Soviet Union for all socialist countries to work together, even though the working together for military preparation may be in some cases contradictory with the ultimate objectives of socialism.

In the light of the foregoing, the basic problem of world peace is to get the United States of America on a sound program toward solving our own social and econimic problems.

On occasions, translations of speeches by prominent leaders of the Soviet Union have shown that they admit some failures in their policies in regard to immediate "humanitarian" questions. The fact that they admit some inadequacies indicates that they are attempting to live up to the ideals of socialism, but have been in situations where they must choose between unpleasant alternatives, where the best they can do is to choose the path which will mean the least human suffering in the long run. Our task is to find a way to get the U.S. on a reasonable path which would make possible the freeing of the creative resources of both the U.S.A. and the U.S.S.R. from military preparation.

One basic difficulty with the economic system in the U.S.A. is that the preparation for war is necessary to keep our economic system functioning without large numbers of unemployed.

FF. Experimental Testing.

The experimental testing is perhaps a fancy wording for political action, but implies more, in that before public political action is attempted the ideas must be tried out in small groups. The social scientist has less freedom in the construction of experiments than the physical scientist. The most careful use of all available historical and contemporary data must be made in order to reduce the chances of a faulty experiment. Also the timing of social experiments is restricted by prescribed election times and the occurance of particular crises.

It has been found by experience that most organized groups are inadequate for the carrying out of the objectives of this social engineering program. Academic groups under present conditions search for the isolated components which might be less controversial and thus direct their efforts to the non-essential parts. Groups spending most of their effort in direct political action seem reluctant to investigate the fundamental issues--for example the United World Federalists at first kept saying that they would have to refer my suggestions to the national officers and to my later suggestions they replied that they were too busy to study the material which I suggested.

There are some groups which are willing to tackle the basic problems. For example the Philosophers Club at the First Unitarian Church is willing to discuss philosophical concepts.

When some specific problem is suitable for discussion it can be referred to the appropriate panel of the East Bay Council of the Arts, Sciences , and Professions which has panels of experts in the following fields: science, health and welfare, teachers, artists, writers, psychologists, etc. When the stage of direct political action is required A.S.P. in turn can inform the people through meetings, radio programs, etc., or through reports to government officials or to organizati ns involved more directly with politics. An example is illustrated by the transmittal of the conclusions of the East Bay A.S.P/ science panel regarding atomic energy development to the Progressive Party national convention for use in preparing the 1948 platform.

IV. Conclusions.

The material of parts II and III are to be considered as working hypotheses. The arguments and evidence although partially available, have not been consistently put down in detail. Some modification of the terminology in part II is required to be consistent with later developments in part III.

Although the author has not had time to explain the logic of developing this material, it is to be noted that the verification of a hypothesis in the social sciences may not be as simple as the table of evidence for the special theory of relativity in Appendix I, but it appears that the logic of each hypothesis in social science can reasonably be put in simple form understandable to people of intermediate education, while the individual hypotheses considered in relativity theory require mathematical forms not so readily understandible to those untrained in mathematics.

The course of action of the author at present is to concentrate on his electrical engineering work, while maintaining contact with a few groups who are discussing the philosophical questions and considering practical problems so that while I am not doing much in the social sciences myself, my ideas will be available to others and I will be kept up to date as to what progress is being made on the practical problems.

Appendix I

EXPERIMENTAL EVIDENCE OF THE SPECIAL THEORY OF RELATIVITY[1]

		Light Propagation Experiments								Experiments from Other Fields				
	Experiments / Theory	Aberration	Fizeau Convection Coefficient	Michelson-Morley	Kennedy-Thorndike	Moving sources and mirrors	deSitter Spectroscopic Binaries	Michelson-Morley with light from the sun	Variation of Mass with Velocity	General Mass-Energy equivalence	Uni-polar induction with permanent magnet	Radiation from moving charges, (e.g. canal ray experiment)	Meson decay at High Velocity
Ether Theories	Stationary ether, no contraction	✓	✓	N	N	N	✓	✓	N	N	O	N	✓	O
	Lorentz contr., stationary ether	✓	✓	✓	✓	N	✓	✓	✓	✓	O	✓	✓	O
	Ether attached to ponderable bodies	N	N	✓	✓	✓	✓	✓	✓	N	O	O	O	O
Emission Theories	Original source	✓	✓	✓	✓	✓	✓	N	N	O	O	O	✓	O
	Ballistic	N	N	✓	✓	✓	N	N	✓	O	O	O	N	O
	New Source	N	N	✓	✓	✓	N	N	✓	O	O	O	N	O
Special Theory of Relativity		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

✓ = agrees N = contradiction O = does not apply

This outline of the experimental basis shows that experiment contradicts any reasonable alternative to the theory of Relativity, rather than any single experiment proving the theory. The experiments outlined above present evidence that:

(1) The presence of an ether, iether stationary or convectly tively carried, cannot be established.

(2) Modification of electrodynamics of the emission theory type is untenable. The conclusions then make it plausable to look upon the basic laws of mechanics as in need of modification.

1. Wolfgang K. H. Panofsky, Classical Electricity and Magnetism, Physics 210B, University of California Syllubus UG, March 1949, pp. 249-251.

In 1905 Einstein proposed as a solution, compatible with the experimental facts known at that, the following postulates:

(1) All laws of electrodynamics (including, of course propagation of light with the velocity c in free space) shall be same in all inertial frames, as are the laws of mechanics.

(2) It shall be impossible to devise any experiment defining a state of absolute motion or to determine a preferred inertial frame having special properties for any physical phenomena.

It is clear that if the laws of physics obeyed these postulates, all the experimental facts outlined above would be in agreement with these postulates.

Appendix II

Extracts from statements of organizations.

Unitarian Church (Berkeley):

We, the members of the Unitarian Church, are united by a vision of a better world that is to come, and by all those aspirations and loyalties which give meaning and direction to human life.

Our Fellowship is founded upon: Individual Freedom of Belief; Discipleship to Advancing Truth; The Democratic Process in Human Relations; Universal Brotherhood Undivided by Nation, Race or Creed; Allegiance to the Cause of a United World Community.

As such, the members of this church recognize in each other freedom of mind, impose no theological conditions of membership, respect differences of opinion in one another, and we welcome into our fellowship all who love truth and seek to do good.

Council
East Bay/of the Arts, Sciences and Professions:

(extracts from constitution: preamble, arts.II, III.)

We, of the arts, sciences and professions, have a particular need and a particular responsibility in together facing the serious threats to freedom and democratic culture stemming from the developing economic crisis and the intensification of oppression and warfare which beset society.

Our special skills and talents demand that we make an independent, detailed analysis of these problems and so dramatize them as to stimulate people to rational action leading to the solutions.

These very skills place professional and cultural workers on the front line of the present struggle to develop a peaceful, abundant life for all people. Those who do creative work or directly utilize such work are the first to feel restrictions on the freedom of thought and expression and are also the first to appreciate the constructive possibilities of our resources.

Those who wield the potent weapons of modern science, communication and artistic expression find themselves under pressure to prostitute their knowledge and skills in the selfish interests of narrow groups. Though some few are won to this false banner by the temptations which their privileged position affords, the majority react against any use of culture which does not serve the general welfare.

In order to make effective the strong sentiment for democratic culture among professional people, we join with others to develop an independent organization which can bring together those representing all fields and all shades of opinion having the above ideals as their common ground. We recognize that our effectiveness depends on integrating the contributions from all fields of specialization with the specific needs of the community; that our professional problems must be viewed as a whole, in their relation to society.

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Article II. Purpose. The purpose of this organization shall be:

1. To study and discuss the various problems that confront the artist, scientist and professional in the performance of their work and as a member of society.
2. To arrive at such solutions to these problems as will help to establish a prosperous, democratic America in a world at peace.
3. To attempt the concrete realization of these solutions through education and political action.

Article III. Panels. As a principal means of realizing the above purpose, problems of the various professions shall be taken up for study and action by working panels composed of Council members from one or more allied professions.