

"PRELIMINARY CONSIDERATIONS IN REGARD TO THE SOCIAL RESPONSIBILITY
OF ENGINEERS"

by

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The object of this paper is to examine the history of electromagnetic theory preparatory to the consideration of some particular engineering problem involving the application of the theory to the meeting of human needs. From the beginning of this study it has been apparent that the application of physical theory to the meeting of human needs brings about relationships between many fields of endeavor. The physicists and mathematicians make advances in knowledge of the laws of physics. The engineers utilize research of the physicist and mathematician to develop new inventions which are potentially able to meet human needs. Then, if suitable, economic, political and social conditions prevail, part of the people of the community provide the financial backing needed to prepare the factories and production tools, another part of the community cooperates by performing the labor necessary for the production of the new invention. Other portions of the community perform their share in the project through various service and distribution functions. Social institutions are developed to facilitate the cooperation of various sections of the community.

Preliminary examination of the history of electromagnetic theory reveals a magnificent series of advances in our understanding of the basic laws of nature concerning electricity

and magnetism. A series of great inventions and design achievements followed the advances in physical theory. The introduction of these new inventions initially brought cultural values to sections of the community which otherwise could not afford them. Then along with the benefits of the new inventions came various difficulties which require that adjustments be made in the existing social institutions, so that the different sectors of the community can easily cooperate in the common enterprise of utilizing the work of the basic scientists and the engineers for the common good. Most social institutions have orderly procedures for gradual change through which necessary adjustments to changing conditions can be made.

The procedures for change appear to have been inadequately used or improperly used in recent times in Europe and the United States so that inventions of great potential benefit to humanity have been inadequately used or used primarily for destruction. The same radio which has improved the communication facilities of the world and has brought music, plays, news, and many other types of programs to people who could not go to the concert hall or theater, has also been used by demagogues to organize great masses of people into fascist organizations. Even though fascism has been militarily defeated, the seeds of dissension upon which demagogues thrive exist in America and elsewhere in the world.

There seems to be a general feeling of insecurity that

drives each group to grab what it can. After a few groups in society have seized what they can without regard to the interests of others, additional groups reluctantly abandon their previous high principles and look strictly after their own interests. This appears to be leading to stronger and more insoluble conflicts instead of leading to coöperation among all groups.

Today the situation looks very sad in the United States. Labor groups are becoming more dissatisfied. Representatives of capital are talking of legislation to curb labor. This appears to make labor more irritated. The situation leads some people to look for scapegoats, such as "big business" or "the reds". This unrest shows up in many other ways. The divorce rate is up to a point where after discounting some of the abnormalities due to the war, it is estimated that one out of every five marriages terminates in separation or divorce. It is estimated that one out of every ten persons in the United States will need psychiatric care some time during their lifetime. A few engineers and physicists are questioning the value of their work under the present social conditions.

To some people the present situation requires immediate action to solve the tremendous social problems that face our civilization. A few engineers are going as far as abandoning engineering design work to devote their full time to social and political problems. The ultimate benefit to society of

people trying to solve social problems, whose training is almost devoid of any semblance of social science, is somewhat questionable. Even though the number of such engineers is statistically small, it is a significant sign of a growing lack of confidence in the social institutions of our country.

This growing lack of confidence in our social institutions may bear some relation to discrepancies between what the engineer learns during his education and what he finds in business practice. The two most obvious focal points of trouble appear to be the Hebrew-Christian tradition of ethics and the scientific method. The way in which these principles appear to be involved is the contradictory way in which they are only partially applied to business practice so that doubts are aroused as to either the validity of our business practice or the validity of Hebrew-Christian ethics. Provided that vocabulary differences are properly understood, no serious conflict develops between the principles of Hebrew-Christian ethics and the scientific method. This appears to throw added weight to the questioning of the social institutions of our industrial civilization.

Under these conditions it is necessary to develop a perspective that will allow one to study physical science without one's enthusiasm being neutralized by the confused state of our civilization. To achieve this it seems simplest to start with an analysis centered around some branch of physical science

such as electromagnetic theory, which within certain limits is well verified by experiment. This can start with an examination of the methods of verification and process of application to human needs. It appears important to examine the historical relationship of electromagnetic theory to other fields of science.

To promptly achieve a suitable perspective, it is necessary to make some assumptions without detailed analysis. This procedure can be used with caution provided procedures are used which provide for the future correction of erroneous assumptions. To start with, let us assume that the scientific method is the best method of learning the laws of nature by reason of experimental verification. But we must not claim that the exact procedures of the scientific method as used in physics in the study of electromagnetic phenomena can be applied directly to social phenomena. There are differences in detail required by the kind of phenomena being investigated.

To the extent that engineering has been done in a manner consistent with the scientific method, great advances have been made in developing equipment for satisfying human needs. We may consider the engineering method as the best way of interpreting and applying our knowledge of the laws of nature.

Now we come to the question of ethics. Shall we accept or reject our tradition of Hebrew-Christian ethics? It appears that the rejection of these principles leads to disastrous

results as evidenced by the history of Fascism in Italy, militarism in Japan, and Nazism in Germany. The basic principles of Hebrew-Christian ethics appear to have been incorporated in theory into Soviet ethics, but have not been fully realized in practice in the Soviet Union, due to a tremendous fear of attack from their enemies. With due recognition of other religious traditions which share in part the concepts of our Hebrew-Christian tradition of ethics, it appears that this tradition of ethics as it may be extended through scientific research is most worthy of our support.

Having accepted the scientific method, the Hebrew-Christian ethics and the engineering method does not necessarily mean the absolute rejection of everything in conflict with these. Before proceeding further it seems desirable to examine the engineering method to see how it can be adapted to establish cooperation and confidence so that specialists in particular fields of science may enthusiastically pursue their research work with confidence that the problems related to the utilization of their work are being adequately studied and that there are adequate channels through which the scientific knowledge discovered to date will be used to meet human needs.

12/14/46

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SOCIO-ENGINEERING PROBLEMS REPORT NO. 38

Date: 12/14/46 3/23/61 6/25/61 1/21/67

Stage: Draft SEP 45 SEP 38 SEPR 38

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9/30/58

Tom Frank Inst. Jan 58

Television on Tel. Cable Frontier

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Social Responsibility

Use (1) Mons Llewelyn Cooke articles

(2) PAM 01666 Jewett and Kutz

Note how computers are
in this concept.

(3) Use my STC-12

(4) Historical

Stimulus

by Hammond

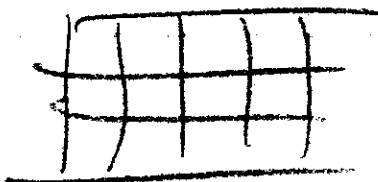
BTL JS Mill

(5) Cybernetics // Inf Theory

see sketch paper

(6) Ltr to Bertrand Russell +
Dr Wille Marseille

(7) Use my



chart

From Atom Piles, etc.

(8) Notes from Hest EMT

(9) RL Meier Behavioral Sci

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