

lay the basis for the destruction or radical change of our civilization.

An examination of the history of Greece, Rome, and Western Europe shows the rise and fall of various types of civilizations. Many scholars are now comparing our Western European civilization (including the United States of America) with the period just prior to the fall of the Roman Empire. It appears that some of these scholars are handicapped by the abnormal retardation of the use of scientific method in the study of social problems to such an extent that they are making serious mistakes. The tension existent in regard to social problems in some cases makes people who try to be social scientists so irritated that they become impatient and concentrate on immediate social reforms to the exclusion of basic research that might bring more powerful results in the long run.

Some people who are aware of the sad state of affairs of our civilization are desperately attacking what they think to be the root of the trouble, but I am afraid many of them do not understand the significance of the data they have collected. It appears that some well meaning persons would lead us back to the dark ages. Many of these people who appear to be leading us astray may be right on many particular issues even though they are wrong on one or two issues of major significance.

This situation suggests that a tremendous effort should be made to increase the research in the social sciences. However, the actions to date of those who represent us in Washington, D.C., with certain exceptions appear to be that of advancing research in the physical sciences, particularly if it is useful for "national defense," while neglecting or even supposing research in the social sciences.

This situation appears to put the physical scientist and the engineer in the position of accelerating the collapse of our civilization through the failure of society to provide for the proper use of the products of physical science. There are organizations proceeding with useful research on important problems, but it is questionable as to whether they can cope with the problems with the speed and on the scale necessary to meet the present situation. It appears that a situation like this exerts a certain retarding effect upon some physical scientists which decreases their enthusiasm for their work. Organizations such as those affiliated with the American Federation of Scientists are making important contributions to the part of the problem relative to atomic energy. However, the basic problems still remain.

Perhaps the adoption of some program or policy through which scientists in different fields would have a means of discharging their responsibilities is necessary. It appears that such a program would require some kind of overlapping of

fields of specialization in order to achieve a fruitful co-operation and to give experts in one field confidence that the other parts of the whole problem, of which they are working on a small part, are being adequately investigated.

Furthermore a satisfactory relationship between scientific research and the people must be established in a democracy. The position of the scientists and engineering scientists must be that of an advisory capacity in a true democracy. This brings up the problem of education and organizational procedure. The possible relationships may be suggested by the following chart:

Types of Phenomena	Types of Activity			
	Basic Science	Engineering Science	Education	Action
Social	*	*	*	*
Psychological				
Biological				
Chemical				
Physical				
	Natural Laws	Techniques and Responsibility	Dissemination of Ideas	Organization

* These columns are left blank for use as a balance or progress chart.

A suggestion for the relationship between basic scientists and engineering scientists is made in The Engineering Viewpoint (10/23/46). The problem of education must be carried on in such a manner as to reach the general public. That is, when research results in ideas suitable for recommendation to the public there must be suitable channels that will allow for adequate discussion. Also the general public must know more about the scientific method. To avoid waiting a generation for each step forward, adult education must be adequately utilized. Organization must proceed along as democratic lines as are possible under the circumstances. Evolutionary change must be in progress all the time to avoid revolutionary changes in society.

This preliminary view of the situation seems to be necessary for me to use tentatively in order to maintain a balance between the study of electromagnetic theory and the related social problems. The most important key to the problems of society appears to be the establishment of a balance between different aspects of social activity rather than the achievement of success in one particular field. The shifting of emphasis from investigation of one type of problem to another without maintaining continuity may establish a basis for future trouble.

It appears to me that I must maintain my close contact with electromagnetic theory in order to be of much help on

1. History of Electromagnetic theory
 - a. Electromagnetic theory
 - b. Microwave Wave Guide Transmission
2. Philosophy of Science Development of a Philosopher³ of Engineering⁴
4. Social Science
 - a. Psychology
 - b. Sociology
 - c. Economics
5. Summary of the Relationship between Physical and Social Phenomena
6. Testing of Ideas Developed in the Study of the Relationships between Social and Physical Phenomena

This whole process overlaps various fields, but logically fits in with engineering better than any other field.

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social problems since it appears that the phenomena which cross the established boundaries of fields of knowledge are perhaps very important under present circumstances. Therefore in order to adequately consider the social problems related to electromagnetic theory, I must be sure to have a firm foundation in electromagnetic theory. I think one of the difficulties that social scientists have is that without an understanding of the physical theory, it is difficult to deal with the significance of physical theory in respect to social problems. The reciprocal may also apply to me, which means eventually I shall have to study sociological theory more thoroughly.

There appears to be considerable confusion as to what the scientific method really is when it is mentioned in respect to social problems. Since the use of the scientific method in the physical sciences is often implicit rather than being specifically stated, consideration must be given to the types of analysis given the scientific method by philosophers in order to avoid confusion concerning how the scientific method should be applied to different types of problems.

The following process appears to be a possible order of study: