

Stage F
of A to T.

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SOCIO-ENGINEERING PROBLEMS REPORT No. 63

"ENGINEERING WORK AND
SOCIAL RESPONSIBILITY."

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by

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ENGINEERING WORK AND SOCIAL RESPONSIBILITY

This note is a survey of the ethical considerations in my work, a discussion of ethics and engineering creativity, my specific objectives in engineering, and the future directions of my work. The points are briefly outlined below:

(1) Ethical considerations in my work.

(a) Our culture has a spectrum of ethical codes which are historically derived from the Ten Commandments through various evolutionary stages toward the simple principle of "Reverence for Life" stated by Albert Schweitzer.

(2) The relation between ethics and my engineering creativity.

(a) I am able to do my engineering work more creatively when I can consciously deal with the ethical implications of my work.

(b) The tendency in American society, both in Universities and in Industry, to force compartmentalisation to the extent of excluding ethical considerations inhibits my engineering work.

(3) My specific objectives in engineering.

(a) I want to participate constructively in the progress of human civilization toward a closer realization of the ideals of mankind for freedom, individual realization with respect for

one's fellow men -- or more simply stated -- "Reverence for Life."

(b) I want the freedom to ask questions about the problems of our civilization. I do not claim to have the answers to our sociological problems nor do I claim to be a social scientist. I claim the right to communicate with appropriate social scientists and other specialists who may have special talents in dealing with the problems of our civilization. For example see my paper "The Social Responsibility of Engineers and Scientists" presented at the Western Joint Computer Conference, San Francisco, March 1959.

(c) I seek to direct my technical work along lines which will contribute to the establishment of the communication links in our society which will help establish stable functioning economic and political systems with adequate guarantees of individual freedom. The potential of mixed private and public enterprises operating with accurate knowledge of what is happening so that private enterprises can adjust their production to the market quickly and so that public enterprises can make timely adjustments to the needs of the people, while at the same time abiding by rules which assure the basic individual freedoms to every person requires technical support in three areas:

1 Data processing systems so that managers of enterprises can know what is happening, so they can make wise decisions,

2 Mathematical models of economic and political systems, including the interconnection of different segments of our society. "Social Planetariums" for the practical use of the mathematical models for the education and guidance of the citizen.

3 Checking techniques and principles of control of computing services which insure that any citizen can for a

reasonable fee, rent time on a computer to try out his own models of the economic system.

(d) I seek to direct my technical engineering work toward advancing the understanding of the technical problems involved in supplying the kind of computing equipment and data communication links to carry out the above principles. The development of a system of remote scientific computing with economical terminals and simple dial-up data transmission to computing centers which every engineer in the country and eventually the world could afford would establish the base for the democratic use of computing service. Technical problems such as reliable data transmission through error-correcting or error-detecting codes with retransmission would have to be developed first to insure accuracy.

(e) I also seek to insure that society can make use of by-product ideas such as analogies from Information Theory in social science fields. My objectives here are not to develop proofs of theorems or to achieve great advances in science, but are to merely expedite the practical use of these concepts. Here it is useful to remember the role of the engineer as "an interpreter of science in terms of human needs." Where the concept of entropy or information in communication theory is useful in helping people organize their thoughts on the importance of democratic institutions, there is an opportunity for the engineer to do an important job of interpretation.

(4) Future Directions.

(a) My personality structure may be considered neurotic--well so what, by doing something with my ideas, I can grow and test the validity of my ideas.

(b) I shall live and work with my own personality, and in the process react, change myself, and change society.

(c) As I work, my personality, concept of ethics, etc., may change or grow, but to try to suppress these ethical feelings is destructive. The major problem I have struggles with during my whole life is the feeling that society represented by first my mother, then by teachers, my wife, my physician, and at some times my boss was pushing me to give up what to me was natural and ethical in human relations, my work, and in community affairs. I realize now that when I give in to these forces and try to separate out the ethical concepts or discard them, my engineering work withers.

(d) I shall fight the unethical aspects in our society in my own self interest to be able to more effectively do my engineering work.

1. Ethical Considerations in My Work.

a. Ethics from religious background of our culture.

I take the ethics of our culture very seriously. I don't necessarily claim that the Ten Commandments should be literally applied to present day conditions. In fact I think some of the commandments need revision. Perhaps Albert Ellis should be taken more seriously. I think that Albert Schweitzer's "Reverence for Life" is sufficient. One can evaluate a given situation in respect to whether a given action is consistent with the principle of "Reverence for Life." I think this procedure would lead to more useful ethical decisions than trying to follow rigidly a set of rules such as the Ten Commandments.

Although many people claim one "is supposed to" throw off the "ethics" one learned in Sunday School as one loses faith in Santa Claus, the Easter Rabbit^e, and God. I claim that ethics are important. I do not mean customs or "mores." The customs of society may deny the principle of "Reverence for Life" through discrimination by class, creed, color, or sex. It appears that a large fraction of people discard the ethics they learn in Sunday School and replace ethics with a "substitute ethics" or mores derived from customs, rather than from real thought of what is best for mankind. These mores are poor substitutes which have been designed to protect certain class privileges. However there are some customs and rules each organization within society sets up to establish communication channels which are necessary to insure that managers of different groups are informed on what is going on and that challenges to established practice are handled in a fair way.

b. Commercial and Political policies conflict with the
Ethics of Our Culture.

My spontaneous approach to engineering problems is to consider the physical problems and the related sociological problems that might arise as integral parts of the whole problem. There seems to be a natural tranference of mathematical equations derived in physical problems to the related sociological problems. Commercial and political policies usually are directed at compartmentalizing engineering work so that the natural relatedness between physical and social phenomena is masked or destroyed.

The attempts of the NAM to deaden the conscience of the churches through their public realtions program and canned sermons was nauseating. The bold defiance of the interests of the American people by one of our largest corporations was very disturbing.

[See File 15-B for notes on N.A.M.]

[See SEPR No. for reference to
Kenneth Boulding on "Puritan substitute
ethic"]

Our Hebrew-Christian Tradition
and
The Scientific Method

seem to fit harmoniously

but

The Capitalist system apperar to
contradict the ethics, ideals, and
methods

[See Oliver C. Cox, Capitalism as a System,
-N.Y.: Monthly Review Press (1964)]

2. Relation between Ethics and My Engineering Creativity.

a. I am able to do my engineering work more creatively and spontaneously when I can consciously deal with the social consequences of my work and the related ethical considerations.

To me life is an integrated, inseparable process in which one creates things, ideas, or services to share with his fellow human beings. One's work is a part of the work of millions of separate individuals who are organized into economic and professional groups within some overall economic system designed to provide a basic set of rules to facilitate the cooperation

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of these individuals and the equitable exchange of the products of their work.

Any social system is designed to take care of the average situation, and may run into difficulties in many special situations. Therefore, the presence of interpreters and of change must be provided in any functioning system. I find that my definition of engineering leads closely to "an interpreter of science in terms of human needs." I find that my engineering work proceeds much more quickly when I understand the "human needs" which generate the demand for the particular engineering job, and the problems related to the potential social consequences.

This perspective of the "social consequences" does not have to contain an ultimate solution to the problems, but only a clear vision of what the problems are and a view of possible paths toward their solution.

During World War II, it was relatively simple to perceive the fundamental human needs in the struggle against Nazi and Fascist dictatorships. It was also simple to see how designing parts of a radar set like the SCR-584 might lead to the protection of England from V-1 rocket attacks.

Also during World War II the social consequences of the possible development of an atomic fission bomb were clear to many physicists. I remember discussions among physicists in which two major points were brought out:

- (1) whichever side first developed an atomic bomb would have the power to end the war on its terms.
- (2) If we were first the way we could end the war, would be to arrange an ultimatum to the enemy with a demonstration bombing of an uninhabited island. Then we would only have to use the bomb, if the enemy refused to accept

surrender terms after the demonstration.

The announcement of the dropping of the atomic bomb on Hiroshima on August 6, 1945, was a great shock to me. It meant that our own country had forsaken humanitarian values for expediency.

Other events which followed also tended to destroy my confidence in the aims and methods of our country. See SEP No. 32 "Historical Notes III."

2 b. The tendency to remove or separate ethical considerations from my engineering work tends to inhibit my interest in engineering.

I have found that when problems of censorship, conformity, over-specialization came up and I couldn't find a way of dealing with the problem that my interest and drive in my engineering work tapered off. We I was confronted with problems such as the church loyalty-oath issue and the "social responsibility paper", where there existed channels in the courts and other institutions which I could use to work out the problems, I found my engineering work went faster and I produced more engineering results during those periods even though it meant some time lost to the pursuit of the negotiations on the sociological issue.

3. My Specific Objections in Engineering and Society.

In this section I proceed from the most general to the more specific.

3a. "Reverence for Life."

As an engineer I want to be an interpreter of science in terms of human needs in a way that is consistent with Albert Schweitzer's principle of "Reverence for Life".