

"A Philosophy of Engineering for
the 1960's"

An extension of
the concepts in
SEPR No. 66.

by

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I believe the old description of engineering use by the Engineers' Council for Professional Development back in 1942 is much more worthy of the potential of the human race, than the more recent definitions promulgated by engineering committees. I quote the old 1942 definition below:

"an engineer is an interpreter of science in terms of human needs, and a manager of men, money, and materials in satisfying these needs."(1)

During World War II, I found an outlook consistent with the above definition very helpful in focussing first upon the urgent needs of our civilization, and working down to what specific part I could contribute to the solution. A very close identification with the human needs for which the engineering project was planned helped maintain enthusiasm and facilitated quick zeroing in on the critical engineering problems.

Following World War II I have encountered increasing forces in American society which attempt to sever the relationship of the engineer from the "human needs." A description of these processes in general in our society has been written by Paul Goodman in his book Drawing the Line.(2) People are resisting the needed changes in society to the extent that Western Civilization is slipping backwards. Yet we have the scientific knowledge and the technology to generate great cultural progress.

A few philosophers have been able to state the problems of Western Civilization in concise ways. For example, Rosenstock-Huessy has observed three major philosophical stages of Western Civilization: (3)

1. Engineering as a Career - A Message to Young Men, Teachers, and Parents. Engineers' Council for Professional Development, 29 West 39th St., New York, N.Y.(1942), p. 6.
2. Paul Goodman, Drawing the Line. N.Y.: Random House(1962). Especially the chapter "The devolution of democracy," pp. 55-77.
3. Eugen Rosenstock-Huessy, Out of Revolution(1938), pp. 741, 753.

credo ut intelligam(Anselm) [Saint Anselm, 1033-1100,
Archbishop of Canterbury]

Truth is divine and has
been divinely revealed

cogito ergo sum(Descartes) [René Descartes, 1596-1650,
French mathematician and
philosopher]

Truth is pure and
can be scientifically represented

respondeo etsi mutabor(Rosenstock-Huessy)

Truth is vital and
must be socially represented

.....However, finally

credo ut intelligam [11th Cent.]
led to

and the Inquisition. [14th to 16th Cent.]

cogito ergo sum [17th Cent.]

led into

an ammunition factory." [20th Cent.]

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During World War II the allied scientists cooperated on practical projects which illustrated: "truth is vital and must socially represented." I discuss more details in another note(SEPR No. 66).

Although parts of the religious teachings from the Hebrew-Christian tradition of Western Civilization require modification as science advances, the more fundamental rules of ethics remain valid. With the need for cooperation between the countries of Western Civilization and other cultures it becomes important to recognize the common ethical concepts in all the different religious traditions. Perhaps Albert Schweitzer has laid the base for global cooperation in his principle of "Reverence for Life."

A formulation of "maximizing the negative entropy" from Information Theory could possibly put Dr. Schweitzer's "Reverence for Life" on a more universal basis so that scientists in the USSR and the Chinese People's Republic, who might be hostile to organized religion could understand the ethics distilled from the major religions.

To get back to the present problem, my interest in particular engineering areas such as data communication, error correcting codes, cable characteristics, and computer-communication systems is tied closely with the relationship of these areas to the major human needs of our era. The relationship is roughly indicated in Fig. 1 and is further developed in Fig. 4 of SEPR No. 92-B.

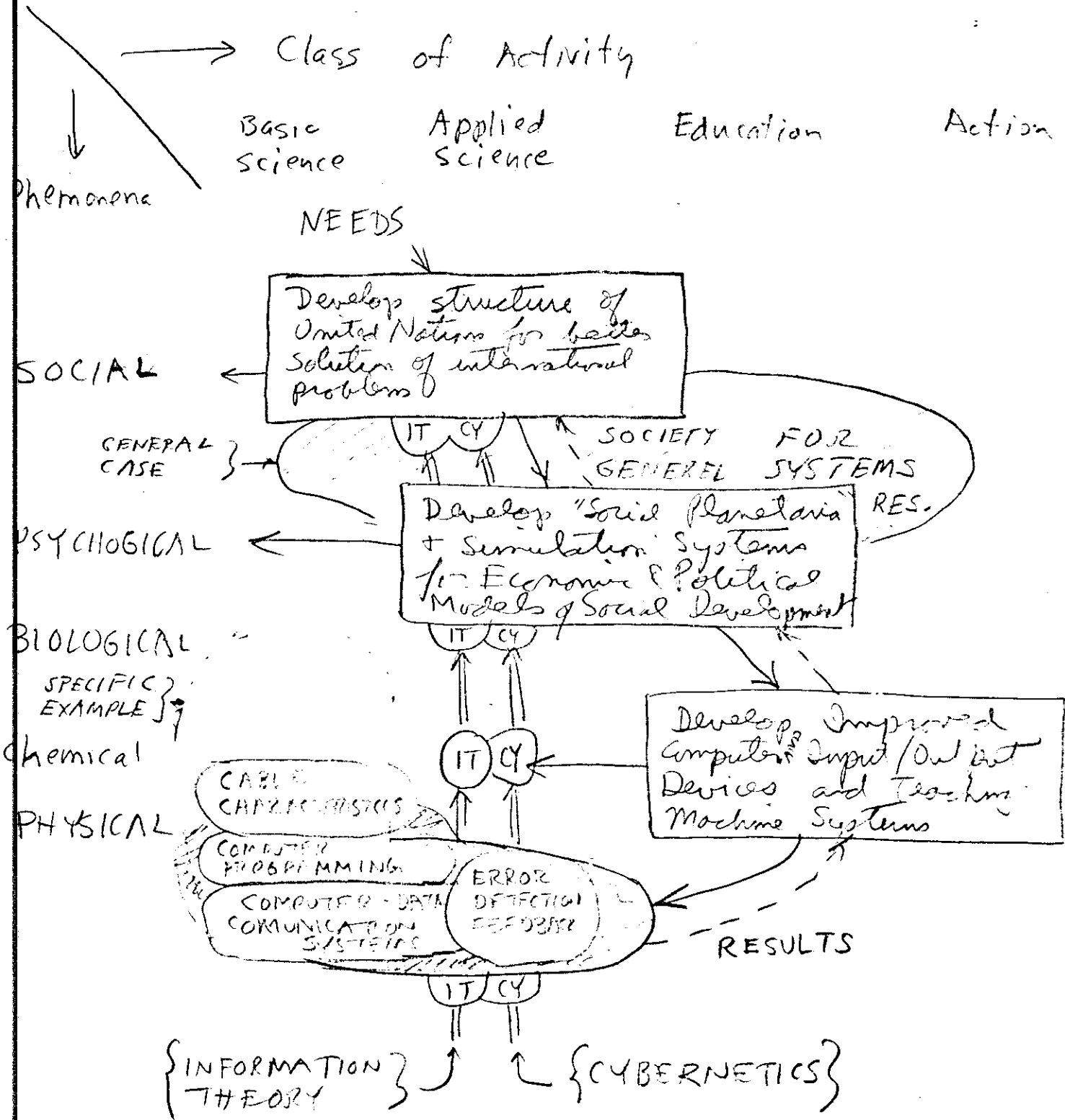


Fig 1 - Computers - Commercial System Research and Human Needs

To separate the questions of "human needs" and "social consequences" from my engineering work constitutes a violation of the principles I acquired and integrated from attending church and religious discussion groups. As an example of my correlation of ideas discussed during one year at one church is given in a separate note as SEPR No. 37-A, "Correlation Committee Data: Principal Ideas Covered In Thrity-Five Group Meetings In 1941-42."

(Arlington Street Church, Boston, Massachusetts)

The problem of "logic-tight compartments" of human beings who ignore the concepts of their religion is discussed by Ernest M. Ligon in The Theory of Christian Personality, N.Y.: Macmillan (1937), also in SEPR No. 49, page 3, and by Archibald MacLeish in The Irresponsibles, N.Y.: Duell, Sloan and Pearce (1940). See also brief references in SEPR Nos. 20-A and 49.

Added note (2/9/67): The ideological problem of getting the U.S.A. to realistically examine our economic problems is examined in the new preface (1962) to Thurman Arnold, The Folklore of Capitalism, Yale University Press (1937), reprinted 1964.

Another feature illustrated by Fig. 1 is the overlapping of parts of the related problem through use of analogies from Information Theory and Cybernetics. It is generally claimed that the religious leaders and philosophers are impractical in their attack upon "over specialization" and "logic tight compartments." I take the stand that the judicious use of cybernetics and information theory can break the barriers of over specialization.

I originally wrote this note as one computer-communication project I had been working on was terminated. I felt keenly a strong conflict between the goals of meeting human needs and maximizing profits, although it was clear to me that maximizing the meeting of human needs would probably also maximize profits. It seemed as if people would forego profits, if the project was developed by engineers interested in meeting human needs. The mention of "human needs" was almost enough to kill the project. Yet as I looked back to the M.I.T. Radiation Laboratory, there the maximum speed of development was achieved by starting from the human needs.

Two years later when another project that was conceived in respect to human needs by an engineer interested in preserving the role of the small businessman in capitalist society-- was being terminated, I found that concepts that I considered very elementary and logical were ruled as inadmissible in discussing the project. The engineering managers seem to be learning to use classical economic theory at a time it no longer adequately describes our economic and social problems.

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