

Frederick Bernard Wood, Ph.D.

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To: Members and Friends of the First  
Unitarian Church of San Jose

Subject: A Hypothesis On The Impact Of  
Cybernetics and Computer Tech-  
nology on Human Civilization.

During Rev. Byrd Helligas' eleven o'clock sermon on November 24, I felt like responding in some concrete way to his description of the role and functioning of the church community. I concluded that I have not been adequately sharing my insights and feelings about the state of human civilization with my friends and members of the Unitarian Church. Therefore I am communicating some thoughts on the impact of Cybernetics and Computer Technology on human civilization.

Hypothesis: Analogies from the mathematical analysis of computer-communication systems can aid us in prevention of dehumanizing processes of mass technological development.

Corollary: By use of concepts from electrical communication theory, we can help any existing social system -- whether capitalist, socialist, communist, or mixed -- to grow the additional feedback loops in its social structure that are needed to help the social organization respect the individual to the maximum degree that is feasible for its stage of social development.

First I am thankful that the following authors have alerted us to the dangers of certain dehumanizing trends in our technological society:

Jaques Ellul, The Technological Society(trans. 1964)  
Herbert Marcuse, One Dimensional Man(1964)  
Ben B. Seligman, Most Notorious Victory(1966)

Second, the above authors in pinpointing the dangers of our technological society, have missed the good news that there are concepts and mathematical tools alongside the new technologies with which man can steer civilization onto a different path, if he so chooses. Perhaps I should also mention certain books of Norbert Wiener, since he alerted man to the new age we are entering, described some of the potentials, and also warned of some of the dangers.

Norbert Wiener, Cybernetics(1948)  
Norbert Wiener, The Human Use of Human Beings(1950, 1954)  
Norbert Wiener, God and Golem, Incorporated(1964)

Third, the Ad Hoc Committee on the Triple Revolution in March 1964 performed a valuable service by alerting us to the developing overlap of three forces, namely the 'weapons revolution,' the 'civil rights revolution,' and the 'cybernation revolution.' Also considerable credit should be given to Dr. Alice Mary Hilton for organizing a Conference on the Cybercultural Revolution--Cybernetics and Automation in June 1964, which is reported in Alice Mary Hilton, The Evolving Society (N.Y.: I.C.R. Press, 1966).

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Fourth, there are more technical developments of great significance. John J. Ford in a chapter in Charles R. Dechert, The Social Impact Of Cybernetics(Notre Dame, 1966), pp.189-190, refers to an ethical principle similar to Immanuel Kant's categorical imperative, which has been proposed by a physicist, R. B. Lindsay as the "thermodynamic imperative:"

"All men should fight as vigorously as possible to increase the degree of order in their environment, i.e., consume as much entropy as possible, in order to combat the natural tendency for entropy to increase and for order in the universe to be transformed into disorder, in accordance with the second law of thermodynamics. (Lindsay, "A Scientific Analogy: The Thermodynamic Imperative," The Role of Science in Civilization(N.Y.: Harper & Row, 1963)"

I think that future historians of science will conclude that Lindsay made an important contribution, but that carrying a concept from physics through chemistry, biology, psychology and sociology requires a number of refinements.

By the time the concept of entropy is carried from physics up through many levels of increasing complexity through sociology, it and its companion concept order(or disorder) acquire subtle distinctions. Therefore it is better to speak of "communication entropy" in respect to sociological phenomena, and the maximization of communication entropy no longer can be simply translated as "order," but it represents a more subtle balance between "organization or order" and "freedom or diversity."

Fifth, the rigorous testing of Lindsay's "thermodynamic imperative" would require the cooperation of specialists from approximately sixteen special fields of science. This is not likely to occur in the near future, because even the most advanced interdisciplinary research institutes are only attempting to bring specialists from three or four special fields together on

current projects. There is an organization which reports annually on what progress has been made on interdisciplinary and multidisciplinary studies where general systems concepts have application in several special fields. These reports are issued by the Society for General Systems Research, Joseph Henry Building, 2100 Pennsylvania Ave., N.W., Washington, D.C., as the Yearbook: General Systems.

Sixth, the problems of our complex civilization multiply at the same rate or faster than the research progress made by organizations such as S.G.S.R. Therefore we need to find shortcuts to applying concepts of Cybernetics to crucial problems prior to the rigorous verification of theory. To find such shortcuts, we need a mathematical model of some important features of the social system. Here we can use the communication channel first described by Claude Shannon in The Mathematical Theory of Communication(Univ. of Illinois, 1949). Shannon applied concepts of entropy and information which are rigorously related on Level 1(Quantum Level) in Fig. 1 to the analysis of the efficiency of sets of telegraph messages (Level 2) and also developed a similar analysis of the words in a language



All these activities are important, but what is missing is an overall guideline or ideology that could help relate all these valuable activities. In Fig. 2 the way of directing action toward obtaining an ideal distribution of political ideas in a social system is illustrated. If we can assume a scale of political views ranging from left-wing to right-wing, the telegraph

or telephone line model gives us a bell-shaped probability curve as the optimum distribution of voltages on a line (or political ideas in a social system).

Applying this theory to social systems gives ideal curves for three countries C1, D1, & D2 for the distribution of political ideas for their 1964 stage of development. The set of curves above the IBM card show an approximation to the real distributions as of 1964.

The curves in the lower corner of the page illustrate the potential distributions for 1984, if the people of the world learn to use these concepts from electrical communication theory to protect and expand the respect for human diversity.

Fig. 2A

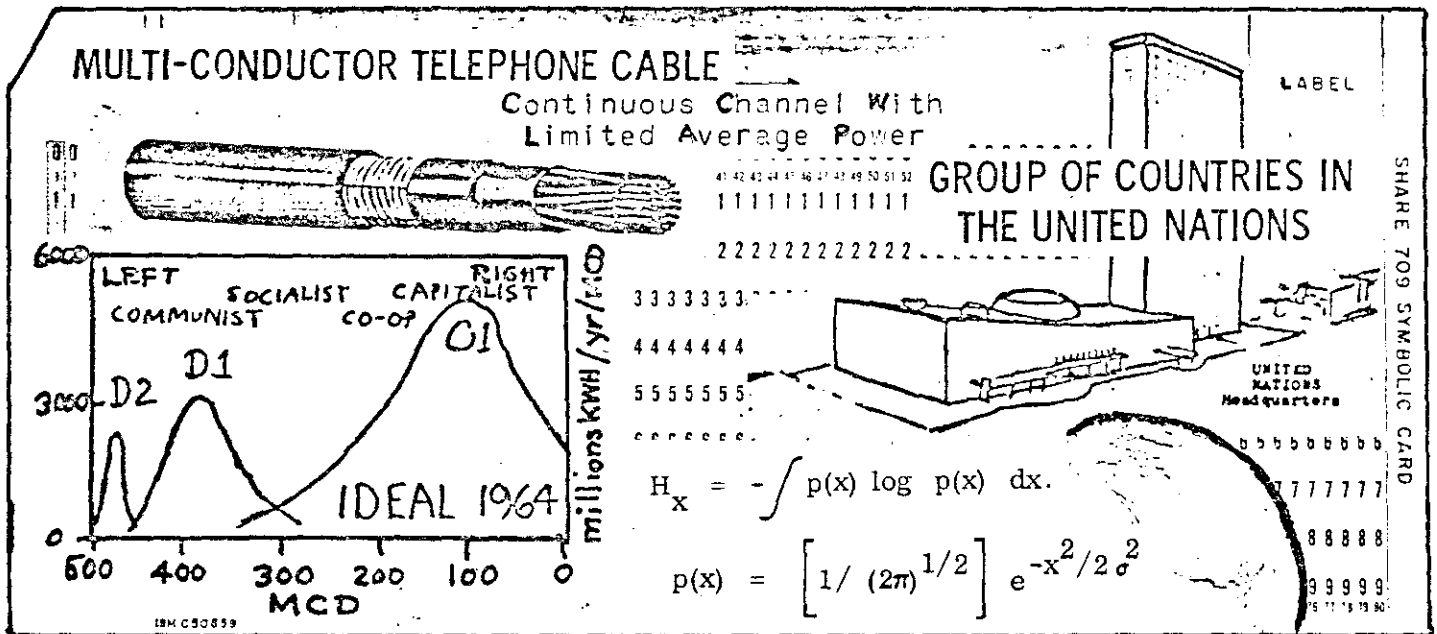
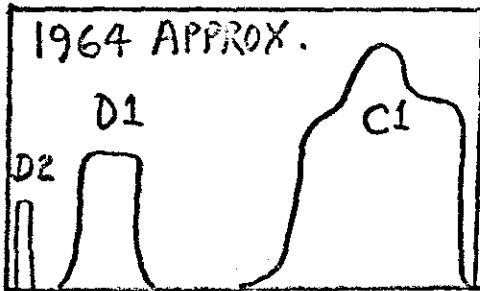
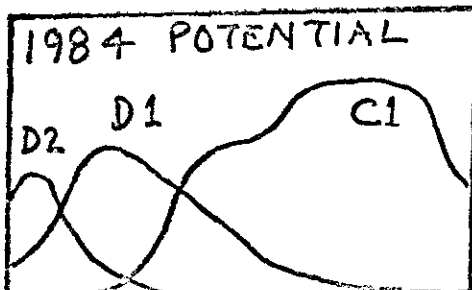


Fig. 2 - Example of Ideal Distribution of Political Ideas in Countries C1, D1, and D2 based on an Analogy from Voltage Waveforms on Telephone Cable.

Fig. 2B



We don't have to wait for governments to officially use such concepts. We can start using the principles to increase the respect for human dignity in our Church, our schools, our business organizations, and in our relations with different community groups.