

6/20/64

Conference on the Cybercultural Revolution -  
"Cybernetics and Automation"

Hotel Roosevelt, New York City

Comments of F. B. Wood, Campbell, Calif.,  
delivered at Panel Discussion following  
Session 3, 6/20/64, relative to talk of:

Ben B. Seligman, "The Costs of Automation".

As a computer engineer I would  
like to take exception to some of the statements  
of Mr. Ben B. Seligman. Since the time  
is short I shall comment only on what  
Mr. Seligman calls the most serious social  
costs:

"Perhaps the most serious social cost  
stems from distortions of our value  
systems imposed by cybernation, for  
the philosophic preconceptions in  
computer technology are thoroughly  
mechanistic." [p. 7 #2]

"What is so disturbing about these efforts  
to cybernate existence is the creation of  
conditions which facilitate the  
manipulation of people. -----

----- Such activities can be rooted  
only in a callousness and sense of  
expediency that readily sustains a mass

Society in which individual uniqueness cannot survive." [p 9, P 2]

The above issues are more philosophical than computer engineering, therefore I shall switch hats to my alternate role of "philosopher". I agree with Mr. Seligman as to his concern for human values. However I feel he only sees a part of the total picture. I grant that, if we look at the designer's circuit diagrams, an operating computer, the input cards or tapes, and the output, we see a mechanistic system.

If we take another look at the mathematics used in designing computer systems we can see how the computer system can be looked at as a set of communication channels with memory and switching circuits generically related to telephone exchanges and networks. This means we could study some aspects of the efficiency of the computer using concepts from Information theory for calculating the average negative entropy of sets of messages.

Next if we use the viewpoint of General Systems Theory to put the above material in perspective relative to other human activities, we can estimate whether the equation for average negative entropy on the physical plane has significance on either of the other levels of

phenomena such as chemical, biological, psychological or sociological.

Now I shall state a hypothesis which I can neither prove nor disprove at this stage. I shall use this working hypothesis, even though unproved, because to date it gives results which are consistent with known facts and accepted political theory. To further define the field of application of the concepts with respect to all human activities it is convenient to define a three-dimensional space in which the x-location defines the process: understanding nature; engineering - applied science; learning - teaching; or decision-making. The y-direction would define the method: empirical science; abstract, philosophical; or intuitive - poetic. The z-position would be the level of phenomena from physical to sociological.

**HYPOTHESIS:** The conditions for the average negative entropy of a set of instructions in a computer or a set of messages on a telegraph line have isomorphic applications on other systems in the column y = applied science.

**COROLLARY:** If we replace the probabilities of a set of messages or instructions being transmitted by the probabilities that people have a set of freedoms in a sociological system, then the calculated average negative entropy is a measure of

the protection of individual human values or a measure of the democracy in the system.

A start has been made in the investigation of this hypothesis and corollary. Some assumed sets of human freedom probabilities have been put into the equation for average negative entropy with the following result:

<u>Set of freedoms corresponding to:</u>	<u>Negative Entropy*</u>	<u>Relative Percent</u>
Ideal Democracy	16.61	100%
Approximate Democracy with 10% of population underprivileged, but status determined by individual performance	16.52	99.5%
Democracy with special privileges for upper class of 10% and discrimination against lower class of 10% on the basis of ancestry or color.	13.90	88.6%

\* More complete details are given in Socio-Engineering Problem Report No. 88-B, P.O. Box 85, Campbell, Calif.

The above table indicates that a part of the mathematics used in computer design has potential value in measuring the respect for individual human values or a measure of democracy in a sociological system when viewed from the perspective of General Systems Theory. Thus there is the possibility that the use of computer technology may yield as

a by-product some isomorphic sociological laws which can at least help us measure the respect for individual human freedom, and may lead to further research on the structure of society so that individual uniqueness can more easily survive.

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Socio-Engineering Problems

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