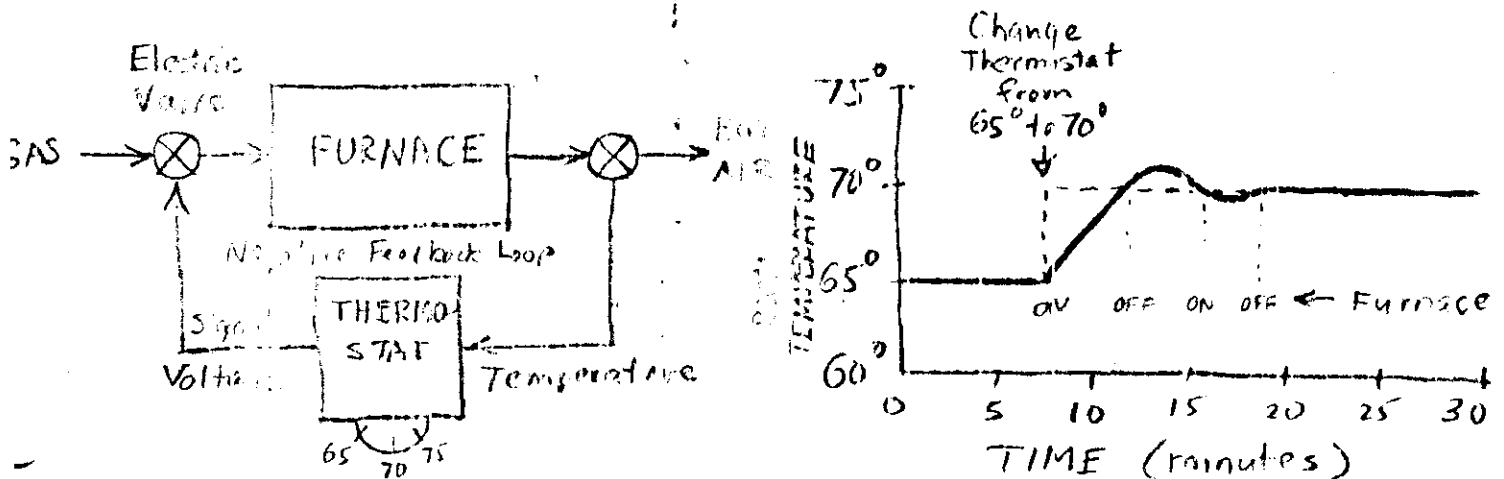


"A SHORT BIBLIOGRAPHY ON CYBERNETICS AND RELATED TOPICS IN COMMUNICATION THEORY"

by

Frederick B. Wood, Ph.D.*

Cybernetics is defined as the science of communication and control in the organism and machine. It deals with the character and function of complex systems operation, including those that are self-organizing and adaptive.



The home heating furnace controlled by a thermostat is a simple example of one of the basic concepts of Cybernetics---namely the negative feedback circuit. The bimetallic thermal element of the thermostat measures the room temperature and provides negative feedback to the furnace, i.e., by sending a signal which turns off the gas when the room temperature is too high and a signal to turn the gas on when the room temperature is too low.

There are mathematically similar feedback loops in automatic control systems in manufacturing plants, chemical plants, communication systems, and computing systems. Analogous feedback systems occur in nature---in the complicated balance of the human glands, muscles and nervous system; in our psychological reactions; and in the interaction of groups of people in social and political systems. The further we go from physical and chemical systems into psychological and social systems the less detail we know for sure, but the feedback loop concepts help us in our research. The more complex systems like the inter-industry relationships in economics have so many potential feedback loops that it is impractical to show the relationships by drawing loops, but the relationships can be represented by mathematical matrices which can be processed by computers to give us important indicators of how our economy is functioning and what is significant for the market in specific sectors of the economy.

There are some arguments between specialists and generalists as to the scope of cybernetics. Norbert Wiener's definition of the scope of cybernetics is discussed by Dr. J. R. Pierce of Bell Telephone Laboratories in his book, Symbols, Signals and Noise, pp. 208-214.

It is hoped that the American Society for Cybernetics, 1303 Wisconsin Avenue, N.W., Washington, D.C., will soon help resolve the differences between the different specialists so that our country can more fully benefit from the advantages inherent in the inter-disciplinary features of Cybernetics.

To help people study this growing field of science---Cybernetics, and more specialized related fields such as Information Theory--- I have prepared a short bibliography. The more elementary books are listed first, followed by biographical books, and then a sampling of the application of cybernetic concepts to different fields such as biology, psychology, sociology, and economics, followed by some more technical references plus a listing of two short references on foreign developments. Some references containing material on cybernetics do not use the word "cybernetics;" but retain more specialized terms.

The table on the right margin indicates what library has the books. The library listings are not necessarily up-to-date.

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Stage: F

Frederick B. Wood, Ph.D., P.O. Box 85, Campbell, Calif.95008, U.S.A.

Michael, Donald N. "Cybernation: The Silent Conquest" is reprinted in the following books:

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McLuhan, Marshall Understanding Media: The Extensions of Man. N.Y. : McGraw-Hill (1964, 1965)
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The publication of the Proceedings of the First Annual Conference on the Cybercultural Revolution (a section of the Scientists On Survival conference of June 1964 in New York City) has been announced for publication in 1966:

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SOCIO-ENGINEERING PROBLEMS REPORT NO. 46-C

Date: 4/24/65 7/3/66 7/16/67

Stage: F Revised Revised

Frederick B. Wood, Ph.D., P.O. Box 5095, San Jose, Calif.95150

Errata Sheet

Correction of typographical error in:

"THE EVOLVING SOCIETY -- The Proceedings of the First Annual Conference on the Cybercultural Revolution -- Cybernetics and Automation," edited by Alice Mary Hilton, New York: The ICR Press(The Institute for Cybercultural Research), 1966.

Page 228: 2nd paragraph, 10th line --
 replace with
 optional optimal

With the above correction, the sentence in question should read:

..... The equations that were devised for computing the efficiency of our instruction messages in the computer, if applied to the problem of human freedom in the social system, prove that negative entropy in a system is greatest when the recognition of individual freedom and the respect for the uniqueness of the individual is optimal.

Frederick B. Wood
 P.O. Box 5095
 San Jose, Calif. 95150

The theoretical basis for the above statement is developed in a paper presented at First International Congress of Social Psychiatry, London, United Kingdom, August 17-22, 1964. Section E/G.S.(General Systems Theory and the Multidimensional Character of Social Psychiatry); Organizer: W. Gray(U.S.A.); Chairman: W. R. Ashby (U.S.A.); Secretary: J. H. Proctor(U.S.A.).

F. B. Wood (USA) 'A General Systems Theoretic Model for the Estimation of the Negentropy of Sociological Systems through the Application of Two Isomorphic Electrical Communication Networks' (SEPR No. 92-B) (24pp.)

At the time of the conference, preprints were obtainable from Dr. Joshua Bierer, Chairman, First International Congress of Social Psychiatry, 7 Hollycroft Avenue, London N.W.3, United Kingdom. Since the supply of preprints is now exhausted, Bruning prints of the paper can be obtained from the author for \$0.50 per copy.

Since then the author has attempted to describe this idea in non-mathematical terms for the layman by use of charts of curves plotted from the theoretical equations. A paper reporting on the progress along this approach was presented at the National Meeting of the American Humanist Association, Asilomar Conference Grounds, Pacific Grove, Calif., April

Frederick B. Wood "Equilibrium Between Order and Diversity as a Crucial Factor in the Development of Democratic Institutions" (SEPR No. 56-B) (13pp)

Bruning copies of the above can be obtained from the author for \$0.25 per copy.