

Book Review

The editor invites books for review on any subject relevant to general systems. Books for review must be sent to Dr. George Klir, International Journal of General Systems, Dept. of Systems Science, Thomas J. Watson School of Engineering, Applied Science, and Technology, State University of New York, Binghamton, New York 13901, U.S.A. (and not to the publisher).

CYBERNETICS: A NEW MANAGEMENT TOOL, by Barry Clemson, Abacus Press, Kent, 1984, 263 pages.

Abacus Press' Cybernetics and Systems series attempts to bring issues in cybernetics and systems theory to the general reading audience. It covers topics in general cybernetic studies as well as their application to specific areas, such as computer theory, economics, neurology, and biology. This book by Barry Clemson, the fourth in the series, is a treatise on Stafford Beer's theories of organization management. The book will be informative to those with a general interest in the cybernetics of organizations, but it is specifically addressed to managers of institutions such as educational centers, corporations, hospitals, and prisons.

Clemson argues that cybernetics is to management as physics is to engineering; rather than providing a set of solutions, cybernetics establishes a set of principles and fundamental laws that constrain the set of viable solutions to management problems. To facilitate this understanding he proceeds both deductively and inductively, drawing liberally from the Systems Science/Cybernetics literature to examine principles of vital interest to managers, while working within a consistent set of examples which illustrate those principles in action. Although the book is a non-mathematical presentation in which the formal content is illustrated by clear, simple diagrams, the last chapter provides a detailed, annotated glossary of the relevant theorems, principles, and laws referenced throughout the book.

The first chapter concerns some points of epistemology and their implications for the management environment. The analogy is made between the manager of an organization and the scientist observing a system. It is argued that managers' perceptions of organizations necessarily affect their decisions, either knowingly or unknowingly, and that for any situation many different valid and consistent perceptions are possible. Further points are made about the impossibility of complete knowledge or objectivity about a management situation, and the extent to which managers' ideologies, or sets of fundamental assumptions about the world, will affect not only their actions, but also their perception and understanding of a situation.

Chapter two is an introduction to and history of Cybernetics and a discussion of its relation to the history of scientific paradigms, including the classical, stochastic, and cybernetic. Clemson's basic definitions here are Beer's, such as cybernetic systems as complex, changing, possibly indeterminate, holistic, open entities, and Cybernetics as the science of effective organization. Other subjects that are introduced are circular causality and the relation between holism and reductionism. The chapter concludes with the explication of three "laws" of cybernetic systems and detailed examples of their usage. These laws include the Self

Organizing System Law, the Feedback Law, which states that feedback may be more important than input in controlling behavior, and the Law of Requisite Variety.

The third chapter is an exposition on the methods that a management-consultant-cybernetician might use to analyze an organization. It is emphasized that the Cybernetic approach may challenge the fundamental structures and power relations of organizations; their implementation requires courage and care by all involved.

Any cybernetician must ask some basic questions about an organization. These include investigating the boundaries of the relevant systems and their environments; the purposes, both ideal and actual, of these systems; the environmental constraints, both necessary and changeable, that are placed on the systems; what "language" the systems use to communicate, and the assumptions and perceptions that language brings to the organization; and the structure and causal interactions of the systems.

Through such an analysis, seemingly mysterious and intractable discrepancies between the desired output and the actual behavior of an organization, which are typically accepted with resignation, may be seen as fundamental problems inherent in the structure of the organization. This kind of knowledge is necessary for revolutionary change, and helpful for less drastic reform.

Chapter 4 discusses methods from Cybernetics and Operations Research which can be used to ease the burden inherent in the management of complex organizations. Previous points about the law of requisite variety, the corollary of the impossibility of complete regulation, and the relativity of different models, are reiterated. The process of management itself is analyzed as the interaction between a set of models of (1) the current state; (2) the goal state; (3) the system structure; and (4) a plan to get from (1) to (2) given (3). Finally, Beer's method of formal analogy between scientific problems and management situations is discussed. Clemson emphasizes that such analogies can never be complete, but may frequently be useful.

Chapter 5 focuses on Beer's central theory of the Viable Systems Model (VSM) of management. While the model was originally designed for neurological systems, its emphasis on scoping and recursion of control systems has made possible its application to social systems of all kinds. According to VSM, at any level in an organization a system has (1) a set of operational elements and their individual managements; (2) a management structure responsible for the efficient immediate operation of this set; (3) another management structure responsible for formulating and providing sufficient conditions for the accomplishment of future goals; and (4) a master control to balance (2) against (3). At a higher level of recursion, component (1) serves as a single operational element, and components (2) through (4) its individual management. Clemson argues that while all social systems naturally possess these components, traditional management is ignorant of this, so that these natural processes are frequently frustrated. In particular, the tasks of component (3) are generally abandoned, much to the long-term detriment of the organization.

Cybernetics: A New Management Tool is a thoughtful and informative work. I recommend it to those who desire an introduction to the Cybernetic approach to management, or as a practical guide for those in power frustrated by traditional management theory.

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