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CONTROL OR CHAOS: CENTRALIZED MILITARY MANAGEMENT

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SUMMARY

The most important single factor governing the effectiveness and efficiency of the armed forces is the quality of its management (to include command).

Management of any system is extraordinarily difficult, but the management of the armed forces is particularly so because of their tremendous size, and the complexities inherent in their missions. A verbal model of a management system indicates quite clearly that a large system is a dynamic entity greater than the sum of its component parts. Its nature is dependent on the interrelationships and interactions of its elements, and the resulting structure is beyond the comprehension of any individual or organizational entity.

There is no sound management theory for large systems, and, as yet, no real management science has been developed. Yet the exponential growth of science and technology has increased the urgency for establishing a viable management science.

Those who believe that the answer to better management is simple decentralization are mistaking the symptom of centralization for the real problem, which is our inability to manage well in the absence of better management techniques. Centralization leads to rigidity, uniformity, and high overhead costs. Decentralization on the other hand results in undesirable suboptimization and slow response to changing conditions. In the absence of a sound management science, the tendency is for overcentralization to result in decentralization. This trend is reversed when decentralization results in the inability to attain objectives.

Effectiveness and efficiency of the military system can be greatly improved in the short time range by legitimate resistance to internal and external pressures and limiting attempts to manage to present capabilities. Long range improvement can be accomplished by the development of a sound management theory, elevating management from an art to a science, and establishing a managerial profession. The ultimate goal would be to staff the Department of Defense with better educated and better trained managers and commanders equipped with more efficient managerial techniques.

CHAPTER 1

INTRODUCTION

With the exponential growth of science and technology during the last 30 years, and the resulting complexity and interdependency of the nations of the world, efficient and effective management of all our national resources has assumed ever increasing importance. But while technical, social, economic, political and military complexity has risen exponentially, management capabilities have, at best, increased only linearly.

The cold war is being waged by the Communists as one conflict, employing alternately and in combination military, diplomatic, economic, and psychological means. The United States strategy must also use these diverse means integrated in the most effective manner.[1]

However, successful prosecution of the cold war depends not only on the proper integration of these four elements and the optimum allocation of resources to each, but upon the skill with which each of these means is managed. The sound management of the armed forces is, therefore, a factor of paramount importance in the implementation of national strategy.

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[1]Rockefeller Brothers Fund, Inc., Special Studies Project, The Mid-Century Challenge to US Foreign Policy, p. 37.

This thesis is not concerned, in any direct sense, with the establishment of national objectives, or with the integration of the military with the other elements of national strategy. It is concerned with the management and command of the armed forces, the problems of control, the causes and effects of centralization of military management at national level, and approaches to improving military management.

An attempt is made in this paper to construct a realistic verbal model of a management system. The principles established through the construction of this model are applied to a general analysis of the present defense system in an effort to depict its strengths and weaknesses. Finally, the model is used to suggest an approach to improving management throughout the Department of Defense.

CHAPTER 2

MEANING OF MANAGEMENT

SIGNIFICANCE OF TERMS

Many of the problems inherent in the discussion and analysis of management are caused by an absence of clarity and uniformity in the terms used. Management terms, when used in this paper, are considered technical, and their meaning will be explicitly or implicitly defined or explained.

Two terms--"effective" and "efficient"--have already been used, and, since they will occur repeatedly are defined at this point. Barnard's definition of the terms is quoted because it is uniquely appropriate to the theme and purpose of this paper.

> When a specific desired end is attained we shall say that action is 'effective.' When the unsought consequences of the action are more important than the attainment of the desired end and are dissatisfactory, effective action we shall say is 'inefficient.' When the unsought consequences are unimportant or trivial, the action is 'efficient.' Moreover, it sometimes happens that the end sought is not attained, but the unsought consequences satisfy desires or motives not the 'cause' of the action. We shall then regard such action as efficient but not effective.[1]

This definition has the dual advantage of covering the spectrum of relationships between the words "effective" and "efficient,"

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[1]Chester I. Barnard, The Function of the Executive, p. 19.

and of not demanding too much of the word "efficient." Efficiency is difficult enough to measure without depriving it of meaning by making it almost synonymous with perfection.

THE FRAMEWORK OF MANAGEMENT

The purpose of this section is to establish a management environment or framework as the foundation or basis of a management system model. A model may be simply a thorough understanding of a system, a word description, a diagram showing organization relationships and the flow of data within a system, or a series of equations, curves, and formulae that describe all or most of the operation.[2] The model in this paper is verbal.

AR 1-24 provides a convenient starting point in its definition of management.

> Management. A process of establishing and attaining objectives to carry out responsibilities. Management consists of those continuing actions of planning, organizing, directing, coordinating and controlling use of men, money, materials and facilities to accomplish missions and tasks. Management is inherent in Command.[3]

This definition indicates that management is a process, the purpose of which is to establish and then to attain objectives

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[2]Joseph F. McCloskey, "Case Histories in Operations Research," Operations Research for Management, ed. by Joseph F. McCloskey and Florence N. Trefethan, pp. 262-263.

[3]US Dept of the Army, Army Regulations 1-24, pp. 1-2.

by the use of given means or resources. However, at any management level or echelon certain objectives and means are given, and the process involved is actually that of establishing intermediate objectives the attainment of which will insure attainment of the given objective.[4] Thus, at each management level there are objectives and resources (ends-means) both given and internally established. The framework within which the management process operates we will call a system.

"System" is a familiar term with many meanings and shades of meaning. The dictionary defines it as "an assemblage of objects united by some form of regular interaction or interdependence; an organic or organized whole. . . ."[5] In an attempt to further clarify the term, two definitions or explanations given by prominent authors in the field follow:

> . . . a system is something which must be treated as a whole because each part is related to every other part in a significant way. What is significant is determined by order as defined for a particular purpose, or from a particular point of view, such that if there is a change in relationship of one part to any or all of the others, there is a change in the system. It then either becomes a new system or a new state of the same system.[6]

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[4]James G. March and Herbert A. Simon, Organizations, p. 156.
[5]Webster's New Collegiate Dictionary, 1953.
[6]Barnard, op. cit., pp. 77-78.

> Let us understand by the term system, a group of men and the tools they use to perform some determinant function. In practice, a system operates within an environment of which an important feature is the presence of other groups. These groups in the environment often have purposes that conflict with the purposes of the given group.[7]

These definitions indicate that a system is composed of interrelated parts which interact with one another, and that it is dynamic rather than static. However, additional concepts concerning systems are required to construct a model.

ELEMENTS, SUBSYSTEMS, AND SYSTEMS

The language of set theory offers possibilities for supporting the evolution of a conceptual framework within which military management systems may be studied and discussed. While it is doubtful that the entire mathematical machinery of set theory can be used, "as an approach it has the advantage of being both parsimonious and mnemonically convenient."[8] In set theory, a set is a well-defined collection of elements. For example, all the books in the US Army War College library is a set whose elements are each of the books. All books on China in the same

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[7]Lee S. Christie, "Organization of Information Routing," Operations Research for Management, ed. by Joseph F. McCloskey and John M. Coppinger, p. 421.

[8]Charles K. Gordon, Jr., An Introduction to Set Theory, p.3.

library also comprise a set; but since they are included in the grouping of all the books in the library, the books on China are a subset of the library set. Similarly, all books on economics in the library belong to a subset of the library set. Note also that books dealing with economics in China is a set which is a subset of both the China subset and the economics subset. In fact it is the set consisting of elements (books) in the intersection of the China and economics subsets.

In this context, systems can be considered as sets of subsets and/or elements, and many of the conventions of set theory apply to them without the use of any mathematical formulation.

The basic component of a system may be called an element. For the purpose of the management system model, the elements of a system consist of people, facilities (to include plant, machines, and tools), materials, organizations, policies, procedures, constraints, and objectives. The exact determination and definition of elements is not too important to the theory as long as they consist of all factors--material and non-material--required to accomplish the goals or objectives of the system. Groupings of all or some of these elements in a nearly infinite variety of ways form systems. Groupings of systems form a larger system of which the original or basic systems are subsystems. This process of grouping can, of course, continue until the ultimate system becomes the entire universe.

In this context, the defense system can be considered a subsystem of the national government system, and within the defense system there are numerous subsystems each of which contains many other subsystems. Except at the very lowest or very highest echelons, whether a particular group of elements is considered a system or a subsystem depends on the point of view of the observer or the purpose of the observation.

All subsystems and, hence, the defense system as a whole is in a continual state of flux or change because of changes in the elements themselves or in the grouping of elements and subsystems. These changes are caused by interactions among elements or by fiat. Some of them are planned and directed, others just happen and may or may not be noted.

The use of set theory to describe a system indicates that a system is not merely the sum of its individual parts, but a separate, distinct, dynamic, and complex entity resulting from the interaction and interrelationship of its parts. Its complexity is such that it is beyond the comprehension, in any given instant of time, of any one individual or organizational entity (commander and his staff, for example).

ENTROPY IN A SYSTEM

Another interesting and probable characteristic of a system is worthy of note. The relatively new science of cybernetics,

which encompasses the entire field of control and communication theory, whether in the machine or in the animal,[9] points out that there is in man-made systems, as in nature, a statistical tendency toward disorder and chaos. To stop or reverse this trend requires the continual insertion of energy into the system.[10] The basis upon which Dr. Wiener developed his science of cybernetics evolved from his study of the writings of Dr. Josiah Willard Gibbs, a nineteenth century American mathematician who gained his greatest renown in the field of thermodynamics.

> As entropy / loss of useful or usable energy/ increases, the universe, and all closed systems in the universe, tend naturally to deteriorate and lose their distinctiveness, to move from the least to the most probable state, from a state of organization and differentiation in which distinction and form exists, to a state of chaos and sameness . . . order is least probable, chaos most probable.[11]

However, Wiener points out that human beings are not isolated systems, but by taking in food and information from outside the man-made system are capable of generating energy and, thus, decreasing or even reversing entropy within the system.[12]

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[9]Norbert Wiener, Cybernetics, p. 19.
[10]Norbert Wiener, The Human Use of Human Beings, pp. 28-36.
[11]Ibid., p. 12.
[12]Ibid., p. 28.

Cybernetical contribution to the model is that systems tend to lose their distinctiveness, their state of organization, and become uniform, disorderly and chaotic unless energy is continually and properly applied.[13]

CONTROL OF SYSTEMS

Man, of course, is the most important element of any system, and is the source of the energy that enables the system to maintain its orientation and achieve its objectives. Man can and does, however, amplify his own energy through the use of machines and tools, which when properly constructed and operated by man, are a source of energy in themselves. Unharnessed energy, though, tends to be destructive rather than constructive. It must be controlled. Control, therefore, can be considered as the application of energy to, or within, a system in such a manner as to keep it operating in a way that will attain the objectives of the system. Therefore, every individual and many machines within a system exercise control. In each case, energy is theoretically being applied in the proper form, manner, and quantity to accomplish specific limited objectives.

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[13]The idea of uniformity and chaos being conceptually related is somewhat difficult to grasp. However, consider the oscilloscope picture of a meaningful telephone voice message as compared to the picture of a message rendered unintelligible by a loud, steady hum. In the first case, we see a non-uniform highly differentiated curve. In the second case, the differentiation is suppressed and the curve is more uniform.

Thus, control is exercised throughout a system and is not and cannot be concentrated at the top echelons. Top echelon control simply means that the energy being supplied by people and machines at the top will insure that the objectives of the system as a single entity will be attained.

NATURE OF AUTHORITY

Although man is a source of energy and, hence, exercises control, he is also an element of a system and as such must himself be controlled. The basis of this human control of humans is authority.

> . . . authority is the character of a communication (order) in a formal organization /an element of a system; its human structural framework/ by virtue of which it is accepted by a contributor to or 'member' of the organization as governing the action he contributes, that is as governing or determining what he does or does not do so far as the organization is concerned.[14]

> A person can and will accept a communication as authoritative only when four conditions obtain: (a) he can and does understand the communication; (b) at the time of his decision he believes that it is not inconsistent with the purpose (objectives) of the organization; (c) at the time of his decision he believes it to be compatible with his personal interests as a whole; (d) he is able mentally and physically to comply with it.[15]

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[14]Barnard, op. cit., p. 163.
[15]Ibid., p. 165.

A question immediately arises concerning this assertion that the determination of authority lies with the subordinate individual. How is important and lasting cooperation ever secured? Primarily because each individual has a "zone of indifference" within which orders are accepted without conscious questioning. Also group interests exert certain pressures on an individual which maintain the stability of this "zone of indifference." Thus, individuals are loathe to question authority that is within or near the "zone of indifferences." When formalized, this common sense attitude becomes the fiction that authority comes from above.

This fiction is necessary for two reasons. First, it provides a process for delegating upward to the organization, responsibility for what is a depersonalized organization decision. Persons are inclined to grant authority upward because they dislike the personal responsibility which they otherwise accept. This is especially true when they are in no position to accept it. Second, the fiction provides impersonal notice that what is at stake is the good of the organization. Thus, flouting authority for purely personal reasons is a deliberate attack on the organization itself (and on one's peers). Such action is an act of hostility and must be punished.[16]

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[16] Ibid., pp. 167-169. Mr. Barnard's concept of authority including the term "zone of indifference" has been accepted and used in this paper without significant modification. Most authorities in management today adhere to it in principle.

In small or well established organizations of a stable nature most orders deliberately issued comply with the four conditions of acceptance stated above. In very large, rapidly changing, complex systems; such as the ones comprising the military, it is often difficult to comply with the stated conditions, with the result that many orders and directives are not obeyed (at least not as intended). Also, in view of the large and somewhat vague scope of a military manager or commander's responsibilities, many meaningless orders are published as a matter of routine to "cover" the manager or commander when his stewardship is inspected, audited, or investigated.

THE MANAGEMENT SYSTEM MODEL

The verbal model depicted in the preceding sections indicates that a management system consists of heterogeneous elements, the most important of which is man, grouped into complex interacting subsystems for the attainment of given objectives.

The system is characterized by continual change resulting from the change in its elements or in the relationship of its elements because of external and internal influences. Man with the help of machines supplies the energy necessary to permit the system to attain its objectives. The application of this energy is control and is exercised by every individual and many machines within and outside the particular system or subsystem. Management is the exercise of this control.

CHAPTER 3

CENTRALIZATION VERSUS DECENTRALIZATION

NECESSITY FOR CENTRAL CONTROL OF THE MILITARY

The size of the defense budget and the importance of the military in the current world environment result in the exertion of great pressure on the Department of Defense and the necessity for rapid response. Since the lives of most U.S. citizens are directly or indirectly affected by defense policy, it is inevitable that domestic politics should be intimately concerned with the defense effort. The public, the press, the Congress, and other government and private agencies ask questions, criticize apparent inefficiencies and inequities, and demand remedial action. If the Office of the Secretary is to respond promptly and in the best interests of the country, it must have effective central control of the entire military system.

The fifty billion dollar defense budget has a definite economic impact on the nation. Where, when, how, and for what these funds are spent affects employment and economic growth. It is, of course, only rational that defense policies should not be dictated by their potential effect on economic stability. Rather the unbalancing effect of defense policies should be counterbalanced by adjusting monetary-fiscal policies.[1]

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[1]Charles J. Hitch and Roland N. McKean, The Economics of Defense in the Nuclear Age, pp. 66-67.

Nevertheless, whenever possible, without knowingly obstructing the defense effort, attempts are made to use the defense budget as an aid to economic stability and improvement. For example, small business, labor surplus, and depressed areas receive preferential treatment under the Armed Services Procurement Regulations (ASPRs).[2] Without effective central control, defense procurement cannot serve efficiently the often conflicting demands of the economy and of military preparedness.

From the military point of view, central control is essential since wars, even limited ones, are no longer fought independently by the Army, the Navy, or the Air Force. Forces of all military services must be thought of as interdependent.[3] Only at the national level, can long range military planning and programing be effectively accomplished.

When national strategic objectives are considered, central military control is also essential. In today's world environment the military is just one of the means of achieving national objectives and must be carefully and continually integrated with the other means. Modern electronic communications systems have made possible control of forces deployed in combat from the

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[2]US Dept of Defense, Armed Services Procurement Regulations, Section I; parts 7 and 8.

[3]Alain C. Enthoven, "Systems Analysis and the Navy," Naval Review, 1965.

Pentagon Command Post, and during the Korean War, battalion-sized units were monitored by the Joint Chiefs of Staff.[4] This type of control can be beneficial, if exercised wisely, discretely, and with acute awareness of its limitations.

While it is possible to posit that strong central control of the military is necessary for a variety of reasons, it cannot be asserted that such a degree of control can, in fact, be achieved.

CAUSES OF THE TREND TOWARD CENTRALIZATION

The popular dogma that centralization results in control is simply not true.[5] Centralization is essentially a method of exercising control, or a management technique. As the model constructed in Chapter 2 indicates, control must be exercised throughout the entire system; therefore, its complete centralization at the top echelon is not technically possible. As commonly used centralization means that the details of how, when, and where control is to be exercised in the subsystems of a system is dictated in specific terms by the system management or the top level.

Logically there is no such thing as being for or against centralization. Rather the question is how much authority to

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[4]William R. Kinter, "The Politicalization of Strategy," Marine Corps Gazette, Apr. 1965, p. 22.

[5]John C. Ries, The Management of Defense, p. 278.

determine the factors of control should be delegated, and not whether it should be delegated. If no authority is delegated, it is completely centralized in one person and no subordinate managers or organization exist. Hence, some decentralization is characteristic of all systems.[6]

The centralization-decentralization concept must not be considered only with respect to the top echelon. Varying degrees of centralization and decentralization exist in all subsystems from the largest to the smallest. In any subsystem the boss may retain or delegate almost all his authority or take any in-between position along a continuum of leadership behaviorism. However, neither authority nor freedom are without their limitations.[7] In other words, throughout the system the personality and philosophy of individual managers will have great influence on the extent to which authority is centralized or decentralized.[8]

The answer to the problem of how much to centralize or decentralize is not one of simple choice. The manager of a relatively large system finds himself in a dilemma which has been stated quite well by Mr. Perrin Stryker.

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[6]Harold Koontz and Cyril O'Donnell, Principles of Management, p. 197.

[7]Robert Tannenbaum and Warren H. Schmidt, "How to Choose a Leadership Pattern," Harvard Business Review, Vol. 36, Mar.-Apr. 1958, pp. 95-101.

[8]Koontz and O'Donnel, op. cit., p. 206.

> The dominant complication /in decentralization/ is that top management must, by some means, control decision making by subordinates. The chief executive must actually or skillfully guide, not only major decisions but also a great many seemingly minor decisions that could affect the company adversely. . . . Hence the major paradox of delegation: the more top management tries to decentralize decision making, the more it must centralize its control of decisions.[9]

The two primary causes of an apparently excessive degree of centralization are: (1) an attempt to exercise minimum essential control which does not appear possible by other means; and (2) fear or anxiety. The first cause is rational even though frequently futile, the second is irrational; but both can set into motion a chain of undesirable events unless the limitations on the present capabilities of men to manage large systems are clearly understood and fully considered in all decisions to increase centralization.

Secretary of Defense McNamara in testifying before the Committee on Armed Services of the House of Representatives in 1963 expressed his philosophy of management which illustrates the first cause of centralization.

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[9]Perrin Stryker, "The Subtleties of Delegation, "Fortune Magazine, Mar. 1955, p. 95.

> It is a philosophy based on a decision pyramid and a system of administration in which all possible decisions are pushed to the bottom of that pyramid. But for intelligent decisions to be made at the bottom of the pyramid there must be a framework within which those decisions can be made. Basic policies must be established against which a decision-maker at the lower levels can compare his decision and gain some confidence that he is acting in accordance with a pattern of decisions elsewhere in the organization. This will lead to unity and strength rather than unbalance, which can only lead to weakness. And it is the establishment of these policies that can only be done at the top.[10]

While Secretary McNamara is emphasizing his belief in decentralization, he is simultaneously pointing out the need for a rather high degree of centralization.

The current Department of Defense planning-programing-budgeting process with its emphasis on cost effectiveness analysis affords the Secretary of Defense a control mechanism capable of cutting across organizational lines.[11] In theory, at least, this technique constitutes central control in a very legitimate sense, since it involves integration of mutually dependent and inter-related programs of all the services. There exists in this process, however, the seeds of over-centralization, since the bureaucratic machinery established to analyze and integrate programs is tempted to control the detailed execution of the approved plans, programs, and budgets.

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[10]US Congress, House, Committee on Armed Services, Hearings on Military Posture, 1963, pp. 373-374.

[11]William W. Kaufman, The McNamara Strategy, pp. 188-189.

Mr. McNamara considers three connotations of centralization: centralization of responsibility; centralization of function; and centralization of authority.[12]

> The more a function is decentralized or fragmented, the higher the organizational level on which the authority to make a decision must be centralized. Conversely, the more a function is consolidated or centralized, the more the authority to deal with that function can be delegated to a lower level within the organization.[13]

The Defense Supply Agency (DSA) created by Mr. McNamara is an example of the application of this concept. All supply activities involving items of materiel common to the military services were placed under the control of this agency which reports directly to the Secretary of Defense. However, it is problematic whether this action is an example of centralization, at least in the derogatory sense of the term. DSA is a large organization, and, as such, can be either highly centralized or decentralized. In light of the management system model of Chapter 2, the creation of DSA was more a change in the subsystem structure of the defense system than centralization. The ultimate success or failure of DSA depends largely on whether or not its creation succeeds in reducing the number of necessary interactions and interrelationships previously inherent in the supply system.

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[12]Solis Horwitz, "The Management Concept of Mr. Robert S. McNamara, The Secretary of Defense," Management Views, Vol. IX, p. 21.

[13]Ibid.

Again, while arguing for decentralization Hitch and McKean point out one of the grave dangers inherent in it.

> If decision making is decentralized to a considerable extent, it may help against the possibility of getting stuck with lopsided views at the top . . . . A degree of suboptimization [optimizing a function or activity without regard to the criteria of the next higher echelon, and hence the possible adverse effects on other functions or activities] may mean, for some problems, less risk of tying all analytical results to a "bad" criterion, for instance, one involving a spuriously specific objective in which uncertainty is neglected. On the other hand, there is a real danger in piecemeal analysis . . . . The danger is that the criteria adopted in lower level problems may be unrelated to and inconsistent with higher level criteria.[14]

The first portion of the quote illustrates a broader concept of management. If we admit that truly efficient management of large scale systems is not yet possible, then the advantages of decentralization tend to outweigh those of centralization. Since mistakes are probable under either method, those made in a highly centralized system can be quite disastrous and have a serious impact on the effectiveness and efficiency of the entire military system. Whereas the mistakes made in a decentralized system, although perhaps more numerous, would also be more trivial and may frequently compensate for one another. If the chance of error under centralization were very low, a highly centralized system would be considerably more efficient and significantly

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[14]Hitch and McKean, op. cit., pp. 162-163.

more effective. However, the condition of low probability of error under centralization does not obtain, since the state-of-the-art in management is still far too primitive.

The second cause of over-centralization--fear and anxiety--is less definitive and more elusive because it derives from the ambitions, doubts, and other emotional forces inherent in man. This fear and anxiety is engendered by real or imagined pressures.

As is well known to those individuals who have been involved, considerable pressure is exerted on all major echelons of the Department of Defense by the public, the press, the Congress, the Comptroller General, and the Bureau of the Budget. These are external pressures. Internal pressures are also exerted within the Department of Defense, by higher echelons upon lower and by supervisors upon subordinates. Some of these internal pressures can be attributed to the external ones. Others are independently generated.

Such pressures often result in hasty and ill-advised actions and decisions made in an atmosphere of crisis and confusion. At best, these pressures tend to increase centralization in an effort to prevent reoccurrence of irritating incidents and to provide quick response to criticism.

EFFECTS OF THE TREND TOWARD CENTRALIZATION

Effective centralization requires, as a minimum, two conditions: (1) the timely flow of complete and accurate information

from the lower to the higher echelons; and (2) the timely flow, from the higher to the lower echelons, of clear, concise, logical instructions, which can and will be obeyed. In a system the size of the Department of Defense, these conditions cannot obtain in practice.

To handle and process this information, large staffs are required which rapidly expand into organizational superstructures at the higher echelons. These organizational giants consume and generate an endless flow of information which in turn requires even larger staffs to utilize this information. As these staff organizations expand, separate organizational elements must be established to control and administer them. Thus, an ever increasing spiral of growth is created.

These huge staffs tend to become preoccupied with enforcing uniform standards and defending their own integrity. Policy orientation is replaced by mere routine management, and the staffs develop an immunity to policy change. They develop group values, accepted ways of doing things, and parochial views.[15] As instruments of system control, such staffs are marginal at best and malignant at worst.

The flow of information to the top echelons may initially be for informational purposes only. Inevitably, though, it results

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[15]Peter M. Blau, The Dynamics of Bureaucracy, p. 183.

in an attempt to gain and maintain detailed control at the top. The information received may answer the questions asked; but the answers are often considered unsatisfactory, and pressure is applied to improve operations in the lower echelons. In a sense this is ironic, since although the answers may be unsatisfactory, actual conditions may not be (at least in the manner indicated by the information). Garbled, erroneous, and poorly worded reports rather than the operations themselves may be the cause of dissatisfaction. It is extremely difficult to collect accurate and complete data from the lowest echelons, consolidate and comment at intermediate echelons, and receive meaningful and factual information at the top. Nevertheless, on the basis of this information, the process of centralization throughout the entire hierarchy begins and accelerates rapidly. The result is a prolific and poorly coordinated flow of directives, regulations, and guidance down to the lower echelons.

As this information flow increases, its relevancy to the real world decreases. However, at all echelons except those actually engaged in operations, there are staff sections to receive and process various types of information. To the people in these staff sections, the whole process, although often hectic, makes sense and as far as they are concerned is a part of the real world. But the activities and agencies expected to act on the basis of these directives are unable to do so. The final result is that these never ending orders and directives are either:

(1) not read; (2) read but not understood or misunderstood; (3) physically or mentally incapable of execution; or (4) ignored as being trivial, unrealistic, or opposed to organizational and/or personal interests. The result is a communications breakdown.

This does not signify the overloading of the physical means of communications, although such may well be the case, but rather a lack of understanding among organizational echelons and individuals in these echelons. There develops a tendency for staffs and operators to act independently and cease to influence one another. Frequently there is only a vague, uneasy awareness or none at all that this has happened. The result is organizational euphoria with the two groups existing and working comtentedly in quite different worlds.

Unnecessarily complex systems and procedures have been established not only in an attempt to centralize control, but also to provide protection against every adverse contingency, not the least of which is criticism. In an address at the 1965 Army Operations Research Symposium, the Honorable Willis M. Hawkins, Assistant Secretary of the Army (R&D) noted that many decisions in the military hierarchy appeared to be made primarily with a view to reducing the noise level in investigative bodies. He also pointed out that he had to be extremely careful when asking a question or making a casual remark lest it generate an unnecessary crisis or start a whole new program.[16]

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[16] Willis M. Hawkins, "Introductory Remarks," US Army Operations Research Symposium Proceedings - Part I, pp. 6-7.

The root of the trouble is that management science has not yet provided the tools required to operate a highly centralized system effectively and efficiently. In attempting to centralize beyond the capability to do so, communications breakdown, and, at the operating level, the system becomes quite decentralized.

However, there are indications that a balance between centralization and decentralization is achieved within definite limits. When centralization goes beyond a certain point, communications breakdown and decentralization takes over. If decentralization goes too far, individuals cooperate to achieve the degree of centralization necessary to get the job done, and this rejuvinates the forces of centralization. Nevertheless, a more optimal system could be established if the attempt were made to manage only within the present capabilities of management science. It would certainly save considerable money now being spent on unproductive overhead, and result in a more responsive system.

CHAPTER 4

THE ART AND SCIENCE OF MANAGEMENT

The management system model of Chapter 2 and the centralization dilemma described in Chapter 3 emphasize three points of major importance: (1) management is an extremely complicated process; (2) man's ability to manage is very limited in any absolute sense of the word; and (3) while most military managers are aware of the complexity and problems of management, they and their superiors act as though something can and should be done immediately to correct every specific problem or deficiency.

Yet the existing situation speaks for itself, and authorities in the field of management support the position that management remains an art and is not yet a science worthy of the name. Therefore, problems do and will continue to exist that defy solution in the context of the whole system.

> Since the organization of human beings for the attainment of a common objective is as old as civilization itself, one would expect that, of all sciences, the science of management would be the most advanced. Despite the increasing complexity of modern civilization, however, and the recognized need for effective coordination, only the beginnings of such a science has been developed.[1]

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[1]Harold Koontz and Cyril O'Donnell, Principles of Management, p. 3.

> Even when organizational reformers can agree on a single consistent set of goals, knowledge of methods of achieving them is limited. Administrative science has not progressed very far. And there is no way to be certain of the consequences of decisions relating to organization. Not only is knowledge of consequences limited, but the effectiveness of any particular allocation of activities is ofter impossible to measure. Administrative measurement is one of the most backward of all administrative arts.[2]

While the physical sciences have expanded exponentially, the social sciences (including management) have trailed far behind. There are several not mutually independent reasons for this. In the physical sciences man can be almost completely objective, whereas in the social sciences man is observing, contemplating, and experimenting with fellow human beings. Under such circumstances, objectivity is difficult if not impossible. The second reason is that everyone is a manager of sorts. For better or for worse, each individual must at least manage his own life. Because of this there is nothing sacrosanct about the concept of management as there is about the concept of nuclear physics, biochemistry, or astronomy. Most people consider themselves, if nothing else, good managers; hence no urgency to develop management theory. In addition, since management deals with people, experimentation is extremely difficult. Even when meaningful experiments are devised, the subjects of the experiment (people) react differently

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[2]Herbert A. Simon, and others, Public Administration, p. 176.

knowing that they are part of an experiment.[3] A final reason for lag in the development of a management science is the lack of an urgent requirement until quite recently. Systems were not as complex since governments and businesses were relatively small. A business could, and still can, measure its success by its balance sheet, profit and loss statement, and share of the market. As long as a business is profitable and reasonably certain to remain so, it matters little how efficient its management is. In fact profit is taken as proof of efficiency, although such is not always the case.

The result of this combination of inherent difficulties and human lethargy is that the development of a viable management science has a long way to go. In speaking of problem areas in Army command and management, Dr. Nicholas Smith of the Research Analysis Corporation said,

> The management areas may be divided into two classes: those for which there is as yet no well-formed conceptual method of solution and those for which conceptual methods exist in principle but of which utilization is not now practicable.[4]

It is a mistake, however, to consider that no advances have been made in the art (or science) of administration or management. A modicum of progress was required merely to keep up with the

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[3]Elton Mayo, The Social Problems of an Industrial Civilization, p. 69.

[4]Nicholas M. Smith, Operations Research in the Next 20 Years: A Technological Forecast, p. 5.

increase in complexity of all aspects of government and the private sector engendered by the rapid growth of technology.

The scientific management movement, as it was called, began shortly after 1900 with the work of Frederick Winslow Taylor who has become known as the father of scientific management. He was followed quickly by a host of others who refined and expanded his efforts.[5] Taylor's work was primarily at shop level. He believed in studying each step in a work process, improving it, and training people to do each job in the most efficient manner. Among other things, he advocated friendly cooperation between management and labor. There is nothing startling about his ideas today, but 55 years ago they were revolutionary.

When his time and motion study techniques were adopted by several army arsenals, the labor unions complained that his methods would result in unemployment. The Congress investigated, and in 1911-1912 Taylor testified before a Special Committee of the House of Representatives. In spite of his clear, logical testimony advocating scientific management, the Congress prohibited its use in government arsenals.[6]

In the time between the start of the scientific movement and the present, numerous managerial techniques, philosophies, and

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[5]Marshall Edward Dimock, and others, Public Administration, p. 7.

[6]Frederick Winslow Taylor, "Taylor's Testimony Before the Special House Committee," Scientific Management.

equipment have been developed, and libraries are filled with books on management and administration. Much of this development has been of great assistance to management in government and business. But there is still no integrated management theory, no firmly established science of management, and no recognized management profession.

In fact, there are certain trends which have developed over the past two decades that promise to impede the development of a management science. One of them, the insistence on uniformity and conformity in management personnel connected with big business, was presented very vividly by William H. Whyte in his book, The Organization Man.[7] This could ultimately breed mediocrity followed by stagnation, or, as indicated in the management system model, entropy will increase and chaos ensue.

Another adverse trend, mentioned earlier, is the tendency, engendered by anxiety and fear, to overmanage or attempt to manage beyond present capabilities. This, of course, leads to excessive centralization, and, until communications break down, to a low degree of initiative and imagination in subordinate managers.

The final trend is to place unjustified reliance, faith and hope in machines such as the electronic digital computer. The potential of the computer is enormous. It has applicability in many areas such as scientific analysis, business data processing,

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[7]William H. Whyte, The Organization Man, passim.

technological control, and experimentation through simulations.[8] However, their use as management tools today is limited by the state-of-the-art of management and computer technology. With further development in both these areas their usefulness will increase geometrically.

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[8]Dimitris N. Chorafas, Operations Research for Industrial Management, p. 94.

CHAPTER 5

AN APPROACH TO MANAGEMENT IMPROVEMENT

In view of the complexity of management, the current state-of-the-art, and attitudes toward it, it is apparent that there is no panacea for the management problems of the armed forces. Ways and means for improving the system, however, are available and may be classified as negative and positive, and as short and long range.

ATTITUDE TOWARD MANAGEMENT

The negative approach to improvement involves withholding decisions and actions when they appear on the surface to be required, but can only result in unnecessary turbulence and in a degradation of the system. This is frequently difficult to do, since great pressure is often applied urging managers to take some action. The majority of cases to which this principle of inaction is pertinent are those in which a less than desirable situation exists, but management theory does not provide appropriate methods for correcting it. Any corrective action taken would probably have deleterious effects in the long run.

Concerning the subject of decision making Barnard said,

> The fine art of executive decision consists in not deciding questions that are not now pertinent /in the manager's opinion/, in not deciding prematurely, in not making decisions that cannot be made effective, and in not making decisions that others should make.[1]

A decision or action that might superficially correct the symptom of a problem, but be harmful to the system as a whole, is both premature and ineffective in terms of Barnard's decision-making theory.

However, before the individual manager can realistically adhere to the principle of purposeful inaction, a considerable change in attitude toward management is required. This change in attitude is required by the Congress, the Comptroller General, the Bureau of the Budget, and the Department of Defense. All persons in authority must be educated to the fact that perfection in management is not yet possible, that numerous errors, discrepancies, deficiencies, and inequities can be found in even a nearly optimal situation. They must realize that deficiency is not synonomous with ineptitude and inaction equivalent to indifference.

Unfortunately most people, including military managers and commanders, take the position that any undesirable situation can be corrected or improved immediately by directing it, assigning enough people to the job, and demanding perfection. This, of

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[1]Chester I. Barnard, The Functions of the Executive, p. 194.

course, is simply not true. There are many things that cannot be accomplished because of lack of knowledge; and the effective and efficient management (in the absolute sense) of complex systems is one of them.

No implication is intended that continuing attempts should not be made to improve undesirable conditions. But the perennial and ubiquitous attempts to correct deficiencies on a "crash" basis by means of ad hoc committees more often than not have unsought, adverse effects, and fail to solve the basic problems. An ad hoc committee is under pressure to recommend corrective actions. Frequently methods of correcting deficiencies seem fairly apparent because the situation is considered in isolation and the great complex of interrelationships and interactions is ignored. As a result the recommended changes will create at best a temporary condition of system turbulence without eventual improvement, and at worst new and larger problems.

The required change in attitude can probably best be accomplished by studying, in depth, particular situations that are subjected to criticism. The more apparently valid the criticisms, the better for this purpose. The General Accounting Office, for example, during its investigations bring many apparent deficiencies to light which tend to make military commanders and managers appear inept or indifferent. Frequently the deficiencies and recommended solutions appear so obvious that, except for minor nonconcurrences, the military services and the Office of the Secretary of Defense accept the recommendations readily.

However, a detailed study might indicate that correction of a particular discrepancy would unbalance another part of the system, or that the discrepancy is merely a symptom of a problem beyond the control of the military, and the cost of correction is not warranted. Such a study might indeed indicate a need for improvement in management science, rather than a need for increased investigations.

An honest, complete, and scholarly analysis of several major criticisms might do much to lessen criticism and give all concerned a real appreciation of the current insolvability of many management problems.

Finally, the military itself must understand the limitations of management and attempt to manage only to the extent possible. At the present time, the military will institute changes in organization and procedures almost over night that any well-managed private industry would only accomplish over a period of months or years. The result is often unnecessary system turbulence and more and bigger problems.

In resorting to inaction rather than hasty and ill-conceived actions, caution is necessary to insure that inaction is not merely a rationalization of procrastination, lethargy or indecisiveness. Any decision not to act should usually be difficult to make. If it comes too easily, some soul searching is in order, to insure proper motives. It must be kept in mind that the reason for inaction is to give existing procedures, organizations and systems

a chance to work before changing them, and to refrain from ill-advised changes merely to relieve pressures.

MANAGEMENT EDUCATION

Military officers are primarily managers and yet they are not, with numerous exceptions of course, trained managers either through formal education or enlightened experience. Many of the executives, whether military or civilian, serving in the Department of Defense do not understand the simple precepts of management, not to mention the more esoteric managerial techniques developed in the last two decades. This does not imply that many of them are not considered capable executives; it does imply that they are not usually performing in accordance with their potential.

This indicates the need of an extensive management training program. One which emphasizes management limitations and the very real dangers inherent in making decisions based on the premise that management is relatively simple, and that systems are not or need not be complex.

The Department of Defense and its military services teach several management courses at the present time. Most are of short duration and utilize the case study method or a modification of this method. While they are not without merit, they do not convey a basic understanding of systems and their complexities. Since most of the cases presented have no good solution, the student tends to draw the wrong conclusions. He feels that the "tried

and true" methods of management which emphasize holding down the "noise" of investigation, not "rocking the boat," and publishing "covering" directives are the best methods after all. Perhaps the schools should be teaching the dangers of yielding to unwarranted pressures and taking avoidable "crash" actions in order to make a good impression or to avoid the stigma of being considered indifferent. If circumstances beyond our control necessitate poor management practice, we should at least be aware of what we are doing and why. It might then be possible to mitigate the resulting damage.

It is the long range educational program, however, that is of primary importance. Management personnel, including military commanders, must be thoroughly educated in many fields of academic endeavor ranging from mathematics (which is particularly important) and the physical sciences to the social sciences such as economics, politics, sociology, psychology, and law.

Such extensive education is not only possible; it is necessary. Developments in the field of education make it possible for individuals to learn more, faster, and retain it longer. Action should be taken now to insure a rapid and steady rise in the technical proficiency of Department of Defense managers and commanders in the years to come.

MANAGEMENT RESEARCH

Because of the high stakes involved, the military has a greater need to improve management abilities than any other

government agency or the private sector. Colonel Hayes, in an article in Military Review, emphasizes the urgency of reducing military art to military science as fast as science and research will permit.[2] This urgency, whether it is expressed as better weapons systems, better training, better tactics, or better logistics, is expressed throughout the military. No matter how expressed, it is really a plea for better management of available resources. The technological advances in weaponry and supporting equipment have greatly complicated all aspects of military management, and improved management techniques are becoming increasingly urgent with each passing year.

Additional government sponsored basic research is required in the disciplines of mathematics, sociology, psychology, and economics as well as the physical sciences. Applied research is required in two broad areas: (1) scientific studies of specific management problems confronting the military; and (2) studies designed to transform existing and future management techniques, principles, and concepts from a loose collection of management tools into a viable management science.

Studies of specific management problems have been undertaken in the past, and are continuing in the present within the Department of Defense. However, they must be better coordinated and

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[2]James H. Hayes, "Basic Concepts of Systems Analysis," Military Review, Apr. 1965, p. 13.

their quality and utility improved. Many studies are gathering dust because the cost and means of implementing their recommendations were not considered during the course of the study. Every study should contain, as an integral part, an implementation plan or plans and a cost/effectiveness analysis.[3]

Since each management problem is more or less unique, so, to a degree, is its solution. In this respect management science resembles law and medicine in that much of the body of knowledge established will be of the "case book" variety. Management science must develop systematic approaches and move on to fundamental principles just as law and medicine have done.[4] Applied research should be started without delay in this area for military management use.

Currently the most promising means of developing a sound management theory and eventually a science is through the use of large-scale computer simulations.[5] It is doubtful that a one-to-one simulation of a large system will ever be practicable because of the difficulty of interpreting results and the limitations of even the computers of the future. However, one-to-one simulations should not be necessary if proper concepts and mathematical techniques for handling simulations are sufficiently developed.

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[3]D.G. Malcolm, "on the Need for Improvement in Implementation of O.R.," Management Science Journal, Vol. II, No. 4, Feb. 1965, pp. B 48-B 57.

[4]Joseph F. McCloskey, "Case Histories in Operations Research," Operations Research for Management, ed. by Joseph F. McCloskey and Florence N. Trefethan, p. 257.

[5]Dimitris N. Chorafas, Operations Research for Industrial Management, p. 94.

Methods must be devised through the study of detailed micromodels of small-scale operations to determine the nature and behavior of governing relationships and interactions in systems. This procedure will permit the construction of macromodels of large systems which are realistic enough to be of considerable value.[6] Simulations will then be adequate for solving specific management problems and assisting in the development of a comprehensive management theory.

In forecasting improvements in science, education, and management throughout the United States, the Rockefeller Brothers Fund, Inc. in The Mid Century Challenge to US Foreign Policy expressed its belief in the future in these terms:

> Notable among /the US future/ characteristics will be a high degree of skill, elaborate organization, a refined technology . . . . Education . . . will become an increasingly important element of our national strength. Not the power of the masses, but the power of intelligence--groups schooled to excellence, disciplined and tempered in the exercise of widely decentralized responsibility--will be the source of such authority as America wields in that day.[7]

This can also be the cause and effect of improvement in the effectiveness and efficiency of the armed forces.

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[6]Nicholas M. Smith, Operations Research in the Next 20 Years: A Technological Forecast, p. 6.

[7]Rockefeller Brothers Fund, Inc., Special Studies Project, The Mid-Century Challenge to US Foreign Policy, p. 58.

CHAPTER 6

CONCLUSIONS

Paradoxically, the problem of centralization is not the problem of centralization. It is rather the problem of establishing a viable management science. The undesirable aspects of centralization of military management at national level are merely the symptoms of the real problem. An attempt to eliminate the symptoms by arbitrarily decentralizing would not solve the problem.

At the present time, effective centralization can only be instituted within certain limits. Once these limits are exceeded, communications breakdown and the system tends to become decentralized, in fact, if not in form. This decentralization trend is reversed when the operating managers voluntarily cooperate in order to achieve their objectives. This cooperation soon reaches the point where the forces of centralization once again gain ascendency. This process produces an erratic and sluggish movement along the finite centralization-decentralization spectrum, resulting in a relatively inefficient control mechanism.

The movement toward decentralization does not reduce the size of staffs or the number of organizations. Interactions and interrelationships change within the system but its form and appearance is relatively unaffected. Ineffectual staffs and organizations continue to operate, but many of them operate within a vacuum. Their unproductive efforts constitute an ineffectual allocation of resources.

Many of the actions taken by Secretary McNamara, such as establishment of the Defense Supply Agency, do not constitute centralization of authority in themselves. Rather they are reorganizations along functional lines. Other actions such as the Planning-Programming-Budgeting System are logical steps to establish necessary control. Undesirable centralization frequently results, but the system improvement efforts of the Secretary of Defense are not usually the proximate cause.

Some immediate system improvements are possible by limiting the degree of management to our capabilities to manage. This would increase effectiveness and efficiency by controlling the erratic movement between the practicable limits of centralization and decentralization. In other words the continual uncoordinated and unrealistic changes to systems and procedures should be stopped, and existing systems and procedures given an opportunity to work. This would permit reduction of staffs at all echelons or at least diversion of their efforts into more productive channels.

Improvement in management techniques and the eventual development of a management science is the only means of increasing our ability to manage, and, hence of increasing substantially the effectiveness and efficiency of the military system.

A three-pronged attack on management problems is required. First, a drastic reduction in "crash" programs resulting in

ineffective changes in organizations, procedures, and systems. Second, study immediate problems making implementation and cost of recommended changes as integral part of the study. Institute changes gradually, when appropriate, and then only after a thorough analysis and test. Third, increase emphasis on management research and training with a long-range view toward improving management capabilities.

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BIBLIOGRAPHY

1. Barnard, Chester I. The Functions of the Executive. Cambridge: Harvard University Press, 1946. (HF5500B3)

(A classic in the field of management. This scholarly book was written by Mr. Barnard in the mid-1930's while he was President of the New Jersey Bell Telephone Company. It is the basis of much of the management philosophy existent today, and was of great value to this thesis.)

2. Blan, Peter M. The Dynamics of Bureaucracy. Chicago: The University of Chicago Press, 1955. (JF 1501 b 55)

(A sociological study of bureaucracy. It is primarily concerned with change in government agencies resulting from tensions and cohesions.)

3. Chorafas, Dimitris N. Operations Research for Industrial Management. New York: Reinhold Publishing Corp., 1958. (Q 180 A 1 C 45)

(An interesting and stimulating book indicating the practical value of Operations Research to industrial managers. It contains some mathematical formulation but is nevertheless quite readable.)

4. Cristie, Lee S. "Organization of Information Routing." Operations Research for Management, Vol. II, ed. Joseph F. McCloskey and John M. Coppinger. Baltimore: John Hopkins Press, 1956. (Q 180 A1M3 V.2)

(A technical article on one aspect of Operations Research, but of considerable value to an understanding of systems.)

5. Dimock, Marshall Edward, and others. Public Administration. Rev. ed. New York: Rinhart & Co., Inc., 1958. (JF1315 D5 1958)

(Detailed coverage of all aspects of Public Administration of the federal government. A comprehensive publication on administration and management.)

6. Enthoven, Alain C. "Systems Analysis and the Navy." Naval Review, VA 49 N 3 1965.

(A clear, concise description of the use of systems analysis by the Department of Defense and its application to the Navy. It is an authoritative article written by the Assistant Secretary of Defense (Systems Analysis).)

7. Hawkins, Willis M. "Introductory Remarks." US Army Operations Research Symposium Proceedings-Part I. Redstone Arsenal, Huntsville, Alabama: US Army Missile Command, 1965.

8. Hayes, James H. "Basic Concepts of Systems Analysis." Military Review, Apr. 1965.

(A clear explanation of the concept and importance of systems analysis.)

9. Hitch, Charles J., and McKean, Roland N. The Economics of Defense in the Nuclear Age. Cambridge: Harvard University Press, 1960. (RAND R-34-16)

(A complete review of economic theory with emphasis on systems analysis or cost/effectiveness analysis. A particularly significant work since Mr. Hitch as Assistant Secretary of Defense (Comptroller) was largely responsible for instituting the Department of Defense's present methods of systems analysis.)

10. Horwitz, Solis. "The Management Concept of Robert S. McNamara, The Secretary of Defense." Management Views, Vol. IX. Fort Belvoir, Virginia: US Army Management School, 1964.

(A concise clear expression of the Secretary of Defense's concept of management by his Assistant Secretary of Defense (Administration).)

11. Kaufman, William W. The McNamara Strategy. New York: Harper & Row Publishers, 1964. (UA23 K281)

(A very readable book analyzing Mr. McNamara's strategy based upon the Secretary of Defense's writings, testimony and speeches.)

12. Kinter, William R. "The Politicalization of Strategy." Marine Corps Gazette, Apr. 1965.

(Indicates the trend toward greater control of military strategy by the political element of government.)

13. Koontz, Harold, and O'Donnell, Cyril. Principles of Management. 2d ed. New York: McGraw-Hill Book Company, Inc., 1959. (HD 31 K6 1959)

(A standard text on management, but an excellent reference book.)

14. Malcolm, D. G. "On the Need for Improvement in Implementation of O.R." Management Science Journal, Vol. II, No. 4, Feb. 1965. Washington: Institute of Management Sciences.

(An original article indicating that the reason so many Operations Research Studies are useless is that not enough emphasis is given to the methods and costs of implementing their recommendations.)

15. March, James G., and Simon, Herbert A. Organizations. New York: John A. Wiley and Sons, Inc., 1958. (HD31 M3)

(A penetration book on organizations which was of significant value in preparing this thesis.)

16. Mayo, Elton. The Social Problems of an Industrial Civilization. Andover, Mass.: The Andover Press, 1945. (HF5549 M33)

(A sociological study of human relationships in industrial groups. It contains an excellent analysis of the social factors which affected an experimental group at the Hawthorne Plant of the Western Electric Company.)

17. McCloskey, Joseph F. "Case Histories in Operations Research." Operations Research for Management. Vol. I. Ed. Joseph F. McCloskey and Florence N. Trefethan. Baltimore: John Hopkins Press, 1954. (Q180 A1M3 V.1)

(A good analysis of several case histories in operations research and of the importance of using case histories in developing an Operations Research Science. Since Operations Research and Management Science are closely allied, this thesis uses McCloskey's article to make the point that management science must be developed by a case history approach.)

18. Research Analysis Corporation. Operations Research in the Next 20 Years: A Technological Forecast, by Nicholas N. Smith. Rac-TP-103. McLean, Va.: Jan. 1964.

(A technical paper in the field of Operations Research showing imagination and ingenuity. It was of great value to this study.)

19. Rics, John C. The Management of Defense. Baltimore: The John Hopkins Press, 1964. (UA23 R51)

(An excellent history and analysis of the organization and control of the US Armed Services which condemns the hierarchial decision structure and advocated a committee approach to decision making in which the operators will help determine policy.)

20. Rockefeller Brothers Fund, Inc. Special Studies Project. The Mid-Century Challenge to US Foreign Policy. Report of Panel 1. New York: Doubleday, 1958. (JX1416 R58)

(A concise review of the world environment in 1958 and its challenge to the US. Emphasizes the interdependency of the military and other means of obtaining national objectives.)

21. Simon, Herbert A., and others. Public Administration. New York: Alfred A. Knopf, 1950. (JF1351 S5)

(An excellent book on public administration and management, and although 15 years old most of the material is still valid.)

22. Stryker, Perrin. "The Subtleties of Delegation." Fortune Magazine, Mar. 1955.

(An exceptionally fine article of the difficulties of delegating authority to subordinates. Author shows how large industrial companies have nominally decentralized while in fact they remain quite highly centralized.)

23. Systems Development Corporation. An Introduction to Set Theory, by Charles K. Gordon, Jr. Santa Monica: Jul. 1962. (SP-893)

(A very clear, easily understandable, introduction to the mathematics of set theory and its potential in the field of command and control systems.)

24. Taylor, Frederick Winslow. Scientific Management. New York: Harper & Brothers Publishers, 1947. (T38 T4A33)

(This book is divided into three parts: Shop Management; The Principles of Scientific Management; and Testimony Before the Special House Committee. The pages of each part are separately numbered. The book is one of the first on this subject to be published (1911). Taylor's clear, simple style of writing makes it very easy and enjoyable to read.)

25. US Congress. House. Committee on Armed Services. Hearings on Military Posture. 88th Congress, 1st Session. House Report 1963. Washington: US GPO. (UA23.3 A67 1963a)

(Testimony of Robert S. McNamara, The Secretary of Defense, on his basic management philosophy, has been of great value to this study.)

26. US Dept of the Army. Army Regulations 1-24: Administration, Army Management Doctrine. Washington: 21 Nov. 1958.

(Covers general doctrine regarding management and defines management and command.)

27. US Dept of Defense. Armed Services Procurement Regulations. Sec. I, Pt. 7 and 8.

(Indicate procurement procedures with regard to small business, labor surplus and disaster areas.)

28. Webster's New Collegiate Dictionary, 1953.

29. Whyte, William H. The Organization Man. New York: Simon and Schuster, Inc., 1956. (BJ 1581 W 45)

(An interesting sociological study indicting big business for demanding uniformity and conformity in all aspects of executives' lives.)

30. Wiener, Norbert. Cybernetics. New York: John Wiley & Sons, Inc., 1948. (QA 276 W 48)

(A highly technical book on the subject of communications and control in the animal and the machine. It is the philosophy behind the mathematical theory that is of primary interest in this study.)

31. Wiener, Norbert. The Human Use of Human Beings. New York: Doubleday, 1954. (Q181 W65 1954)

(A non-technical book on cybernetics and its relationship to society which is extremely interesting and readable. The concept of entropy in management systems in the study was extrapoluted from this work.)