A Concept of Organization and Management

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A CONCEPT OF ORGANIZATION AND MANAGEMENT

by

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Chairman

Professor J. Wayne Deegan

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1954
PREFACE

Every activity in which one engages has an objective and a stimulus. This activity had its inspiration in a book, The Functions of the Executive by Chester I. Barnard, which came by chance to the author’s attention many years ago. It redirected and stimulated my thinking with the result that I am responding to the challenge in the preface of Barnard’s book by attempting this dissertation. The statement of challenge is: "Moreover, this treatment is incomplete and unfinished in many respects; many years and many men would be required, I think, to complete or finish such a study." I hope, not to complete such a study, but only to advance the knowledge of management another step along the way.

In this treatise, I am attempting to accomplish three things:

1. The construction of useful concepts of organization and management.

2. The creation of a vocabulary of words with extensional meanings.

3. The reduction of the complex art of management to a relatively few fundamentals to facilitate their application.

Experience is most useful if the knowledge gained assists in coping with problems in the future. Experience is most easily
transformed into knowledge if there exists a concept or a frame of reference into which observations may be fitted. We learn by experience, but only when the experience is properly interpreted. In management, the lack of a philosophy or a conceptual scheme to which to relate experience, may be the cause of many misinterpreted experiences formulated into principles, slogans, and axioms that simply are not true.

It is my aim to present concepts of organization and management that will be useful to students and practitioners of management. In presenting these concepts, the first obstacle to overcome is one of vocabulary and meaning. Many techniques and processes of management cannot be expressed in numerical terms, and thus, it is all the more important that they be expressed in words that will convey the knowledge or ideas from one to another without excessive loss or distortion. I have tried to forge some linguistic tools in the form of rather rigid definitions of many of the common terms in organization and management. These definitions are in terms of activities that can be perceived by other senses. Unfortunately, many words have more than one meaning. For example, the word "management" may be used to describe persons who perform certain functions in an organization. It may also be used to describe certain activities performed in an organization. It is in this latter sense that I employ the word
and the principle of using words in the sense defined has been fol-
lowed throughout.

It is difficult to report simply on a subject of great complexi-
ty. The style of writing used in the following chapters may be con-
sidered by some to be unnecessarily difficult. However, the subject
of organization and management may be as difficult as advanced mathema-
tics. It is seldom possible to write simply about advanced mathema-
tics. One must study a mathematics book and become familiar with the
symbols and their definitions before understanding and the ability to
use the knowledge is achieved. It appears that many expect a treatise
on mathematics to be difficult, but one on management to be simple. If
the two subjects are equally complex, the difficulties of expression
are probably similar, and study will be necessary to understand either.

Management is an extremely complex activity which is, and must be,
practiced by many who have neither the inclination, time, or ability
for lengthy study. Management is a dynamic activity where action
must be taken without delay — contemplative study or reference to
elaborate guides is not possible in meeting the day-to-day problems.
To be useful to the practitioner, the conceptual framework must be
reduced to a relatively few fundamentals. The relationships must be
clearly indicated so that a manager faced with a problem may fit it
to his conceptual framework to find an adequate answer. To indicate
the relationships between various facets of any problem of manage-
ment and the three fundamental essentials of an organization, it has
been necessary to frequently repeat the essentials of an organization.
It is hoped that by repetition, probably to the point of redundancy,
the reader will grasp the concept of the essentials of an organiza-
tion and the activity of managing and know them so well that their
use and application to practical problems is readily possible.

Industry is concerned with effective industrial management and
the desired concepts should be oriented toward industrial organiza-
tions and, if possible, be constructed from ordinary industrial ex-
periences. However, it is not necessary, if indeed possible, to draw
all management experiences from industrial situations. It seems pro-
bable that the ability to do critical thinking in industrial situa-
tions may be improved by giving attention first to the process in
ideal situations. Thus, I have tried to avoid the introduction of
the complexities of the giant corporations and have tried to draw
experiences and apply the concepts to less distracting situations.
The methodology is applicable to any organization but is probably
best learned in a smaller sphere.
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Chapter I

INTRODUCTION

The satisfaction of most of one's wants is accomplished through cooperative association with others in organization. This appears to have been true throughout history for the difficulties man encounters in coping with his environment to satisfy his needs for the bare essentials of food, clothing, and shelter are so great that it does not seem possible that a human being can long survive alone. Certainly, the survival of the race is dependent on the cooperative organization of the family.

Today, our society is infinitely more complex than that of our forefathers and we are interdependent for the satisfaction of practically all of our wants. Essentially, one's whole life is spent within the scope of organized effort, in such organizations as the family, club, church, and government, as well as the industrial or business enterprise in which one earns his livelihood. Everyone is a member of a large number of organizations. It is through these organizations that we obtain most of life's satisfactions. Organizations are basic units of any society and the means by which the society survives and prospers.

The Effectiveness of Organization is Dependent on the Skill of Managers:

The effectiveness of organization in satisfying one's needs or wants is dependent upon the efficiency by which the contributors to the organization are able to coordinate their activities. The efficiency
of coordination is largely dependent upon the adequacy of managers and their skill in managing. Therefore, all of us in most all aspects of our lives are dependent upon this most vital activity, managing. It is a complex activity which may be more difficult to skillfully perform than it is to define and describe, and it is indeed very difficult to define and describe. The failure of organized effort is common and success in maintaining an organization for even a short span of fifty years is comparatively rare. Business failures commonly occur at the rate of 150 per week. Divorces, which are failures of the family organization, average over 7,000 per week.

The need for greater skill in managing has seemingly increased in some ratio, probably exponential, as the number, size, and scope of organizations has increased. The managerial skill possessed by our forefathers which was adequate in their time would probably be inadequate in ours. The very complexity of our society, based as it is on a rapidly developing science, has encouraged if not demanded specialization of efforts by its members. Specialization of effort is so prevalent that extremely few, if any, are able to be self-sufficient in any of the prime physical necessities of life - food, clothing, and shelter. It is surprising that the activity of managing which is so vital to the well-being and probably the survival of our civilization has, until very recently, received so little critical attention and study. For centuries it appears that it was believed that the skill of management was somehow derived from the
ownership of land or other tools of production. This belief is not entirely dead. Hereditary managerial positions still exist, not only in certain forms of government, but in many business and industrial enterprises.

The ability to cooperate on an international scale through world government or a world organization is dependent not so much on the ability to frame a scheme of organization with positions, titles, officers, and a constitution or charter, as upon managerial skills necessary to enlist cooperation of those that are essential to the world organization, and to coordinate and control the actions of the participants. It appears doubtful that there is either sufficient knowledge of the management activity or managers with requisite skills to insure the survivorship of so vast an organization.

The success of civic clubs in attaining fellowship and civic improvement is largely dependent on those who are charged with the management function and their ability to obtain the necessary cooperation from the members and their skill in coordinating the members' activities. Even the stability and happiness of the family is largely dependent upon the skill of the parents as managers of their children. The rearing of children is not commonly thought of as a managing function, but any father or mother will attest to the difficulty and complexity of the task. The activity of managing is pervasive and being so, it has somehow tended, until very recently, to escape our attention and study, particularly in areas outside of the industrial enterprise.
The Contributions of the Sciences

Within the past fifty years, both the physical and the social sciences have made substantial contributions to some aspect of the activity of managing. Unfortunately, discoveries and developments in the various fields of knowledge frequently have been fragmentary and unrelated. A vast array of specialized techniques has grown up, and without the necessary theoretical framework to encompass them and indicate relationships, the tendency in the colleges has been to teach each separately and independent of others. The "technique" subjects have been taught for years. It is only recently that the subject of management itself has been taught, and then frequently under the guise of human relations. Principally from industrial engineering have come the highly developed techniques of methods analysis, time study, production planning and control, statistical quality control, wage incentives, job evaluation, production and manufacturing processes, tool engineering, predetermined time standards, materials control, and other coordinating and control techniques. In the field of psychology, a whole new sub-division called industrial psychology has developed from the use of psychological testing techniques in the selection of industrial employees. The field of industrial psychology has broadened to include extensive studies in motivation and other areas. Sociologists, such as Elton Mayo, F. J. Roethlisberger, and others, have turned their attention to industry and from their research and writing, a new body of knowledge sometimes called industrial sociology has
emerged. And of course, all are familiar with the important techniques of cost accounting, advertising, market analysis, and others that were developed in the field of business administration. To the above can be added other techniques, such as industrial training, which have borrowed from all sciences and developed rather independently. Heaped upon this can be added the lore, compiled from the interpretations of experiences and imagination and passed on in the form of slogans and admonitions - first by word of mouth, but now, unfortunately, in some books on human relations, supervision, human engineering, and kindred subjects. The lore, because it is true at most only in part, may have been more of a detriment than an aid to the development of a useful concept of management.

The techniques of management as they were developed, found ready acceptance and wide application. They are useful and valuable, although the gains in the area of their application may in part or in whole be off-set by losses in other areas. For example, the gain from the minute sub-division of work in some industries may be off-set by a loss in worker morale as indicated by absenteeism, high turnover, strikes, voluntary restriction of output, and other forms of industrial unrest. Nevertheless, through the application of these many techniques, coordination of vast numbers of people in an organization has been attained and control of the industrial enterprise achieved.
It is unfortunate that the development of the various techniques has not been uniform. The relationship of one technique to another has not always been understood and a true pooling of knowledge has not always been achieved. For example, if the methods of introducing change had been developed by industrial psychologists simultaneously with the development of motion and time study, the latter may have achieved much greater results.

To the student of management or the beginning practitioner, there appears to be a baffling array of techniques and procedures to be learned and mastered. Each technique is apparently designed to control a specific factor in the management process and is in many instances unrelated to all other techniques. Dependent upon his major field of study or experience, the student tends to view the management process as essentially legal, fiscal, accounting, marketing, or engineering and production. The emphasis appears to be on a technique or techniques, not on an integrated concept of the process as a whole.

The Need for a Unifying Concept: Before management can be properly studied a unifying concept is needed that relates and ties together the separate techniques and fragmentary knowledge. Managers need a conceptual scheme that relates the contributions of the various disciplines in a well ordered and organized manner. What is needed is an integrated exposition of management analogous to a map; a map so drawn that no matter where a person is, he can find his position on the map quickly by noting a few surrounding landmarks; a map on which
the main routes and the areas they connect are so clearly delineated that the relationships between the areas are readily apparent. Furthermore, the map should be so drawn that as each area is neared, it is revealed in sufficient detail that one may find his way about in that particular area with certainty. And the map must use a set of symbols and words, the meaning of which has been carefully defined so that all who use the map can understand it.

The Development and State of Management:

The development of knowledge of the management process may be compared to the development of knowledge of the physical sciences of mathematics and physics beginning at the time of Aristotle in ancient Greece about 350 B.C. The ancient Greeks, although skilled in the arts, notably sculpturing and architecture, did not achieve a comparable skill in the sciences, particularly physics. Their proficiency in sculpture was probably the equal of today's, but their proficiency in physics appears not comparable to ours because they didn't know the methods of science. Many believed that knowledge came from an "authority," a seer, prophet, or soothsayer, or the occult professional scholar, sometimes religious, who obtained his knowledge from the gods, or the hermit who went off into the mountains to meditate and possibly grow a distinguishing beard and there gained knowledge that was believed to be superior to all others. This was the age of meta-physics. It was the age of the common belief that the world was flat and as long as that belief persisted, it was not
possible to think as Columbus did some eighteen hundred years later that he might reach the East Indies by sailing west. Beliefs similar to the one of the flat world exist in our knowledge of management, and they are just as incorrect and they block progress to truth just as much. In some books on supervision, beliefs originated by the modern soothsayer in human relations and management are being passed on in the form of slogans and cliches, preventing or hindering the development of more useful knowledge.

In the physical sciences, the soothsayer and prophet with their erroneous beliefs, began to fall from power when, in the seventeenth century, Galileo climbed the Leaning Tower of Pisa and dropped the stones. This was a particularly important era. Galileo demonstrated by this experiment and through observations of the heavenly bodies with one of the first telescopes, that knowledge did not come from contemplation or "authorities" but from experimentation. Francis Bacon, a contemporary of Galileo, said this of knowledge: "Man can do and understand so much, and so much only, as he has observed in fact--of the course of nature; beyond this, he neither knows anything nor can do anything. First of all, we must prepare a natural and experimental history sufficient and good; and this is the foundation of all."^1

The democratization of scientific knowledge took the privilege of knowing away from the few and gave it to everyone who would take the trouble to observe and interpret experiences. The importance of this new concept of the source of knowledge can be partially appraised by looking back at the erroneous belief that the world was flat. As long as the concept of the authoritarian source of knowledge persisted, the experience of thousands of people who in that period had stood on the shore of the sea and watched a sailboat approaching them with first the tip of the mast, then the top of the sail, the full sail, and finally the hull of the boat coming into view, did not provide them with useful knowledge. With the concept of Bacon, everyone could in a sense be a scientist and the results of that concept are everywhere evident.

Experimental State of Management; In the field of management, the scientifically guided experimental stage has just begun. Progress in this field is now similar to the progress in the field of physics of the seventeenth century or it might be said that progress in management lags the physical sciences by 300 years. The beginning of experimental stage of management dates back to the first experiments of Frederick W. Taylor, who is called the father of scientific management, on the art of cutting metals at the turn of the century. He first enunciated the principle of experimentation to develop a science for each element of a man's work. Taylor's four new duties of managers practicing scientific management are:
First, they develop a science for each element of a man's work, which replaces the old rule-of-thumb method.

Second, they scientifically select and then train, teach, and develop the workman, whereas in the past he chose his own work and trained himself the best he could.

Third, they heartily cooperate with the men so as to insure all of the work being done in accordance with the principles of the science which has been developed.

Fourth, there is an almost equal division of the work and the responsibility between the management and the workmen. The management takes over all the work for which they are better fitted than the workmen, while in the past almost all of the work and the greater part of the responsibility were thrown upon the men.\(^1\)

Taylor, in his writings, stressed the experimental or scientific method of management and his methods were used by his followers such as Gantt, Gilbreth, and Emerson. Thus only in the past fifty years has the method of science been applied to the management activity. Today, many experiments have been performed by men trained not only in the engineering and allied technical disciplines, but by sociologists, psychologists, cultural anthropologists, political scientists and others. They and their experiments have revealed much useful

knowledge, but as were the experiments of Galileo and his contemporaries, the knowledge is not well organized.

It was Issac Newton, who, a hundred years after Galileo, assembled the fragmentary and scattered knowledge of physics painstakingly gathered from experiments and gave the world the Newtonian concept of physics by mathematically stating the relationship of mass, force, and velocity. The laws of his mechanics seek to explain and relate physical phenomena by a few general principles. Newton's was the unifying concept that concentrated his description of the universe into four sentences.¹

This was a contribution of the greatest importance. The experimental knowledge now fell into a pattern, and most important, it allowed predictions of the future to be made with a high degree of certainty. Astronomers could predict the positions of the planets at any given time in the next several centuries. Scientific progress was immeasurably accelerated, for the Newtonian concept was the means of integrating knowledge of the physical universe. It was particularly useful because only a few general principles had to be mastered to understand an entire field of knowledge. Upon this unifying concept has been built the field of engineering.

Such a concept or conceptual scheme is needed in management. Experimental knowledge is rapidly accumulating - it must be related. Management must be viewed as a whole process, not as separate techniques drawn from such diverse fields as accounting, statistics, psychology, sociology, and industrial engineering. The conceptual scheme must be based on a relatively few general principles if it is to be widely applicable. And to be useful, it must make possible predictions of the future if not with the certainty of physics, then within some limits of variation.

The Emergence of a Concept: The rough outline of such a concept in management is emerging. It seeks to relate knowledge, to view management as a whole, and is based on a few general principles. Unfortunately predictions cannot be made with certainty for the concept is not yet quantitative although it may eventually become so, at least in some aspects.

The concept of organization and management which has been slowly emerging was first delineated by Chester I. Barnard in his pioneering book, *The Functions of the Executive.* Many others since 1938 have added to his conceptual scheme. It is the goal of this dissertation to further delineate and expand on this concept of organization and management with the hope that progress may follow the eventual delineation of a good conceptual scheme with the same rapidity that progress followed the statement of Newtonian physics.
The Need for Definitions:

Newton expressed his general principles in the language of mathematics and thereby achieved accuracy of prediction. The general principles of a concept of management cannot at this time be stated quantitatively in the language of mathematics, but only in language of words. The accuracy of prediction can never be greater than the precision in which the principles are stated. Thus, a common language and nomenclature is essential. The objective should be to give words a concreteness equivalent to numbers and this can only be achieved by definitions of words that are in terms of things that can be verified by the senses.

Definitions are most useful if in words of lower levels of abstraction than the word defined, and the definition must not merely use alternative words in the same or higher levels of abstraction. It is of little use to define democracy as the "preservation of human rights" for the definition has merely substituted one verbal symbol for another without informing. Linguistic symbols, to be most completely understood, must be capable of sensory perception. It is only through the careful construction of a language of management that a concept of management can be useful in guiding actions.

A useful conceptual scheme must have universal application. Newtonian physics is as applicable to preduction of the position of planets as to the preduction of the impact force of a baseball falling into the hands of an outfielder. Problems of management exist not
only in business and industry, but in all associations of human beings whether in work or play and the same general principles must be applicable to all cooperative associations.

**The Manner of Presentation**

In the chapters which follow, a conceptual scheme of organization and management will be developed. This exposition is based on the assumption that each problem of management is unique, that it has never occurred before and that it will never occur again. The differences between succeeding management problems may be slight, but they are nevertheless significant and preclude any solution based solely on experience. Because the management activity is concerned with the motivation and coordination of people, and because each person is different and the same person is different at different times, it is obvious that problems of management can never be exactly the same. For example, the exact method and words appropriate to admonish one employee for inadequate performance are not expected to be equally appropriate for another employee for a similar offense. One person may understand and react favorably to a comment such as "get the lead out of your feet" and another may not, but might react favorably to a comment such as "your production is less than Joe Brown's."

The assumption that the problems of stimulating and coordinating people are always different and unique greatly influences the material presented and the manner of presentation. The difference in
this presentation from the more usual one can best be described by the two terms, education and training. Education is the process of motivating a person by incentives and persuasion and equipping him with mental and physical skills to solve problems. Education is teaching how to solve problems; its aim is not to teach the solution to problems. Training, on the other hand, is practice and repetition in the solution of a specific problem or the mastery of solutions of problems. Training is teaching the answer; its aim is to provide ready answers to known problems and is only effective in situations where identical problems are frequently repeated.

Thus, the educational or problem solving approach is necessary in the field of management and the training approach as it pertains to problems involving people has extremely limited application. Slogans or axioms will not be used in this exposition as they are rarely efficacious. Statements, which are common in the literature, such as "authority must equal responsibility" are at the best meaningless and at the worst misleading. It is probably not what is not known that complicates the solution of management problems; it is what has been stated that just isn't true.

This dissertation is concerned with explaining and defining a concept. Its usefulness can be compared to the physician who has no specific remedies for sickness in general, but he does have a
simple useful way of thinking about the physical organism. He sees the organism as parts which are interrelated and interdependent. Specific remedies are not one of the aims of this exposition, only the whole organism and its interrelated parts. This is not a dissertation on how to manage, it is an explanation of the managing process.

In the remainder of this chapter, most of the important concepts will be mentioned but not fully developed or described. Full descriptions will follow in later chapters. It is hoped that by briefly presenting some of the important concepts in this chapter, the explanations of each of these concepts in later chapters will be more understandable. The remainder of this chapter is a brief review of what is to come, the relationship of the concepts is established but not supported.

In the chapters that follow, the activity of management will be derived from the needs of organization. Management is the activity of maintaining the system of coordination of human activities known as an organization. Management is not imposed on the organization, it is a response to the demands of those contributing to the organization as an essential means to assist them in achieving their purposes.

\footnote{Roethlisberger, F. J. Management and Morale, p. 191. Cambridge, Harvard University Press, 1941.}
Why Organizations are Formed: Organizations are formed to achieve ends that cannot be achieved as efficiently or effectively by an individual. An individual joins with others because by so doing he hopes to attain something that is unattainable or not as easily attainable by his singular and individual efforts. He refrains from contributing his activities to an organization when it appears to him that the benefits he will receive are less than the burdens imposed or when the same benefits can be obtained with less burden by his individual efforts or from another organization. In some instances, it may appear at first glance that an organization is less efficient than individual efforts. For example, one man can play around a golf course faster alone than by playing in a foursome. If speed were the only measure of benefits, undoubtedly there would be few if any foursomes. But some of the incentives derived from the resultant of the organization of the foursome are companionship and fellowship which can not be achieved by the lone player. In all organizations, the desire of men for continuous and intimate association with others in work is one of the strongest human desires and thus, association is one of the primary benefits of work. It seems that man works better when stimulated by example and discussion of fellow workers. He profits by suggestions, comparison and emulation.

At all moments, man has the alternative of contributing his activities to a wide range of organizations or of withholding them from
organized effort entirely. The choice of the alternative may not be a process of conscious reflection and weighing of the burdens deemed to be imposed against the expected benefits to be received, but the possibility always exists. At nearly all times, managers of organizations need the efforts of more men, if not as members, then as customers. Therefore, they seek and attempt to induce more men to contribute efforts in some way to their organization.

It is necessary to note that in this exposition, men are held to be masters of their destinies at least insofar as freedom of choice of joining or not joining an organization. Thus, persons are considered to cooperate with others as a means of achieving ends they desire.

**Definition of Terms**

The language of human relations lacks much of being precise. Many commonly used terms are often subject to a wide variation of interpretation. For use in this exposition, a number of terms will be defined and described in some detail. Defined terms will be used hereafter as defined except in situations where confusion is unlikely to result. Prior to this the term organization has been used in its usual sense. However, it will be necessary to differentiate between different kinds of organizations and the term will be defined and then used only in its defined sense.

**Benefits, Burdens, and Satisfaction** In this dissertation, persons are considered to be continually seeking to satisfy their wants
or to relieve tensions. Anything that a contributor believes will satisfy his wants or is an obstacle to satisfying his wants is an incentive. Obstacles to satisfying wants are generally called negative incentives. Incentives are physical. When they are subjectively evaluated by the contributor, they are considered as benefits if the incentive is considered to be want-satisfying or as burdens if considered to be obstacles to want satisfaction. For example, physical exercise may be either a benefit or a burden, play or work depending upon the contributor's personal purpose. Some people play golf for the benefit of the physical exercise while the professional golfer probably considers the physical exercise a burden.

Any attempt to gain benefits is always made at the expense of suffering burdens. An individual's subjective consideration of an incentive will lead to an evaluation of the benefits and the burdens and the determination of the net satisfaction to him. The satisfactions are the difference between benefits and burdens. The relationship between benefits, burdens and satisfactions may be expressed thus:

\[ \text{Benefits} - \text{Burdens} = \text{Satisfactions}. \]

**Cooperation and Coordination:** The terms cooperation and coordination appear frequently in discussions of management. As will be apparent later, they embody two essentials of organized effort; namely, the willingness of a person to contribute acts, and the ordered integration of human activities.
Cooperation is the contributing of personal acts to a unit organization. Cooperation is a tangible expression of willingness to participate in organized or joint effort with others. The personal acts that are contributed consist of muscular forces, that is physical forces. Thus cooperation is manifested by physical forces and is discernable by an observer through his senses. As used here, cooperation is more than a mere willingness to serve. It is willingness brought to fruition in an act, where the act is a concrete attempt to aid in achieving the resultant of the unit organization to which it is contributed. Cooperation results when a potential contributor of acts concludes that acts contributed by him will gain him greater benefits than burdens.

Coordination is the contributing of personal acts to a unit organization that are appropriate as to kind, time, place, and manner to augment the acts of others in the achievement of an end.

Coordination is concerned with the appropriateness of the physical activities of one person in relation to the activities of others in the achievement of a goal. For example, in football the aim of the team with the ball is to make a touchdown. One way to do so is for one teammate to pass the ball to another. The essence of the coordination in this example is the appropriateness of the relationships of physical acts of the two players to the accomplishment of the desired end. The desired degree of coordination is often difficult to achieve and
the subject of much attention in industry as for example in the scheduling of production. Cooperation is a forerunner of coordination. But no matter how willing contributors may be to coordinate their acts, willingness alone will not achieve this end. Their acts must be objectively adequate. Thus, a dominant characteristic of cooperation is willingness, the motivation behind an act. And the dominant characteristic of coordination is the objective fitness of the acts of one person in relation to those of others in the achievement of an end.

**Unit Organization:** The term organization commonly denotes an association of some kind. The General Electric Company, the Center City Rotary Club, and the Jones family are commonly considered to be organizations by virtue of being associations of people. But, associations of machines parts, ideas, insects and animals, and of course, biological parts, also are sometimes considered to be organizations. In this dissertation, the meaning of the word unit organization will be used to designate as association of acts of people. This meaning corresponds to Barnard's definition of formal organization which may be stated as follows:

> A unit organization is a system of consciously coordinated activities of two or more persons.

---

This definition will be implied whenever the term unit organization is used henceforth. As defined, a unit organization is a concrete entity whose constituent human acts are observable through the senses. Physical forces do not partake of the characteristics of their sources. A fifty pound force applied to a rope by Mr. A in anger does not differ from a fifty pound force applied to a rope by Mr. B, whatever his mood. Limiting the meaning of unit organization to an association of human acts permits the phenomena and consequences of coordinated acts to be the subject of study unobscured by the idiosyncracies and motivation of the people who perform the acts. The relationship of people to unit organization as defined then becomes a subject for independent study. It is believed that this separation simplifies the presentation and understanding of the problems of managers.

This definition expressly includes the concept of coordination and through the words "consciously" and "acts of two or more people" implies the concept of cooperation.

When two or more unit organizations are in a system of cooperation, it will be called an organization and is defined as follows:

An organization is a coordinated system of unit organizations.

It will frequently be desirable to identify particular organizations, such as industrial organizations, civic and social organizations; and in some cases to identify particular organizations such as the General Motors Company, the Rotary Club and the Y.M.C.A.
Contributors: Since the sources of the acts that constitute a unit organization are always persons and because they must often be considered, it will be convenient to have a broad inclusive name for them. A person who supplies acts to a unit organization will be called a contributor which term is defined as follows:

"A contributor is a person who supplies acts (personal physical forces) to a unit organization."

An industrial enterprise may consist of the activities of a wide range of persons. First to come to mind usually are owners, managers, and employees. But an industrial enterprise also needs the activities of customers, suppliers of materials and equipment, as well as the government. Owners contribute activities that make money and property available, managers contribute directions, employees contribute effort, customers exchange money for products, suppliers exchange materials and equipment for money and representatives of the government collect taxes in exchange for the "common defense and the general welfare." They are all contributors.

It will be necessary in many instances to classify contributors into operative contributors and coordinative contributors.

"A person when supplying acts that are coordinated is an operative contributor.

A person when supplying acts that coordinate the acts of the operative contributors is a coordinative contributor."
Coordinative contributors in industry and business are known by such names as managers, administrators, supervisors, foremen, executives, salesmen, purchasing agents, and so forth. A contributor is considered to be a coordinative contributor only when he is directly engaged in the activity of bringing about the coordination of the acts of other contributors as when he communicates. The term manager will be used frequently to signify coordinative contributors.

Operative contributors are known in industrial and business organizations by such names as workmen, machinists, clerks, typists, artists, and truck drivers. Their energies are directed to the alteration of the physical environment in organizations.

**Resultant of Cooperation**: The physical forces of operative contributors act upon and alter some segment of the physical environment. The alteration of the physical environment by the physical forces of a unit organization is termed a resultant and is defined as follows:

A resultant is an alteration of the physical environment brought about during any specified period of time or by any specified sequence of physical forces of a unit organization or a complex of unit organizations that may be designated.

The alteration of the environment that constitutes a resultant may in turn constitute a utility that is capable of satisfying human wants. The utility of a resultant can be distributed as incentives to the contributors. The incentives are considered as benefits that satisfy contributors.
In addition to the sought resultant, there is always some incidental alteration of the physical environment that may or may not be desired. For example, in assisting in the task of lifting a box, a contributor may compress the soil under his feet or generate heat in his muscles. Such incidental environmental alterations may have utility for the contributor to whom it occurs or to anyone who may perceive them. The athlete often gets great satisfaction from his own muscular action, and the observable play of his muscles may be a source of satisfaction to spectators.

Each person who contributes acts to a unit organization does so because he believes that by so doing, the benefits he derives will exceed the burdens entailed, and thus result in a net satisfaction. The benefits that each of several contributors to a unit organization may receive may vary widely. For example, consider a foursome of golf made of Mr. A, Mr. B, Mr. C, and Mr. D. A partial statement of benefits that each received from a round of play might be as follows:

Mr. A gained relaxation and an enormous appetite for dinner, in addition to enjoying the camaraderie of his fellow players.

Mr. B was most pleased by becoming acquainted with Mr. C.

Mr. C gained respite from the cares of his office and was pleased because he noticed that playing had reduced the soreness in a previously sprained wrist.

Mr. D was most pleased by the fact that he felt he had acquired the knack of putting during the round.
All of the benefits expected to be gained are the incentives derived from the resultant. Since the activities of contributors usually precede the receipt of benefits, such adjectives as expected, prospective, or anticipated may be used in conjunction with the terms benefits, satisfactions, or incentives.

In the same way, the resultant of the activities is not certainly known until after the activities have been performed.

**Essentials of Unit Organization:**

From the definition of a unit organization as a system of consciously coordinated activities or forces of two or more persons, the minimum conditions for the existence of a unit organization may be inferred. Coordination of activities is meaningless unless they are coordinated to attain an end. People will not contribute activities toward the achievement of ends which do not result in a net benefit to them. It follows that a prospective resultant of cooperation must be known and acceptable to the contributors before they will cooperate. The resultant may not be achieved, but at the time of cooperation, a resultant must be contemplated and its net benefits must be anticipated by the contributors. In organizations beyond the very simplest and certainly in all industries, there is a whole hierarchy of resultants of coordinated activities. For example, men coordinate their activities so that a ditch is dug; a ditch is dug to pour a foundation; a foundation is poured to build a factory; and a factory is
built to produce automobiles. Certainly the first product of cooperation, the ditch in the example above, must be known by the diggers even though they may question its desirability, so that they may effectively coordinate their efforts. Thus, one of the essentials of a unit organization is a known and agreed upon prospective resultant of cooperation.

The activities that are consciously coordinated in a unit organization must be contributed by people. Though a unit organization is impersonal, persons must be induced to contribute needed physical acts to it. Inducements in the form of incentives of some kind must always be present. Some incentives are tangible and material, others intangible; some are positive, others are negative or coercive. The incentives to contribute may be in the form of benefits, or they may reduce present burdens. Incentives in one form or another must be available in sufficient quantities to induce a potential contributor to perform the needed physical acts. Thus, a second essential of a unit organization is a recognition of incentives by contributors that induce them to contribute needed acts.

The coordination of activities is accomplished when the separate physical acts are contributed at the "right" time, place, and manner. The contributors may perceive needed appropriate acts through any of their senses, but usually by means of hearing oral communications, by seeing written communications, or by hearing or seeing the activities of other contributors and environmental factors. In any case,
information relating to the kind of activity and the time, place, and manner of delivery must reach the potential contributor so that he will act appropriately to achieve the contemplated resultant.

The third essential of a unit organization is the perception of the acts needed to achieve the prospective resultant of cooperation.

Summary of Essentials of a Unit Organization:

A unit organization comes into being and endures when two or more persons;

1. Know and agree upon a prospective resultant of cooperation.
2. Recognize incentives that induce the contribution of activities.
3. Perceive the acts needed to achieve the prospective resultant.

An intimate knowledge of these three essentials of a unit organization, (1) known resultant, (2) recognition of incentives, and (3) perception of acts, is basic to understanding the activity of managing. As all discussions of managing will be derived from one or more of these three essentials of organization, they will be frequently repeated in the following chapters. It is hoped that this repetition will serve to fix them in the readers mind so thoroughly that recall will be effortless and application of the essentials to practical problems almost automatic.

The three essentials of a unit organization enumerated above are in essence a restatement of those advanced by Barnard in the statement,
An organization comes into being when, (1) there are persons able to communicate with each other, (2) who are willing to contribute action, and (3) to accomplish a common purpose.®^1

The essentials of a unit organization as advanced by the author are believed to facilitate discussion and understanding of organization and management.

The Activity of Managing:

Managing is a physical activity, a part of the system of activities of a unit organization. It is a communicative activity whose purpose is to initiate or maintain the system of coordinated activities. The activity of managing consists of communicating to aid operative contributors to know and agree upon a prospective resultant of cooperation, to recognize incentives that induce them to contribute acts, and to perceive the acts needed to achieve the prospective resultant. A manager communicates to the contributors whose activities he coordinates. He communicates about the resultant of the activities of these contributors and the relationship of the resultant to the resultants of other unit organizations, particularly within the industrial enterprise. The manager communicates about the incentives, their source, and their ability to satisfy contributors, and he

®^1 Barnard, Chester I. The Functions of the Executive, p.82. Cambridge, Harvard University Press, 1938.
communicates about the physical, biological, and social environment that aids the contributor to perceive the kind of activities needed at the right time, place, and manner.

The activity of managing does not directly become a part of the resultant of cooperation; it is an activity that serves much as a catalyst serves two chemicals. It stimulates the reaction without necessarily becoming a part of the product. A manager may be compared to the driver of a car. He only guides or steers the automobile, he doesn't provide the power. Managing activities are always directed toward the operative contributors of activities; never directly toward the resultant of the activities.

**Schematic Organization**

The industrial and business organizations exist because a prospective resultant of the activities of the contributors is known to them; because the resultant, when returned directly or indirectly to the contributors as incentives, is recognized by them as overbalancing the burdens of contributing activities; and because the contributors can perceive directly and indirectly the particular activities needed at the right time, place, and manner. Schematically, this may be presented as follows.
Contributors are induced to perform activities they believe are needed which become an integral part of the resultant. The resultants of cooperation are the source of the incentives which are received by the contributors in exchange for their activities.

A unit organization is a means of exchanging activities for incentives or for exchanging utilities, and the function of managers is to maintain this process of exchange indefinitely.

The remainder of this dissertation is devoted to an elaboration of the concepts presented in this introduction with special emphasis on the activity of managing.
Chapter II
DEFINITION AND ECONOMY OF ORGANIZATION

As previously defined in Chapter I, a **unit organization is a system of consciously coordinated forces or activities of two or more persons.** This is a fundamental and most important concept, and is basic to this exposition on organization and management. Managers are concerned with the functioning of unit organizations and complexes of unit organizations and achieving desired resultants by means of them. Thus, a clear conception of the fundamental nature of organizations is a necessary forerunner of a discussion of management.

Man finds it desirable in countless situations to cooperate with his fellow men in satisfying his wants. To do so, he coordinates his activities with others in respect to time, place, and manner. The fruitful element is the objective integration of human acts. What is regarded here as a unit organization is a system of appropriate human acts appropriately coordinated to achieve a resultant that satisfies the wants of those who participate in the cooperative venture by contributing acts.

**A Concept of Organization:**

This concept of organization is fundamental and is deemed to be unusually applicable to the cooperative joint efforts of men to satisfy their wants. This concept of organization is believed applicable to all business, industrial, and social associations that have quite definite form and structure and usually, a name. It is applicable
also to more fleeting and less formally structured activities such as are engaged in by a golf foursome, a bridge club, a conversational group at a morning coffee break, a person asking another on the street for directions, two friends exchanging greetings, or in fact, any association of persons in which the physical acts of the persons, including speech, are cooperatively pooled and coordinated to attain an agreed upon resultant.

The number of organizations to which one belongs that have a name and definite form, such as General Motors Corporation, Rotary, Lutheran Church, American Legion, Y.M.C.A., and the State of Oklahoma, is large. The number of cooperative associations having no name or structure, but organizations nonetheless, is countless. Most of our lives are spent within the framework of organizations. The effectiveness of all of these organizations in satisfying our wants determines in large measure our happiness.

A unit organization is considered to exist only when physical activities are being coordinated. For all practical purposes, the Rotary Club can be viewed as dormant except during the few hours it meets each week. The industrial organization is also dormant from quitting time on one day to starting time on the next. Thus unit organizations are spasmodic and exist only when activities are being contributed and coordinated.
Contributors to Organizations: In the strict sense of the definition of unit organization, "members" in the usual interpretation of this word are not a part of a unit organization, but are contributors of the acts to be coordinated. The unit organization is something impersonal and in essence a dynamic combination of human physical forces. The source of human activities or forces is the energy generated by human muscles. Our attention as managers is directed toward people because they are the sole objective source of organizational activities. Management is not the arrangement of things nor is it concerned with things directly, but only indirectly as they are acted upon by people. In the sense of the definition of unit organization used, machines or materials are not managed, for inanimate objects are moved, arranged, and controlled through the cooperative, coordinated forces generated by men.

A person who releases physical muscular energy to a unit organization will be called a contributor, rather than more conventional names such as member or employee. The conventional names have connotations too restrictive for use here. The word "contributor" embraces not only members and employees, but all others whose physical forces are coordinated. The contribution of a contributor, always physical muscular forces, will be called acts, activities, human energy, communication, and other names when they will not confuse. In a strict sense, an individual is a contributor only during the time
that he contributes an activity or force to the unit organization. During even a short interval of one hour, it is possible for one individual to be a contributor to many unit organizations. As contribution of activities is usually intermittent, an organization may be composed of the acts of changing contributors during its existence. Because of the common practice of using the term member or employee to designate a person who is associated with a unit organization, this word may sometimes be used as an alternate for the term contributor. Member or employee will then mean one of a group of persons who supply acts to a unit organization.

The Activities Contributed: The industrial organization, to maintain itself, needs more than the activities of owners who make money and equipment available or the activities of employees, including managers, who process the raw material to produce a product. The activity of the customers of purchasing the final product is also necessary. It is only necessary to look at the advertisements in the daily newspapers to note that the activities of customers are regarded as important to an industrial or business organization. Buying a product is an activity as fundamental to an organization as the activity of an employee or stockholder. Both employees and customers are contributors. The supplier who contributes the activity of delivering necessary raw materials and supplies also contributes an essential activity to the industrial organization. The need for
the activities of suppliers is generally recognized in industrial concerns by the creation of a separate function, the purchasing department, to maintain cooperative relationship between manufacturer and supplier so that the need for the activity of supplying will be met. Thus, the relationship to the unit organization of a wage earner, or of an officer, is the same in principle as that of a customer, or of a person from whom material is being purchased. The common characteristic of the relationship in each case is that needed acts are contributed and coordinated to achieve a resultant.

The activity of managing is solely and exclusively concerned with stimulating and coordinating the physical acts of people. Managing is also a series of physical activities, part of the system of consciously coordinated activities. The movement of body members, including eyes and vocal chords, by contributors, including managers, are the sole substance of a unit organization.

Kinds of Organizations

With these remarks on the components of organization, it is now necessary to proceed to classify organizations in a way useful to this dissertation.

It is apparent that the matrix of society is a countless number of unit organizations intertwined and intermingled in a confusing and interlocking pattern. One system of cooperative activities is part of a larger system and this is part of a still larger system. For
example, one contributes activities to the following governments: precinct, ward, city, township, county, state, and nation. Each is a system of activities within another system. This mass of unit organizations is not independent, but interdependent. The functioning of one is dependent upon, in some degree, the functioning of all other unit organizations. This is apparent in the Standard Oil Company (New Jersey) which is wholly dependent upon its subsidiary companies, and each subsidiary company is dependent upon its component divisions such as production, exploration, and refining. Each division is dependent upon departments and so on and on through the whole structure. The knowledge of interdependence of unit organizations, and particularly the character and strength of the relationship is of great value to managers.

The usual methods of abstracting some characteristics of organizations from all the organizations composing society is not useful for our purpose. Organizations have been classified by type of ownership (single proprietor, partnership, corporation), by product (oil, steel), by number of employees, by assets, by value of products produced and many other criteria.

Our purpose is to classify unit organizations in terms of the means by which the activities contributed are coordinated. The activities of persons in unit organizations may be coordinated in two ways. A contributor, by perceiving the activities of other contributors,
may on the basis of this perception or communication control his activities so that they are coordinated. This type of coordination is called self-coordination. Most of our daily activities within organizations are primarily self-coordinated.

The second method of coordinating activities is by a "recognized" coordinator or manager. The contributors of the activities recognize someone as being the coordinator and accept his communications or orders as controlling or governing the activities they contribute. Managerially coordinated activities are a small but extremely important part of our total daily physical acts.

Kinds of Unit Organizations Illustrated:

For purposes of analysis and understanding of everyday organizations, it is useful to classify all unit organizations into either formal unit organizations or informal unit organizations. These will be illustrated by the example below and then each will be defined.

Suppose that three blindfolded men are seated around a table at intervals of about 120° as in Figure 2. Each person is asked to grasp one end of a cord whose other end is attached to a plummet resting near the center of the table and near an open container. Consider that the three blindfolded men and a fourth person, termed a coordinator (manager), not blindfolded and standing near the table, are to move the plummet into the container. This resultant can be accomplished by the three blindfolded men if they can coordinate their actions so
that the tension placed on each cord in successive moments is such that the plummet is transported to a position over the container and then lowered.

Figure 28: Blindfolded contributors of activities constituting a formal unit organization.
First assume that the coordinator is "recognized" by the blindfolded men; that is to say, they will accept the coordinator's directions as controlling their actions. Next, assume that the coordinator observes the situation in successive moments and communicates directions that enable the blindfolded men to coordinate their acts to move the plummet into the container. In this illustration, there is a coordinator whose directions are acted upon by contributors. The coordinator is stimulated by moment to moment observations of the situation and translates the received sight stimuli into communication sound stimuli which are received by the blindfolded men and which control their actions sufficiently well to accomplish the task. The system of coordinated acts of the four men in the above example embraces the essentials of formal unit organization.

If the three men holding the cords are not blindfolded, it is likely that a simple directive similar to "please place the plummet into the container" will be sufficient for them to coordinate the forces applied to the cords for accomplishment of the task.

In this case, the moment to moment positions of the plummet in relation to the container directly stimulates each contributor to supply acts appropriate to the joint effort and a recognized coordinator is unnecessary. In the latter case, where each contributor is guided alone by his own observations of the situation, the system of coordinated acts of the three men constitutes an informal unit organization.
Formal Unit Organization

A formal unit organization is a unit organization in which coordination of the acts of operative contributors is achieved through communication of a recognized coordinative contributor. The formal unit organization is a system of personal acts in continuous coordination. The continuous coordination is achieved, at least in part, by means of communication of a recognized coordinative contributor.

The adjective formal in the term formal unit organization is suggested by the implied selection of a common coordinative contributor by the operative contributors, and their acceptance of his communications as governing their actions. Also in business, industrial, civic, and social associations some supervisory personnel are more or less formally designated as such, and these supervisory personnel are usually found in the roll of coordinative contributors in formal unit organizations more frequently than other contributors.

Activities of a formal unit organization are referred to as being manager-coordinated.

There are countless situations in which close coordination of two or more persons is needed where it is advantageous to have one contributor specialize in the activities of observation and communication of directions. To the extent that complete directives are given by one contributor to enable other contributors to coordinate their acts, the latter are relieved of the necessity of observing and
preceeding the acts each should supply. Also, a coordinative contribu-
tor's communication may relieve operative contributors, in part, of
considering the cooperative prospective resultant and of recognizing
the incentives that they may receive from achievement of the prospective resultant. This often greatly facilitates cooperative effort.

In the example pictured in Figure 2 in which the operative contribu-
tors were blindfolded, it is apparent that they were almost entirely dependent upon the coordinative contributor's communication for maintaining continuous coordination of their acts. The coordinative contributor's acts are as much a part of the organization as are acts of operative contributors although the former do not directly enter into the achievement of the resultant as has been explained previously.

There are, of course, many situations in which the operative contributors depend partially upon their own observations and partially upon that of a coordinative contributor to maintain coordination. The same is true in regard to knowing the resultant of cooperation and to recognizing incentives.

Informal Unit Organizations:

An informal unit organization is a unit organization in which coordination of the acts of operative contributors is achieved through perception of operative contributors.

An informal unit organization is a system of personal acts in continuous coordination. The continuous coordination is achieved
by means of each operative contributor observing the environment, including other contributors, and on the basis of his observation, supplying appropriate acts. Informal unit organizations do not involve either observations or communications of coordinative contributors. Activities of informal organizations are referred to as being self-coordinated.

When the blindfolds had been removed in the example illustrated in Figure 2, the three men were able to coordinate their acts to move the plummet into the container solely on the basis of the independent observations and motivation of each contributor. In other words, the activities of each contributor were self-coordinated.

Observation of organized activity leads to the conclusion that most of the accomplishment of organizations is the resultant of self-coordinated effort. Employers are constantly on the look-out for employees who do not have to be told everything. An objective of the development of proficiency in a person through instruction and practice is often to enable him to coordinate his activities with others on the basis of his own initiative. In this connection, consider the coordination of football players who receive no direction after the ball is snapped. Similarly, many, if not most of the directions given in industry consist largely of telling individuals or teams of workers what objectives they are to attain; the workers are depended upon to self-coordinate their actions as required to achieve the assigned objective.
Some Characteristics of Formal and Informal Unit Organizations

The two basic characteristics of a formal unit organization are that there is continuous coordination of human acts and that continuous coordination is in some measure the result of a coordinative contributor's communication. Because of these basic characteristics, formal unit organizations are often of fleeting duration. A break in the continuity of coordination dissolves a unit organization. Also, formal unit organizations are often transformed into informal unit organizations by cessation of a need for the communication of a coordinative contributor. For example, a formal unit organization is in existence when a foreman is giving a number of men directions to maintain coordination of their activities. But, when the foreman concludes that the men can continue on their own and he ceases to contribute to the original formal unit organization, it ceases to exist, and an informal unit organization consisting of the activities of the remaining men comes into being. Some moments later one of the remaining contributors may take the role of a coordinative contributor and communicate directives accepted by the remaining operative contributors as controlling their activities. Then, the informal unit organization will have become a formal unit organization, but not the original one in the first example.

Except in unit organizations, people do not coordinate their acts from moment to moment one with another. But activities of unit organization may be coordinated one with another, and this is the basis of
the structure of the usual industrial, business, civic, and social organizations which have designated persons to perform certain functions.

Unit organizations are limited in size by the necessity for sufficient perception by contributors to coordinate their acts. Observation leads to the conclusion that relatively few unit organizations involve more than a dozen people. Some examples of large unit organizations are the activities of companies of soldiers on parade, orchestras, and an assembly of people listening to a lecture.

**Complex of Unit Organizations**

Large organizations are aggregations or complexes of changing formal and informal organizations. The usual organization chart designates a few of the more important formal unit organizations that exist or are assumed to exist from time to time. In Figure 3, the president and his vice-presidents are shown. The activities of these persons may from time to time constitute a formal unit organization to which the president is a coordinative contributor and to which each vice-president is an operative contributor. The president and vice-presidents have been ringed to represent the formal unit organization which their activities may form from time to time. But the activities of these officers can be combined to form innumerable other formal and informal unit organizations. Except in unusual circumstances, a communication from the president would be most readily "recognized" as
controlling the acts of the remainder of the group. This amounts to saying that communications of persons found in formalized designated executive positions are more readily acted upon in matters pertaining to coordination, resultants and incentives than those of persons not so situated.

What has been said applies also to any manager and his immediate subordinates. If each manager and his subordinates are ringed, as in Figure 3, to denote formal unit organizations, the latter form a chain-like complex. It is such chain-like complexes that we know as the Westinghouse Company, the American Telephone and Telegraph Company and countless others that evidence the same basic structure.

Everyone in this complex chain of formal unit organizations except those persons on either end, commonly called the top and bottom, are contributors at different instances to at least two formal unit organizations. In one instance, the foreman is the coordinator in the formal unit organization with his workmen, and in another situation, he is one of the operative contributors in the formal unit organization with his coordinative manager, the superintendent. This alternately changing role from coordinative contributor to operative contributor introduces many difficulties in the management process.

In a tenuous way, the chain actually forms a complete circle, for the board of directors is responsible to the owners. And the
Figure 3: Schematic representation to illustrate the usual formal unit organizations that exist or are thought to exist from time to time.
non-supervisory personnel, whatever their title, may be owners by virtue of ownership of company stock, to whom the directors are thus responsible. Certainly, the non-supervisory personnel are a part of the state which sanctioned the corporation and made it a legal entity.

Managers are interested primarily in the formal unit organizations as managing activities are directed towards immediate operative contributors. The president, in supervising the activities of the production employee, does so through intermediate supervisors. Thus, his primary interest is to stimulate and direct the activities of his immediate vice-president of production so that the vice-president of production will produce some physical activity, usually in terms of marks on paper or sound waves, that will stimulate and direct the activities of the next supervisor. He in turn will release communication energy to the next until it reaches the production employee who releases the energy considered essential to the production of the product. A schematic representation of a complex of formal unit is shown in Figure 4.

Suppose that a contemplated resultant of activities of an organization required that weights $W_1$, $W_2$, and $W_3$ be raised and reach line $A A'$ at very nearly the same time. To accomplish this resultant, the superintendent might release energy in the form of a communication directed jointly to Foreman$_1$, Foreman$_2$, and Foreman$_3$, or individually to Foreman$_2$. In either case, the superintendent would be the coordinative contributor of a formal unit organization. Next, Foreman$_2$
Figure 4: \( W_1, W_2, \) and \( W_3 \) are weights which are to be raised to line \( A A' \), at the same time by communication energy expended by the Superintendent, Foreman\(_2\), and other energy applied by Workman\(_1\), Workman\(_2\), and Workman\(_3\) as a consequence of the receipt of communication energy.
might become a coordinative contributor and communicate to Workman₁, Workman₂, and Workman₃ to form a second formal unit organization whose manager-coordinated activities might bring the weights to the desired level at the desired time. It is possible that Foreman₂ need only advise the workman of the result to be attained. In this case, the weights might be brought to the desired level at the desired time by self-coordinated activities, and therefore by an informal unit organization.

It is entirely possible for the superintendent to by-pass or "short-circuit" his subordinate foreman and communicate directly with the workman in the above example. If he does, a new formal unit organization will be formed. This process is generally considered poor practice because it is difficult for others to become acquainted with and properly evaluate capriciously formed formal unit organizations.

**Relationship of Unit Organizations in Complexes of Unit Organizations:**

It has been noted that large organizations consist of an aggregate of formal and informal unit organizations that are continually being formed, transformed, and dissolved. Thus, an inventory of the unit organizations in a complex of unit organizations only can show the unit organizations in existence at a particular moment. It has also been noted that a person may be a contributor to many unit organizations during a single day, sometimes as a coordinative contributor to formal unit
organizations, and at other times as an operative contributor to formal and informal unit organizations.

Figure 5 is a schematic representation of unit organizations existing in an aggregate of unit organizations at two successive instants in history. It is well to recall that whatever cooperation there is in an organization takes place only in unit organizations. The dynamic characteristics of organizations cannot be adequately described by static symbols upon paper. An organization is somewhat analogous to a biological organism. At any instant it is composed of a certain number of cells in a certain relationship. But new cells are constantly being formed and old cells die or are otherwise destroyed, and the biological organism may have more or less cells tomorrow than it had today.

No unit organization ever exists independently. It is part of society and thus a part of a larger system. If the resultant of cooperation is recognized as being symbolically or actually transferred from one unit to another unit, then the two units are generally recognized as being a part of the same complex of organizations. A unit organization may thus be simultaneously a part of several organizations.

Designation of Managers: As has been noted, the usual way to represent a complex of unit organizations is a chart which shows a hierarchy of some of the more important formal unit organizations, each with a manager designated by an appropriate title.
Figure 5: Schematic representation of formal and informal unit organizations in an organization at two successive instants in history.
It seems that some persons are highly motivated to want to assume responsibility for achieving resultants through cooperative effort. Persons so motivated often become coordinative contributors. Their motivation is often quite constant or stable as may be inferred from the fact that certain purposes are pursued by individuals through difficulty for long periods of time. Thus, we find persons whose purpose is to sell more and more of a certain product. Others are assiduously seeking to design a more efficient engine, and still others are imbued with the desire to preserve such symbols of our heritage as Mount Vernon or the Gettysburg Battlefield. The stability of motivations of some persons is undoubtedly a factor in their becoming coordinative contributors.

Because these persons spend more of their time in the activity of a coordinative contributor in a formal unit organization rather than as an operative contributor, they are given a title to designate this more frequent role and are shown in the usual organization chart with connecting lines to the operative contributors to whom they usually communicate.

It should be borne in mind that the usual organization chart shows only some of the more important formal unit organizations that may be active from time to time. When viewing the usual organization chart it is well to recall that a better representation of an organization complex at a given moment would be something like that shown in Figure 6.
Figure 68 Schematic representation of informal and formal unit organizations in existence at a given instant in an organization represented by a schematic organization chart.

Key:

- Formal unit organizations assumed to exist from time to time during an extended period of time.

- Formal unit organization existing at instant number 1.

- Informal unit organization existing at instant number 1.
Informal Unit Organizations are Omitted on Organization Charts.

In the preoccupation with formal unit organizations and the drawing of organization charts, the preparation of management guides, and position or job descriptions, the importance of the informal organizations seems to have been overlooked. Occasionally, it is recognized that all relationships cannot be prescribed in detail, and it is acknowledged that the organization chart and position descriptions do not tell all about the unprescribed and self-coordinated activities that are many times more numerous than the prescribed activities. An organization chart tells very little about how the organization really operates. "Learning the ropes" is an adventure in discovering the important formal unit organizations and particularly the informal unit organizations that are unprescribed on the chart.

In manufacturing and business, the alteration of material by physical forces into products is largely performed in informal unit organizations. Much of the information, particularly about social environment is passed in informal unit organizations. The important unit organizations in achieving the resultant of the complex of formal and informal unit organizations are the informal ones.

However, probably because informal organizations do not have a manager, informal unit organizations are always omitted from organization charts, one of whose features is always a hierarchy of managers. This of course, does not preclude managers using informal unit
organizations to increase the effectiveness of formal unit organizations for, in fact, this is continuously the case whether recognized or not.

In recent years, a number of investigators who have closely studied organizations have very successfully developed a technique for identifying some of the principle informal unit organizations in a specific situation and have suggested graphical means of portraying them.¹

Contributions to Industrial Organizations:

As previously stated, any industrial or business organization is a complex of interdependent formal and informal unit organizations. For purposes of illustration a classification will be made of the contributors to an industrial organization. This classification with modification of detail is applicable to any organization.

In Figure 7 the central circle represents an industrial organization. The arrows directed to the circle represent contributions by the classes of contributors whose activities constitute the organization. Thus, customers are represented as contributing the activity of bringing money; suppliers, goods and equipment; employees, efforts; government, protection and service; and owners, capital.

Figure 7: Schematic representation of contributions to an industrial organization by classes of contributors.
These activities are the input to organization. The contributor has freedom of choice in respect to whether he contributes his activity to this or another organization. When he contributes to one organization, he foregoes the opportunity to contribute that activity at that moment to another organization. Thus, the activity he contributes has value or utility for him. As the evaluation is always in the future and is personal, the magnitude of the utility contributed is always determined by the contributor's subjective evaluation.

Creation of Utilities:

The function of organization is to combine and transform the activities contributed into a resultant and to distribute the resultant in the form of incentives in such a manner that each contributor will receive, in terms of his evaluation, greater utility than he contributed. This means that utilities must be created in the unit organization. Organizations that endure do so because they can pay out greater utility than is paid in to them. That is to say, they provide greater output than they require input.

Some organizations are dissolved because the purposes of their contributors have been met, but many organizations fail because contributors believe the utilities to be contributed are more valuable than the utilities or satisfactions to be obtained. Such organizations have failed in the function to create utilities and instead have destroyed utilities.
The total output of utilities is the sum of the subjectively evaluated satisfactions of all contributors derived from the incentives which are in turn derived from the resultant. The resultant of cooperation is not the algebraic sum of the activities contributed or the sum of the utilities of these activities. It is something new and different, something unique. The incentives derived from the resultant of cooperation are numerous, some are wanted, some are not; some are material, many are non-material; and all are subjectively evaluated. To the contributors, a strong handclasp of friends long separated is evaluated as something more and different than a rapid movement of an arm and the constriction of the muscles in the hand.

In an industrial organization, a material resultant, such as an automobile, may be made which is a unique combination of the activities of all contributors. In accomplishing this resultant, certain satisfactions may have been achieved. The gregarious motives of people may have in part been satisfied, some employees may have a feeling of worthwhile accomplishment, many may have formed very pleasant and satisfying friendships. On the other hand, some may have found enemies, or had their pride of workmanship thwarted, and some may have had to bear heavy responsibilities. These are not desired but nevertheless are derived from achieving the resultant of cooperation and are considered as burdens.
Distribution of Utilities

For resultants of cooperation to become incentives of satisfaction or utilities to contributors, a process of distribution must come into play. Wages and other satisfactions are distributed to an employee in return for his effort. Dividends and other satisfactions are distributed to suppliers of capital. A distribution of money and other levies is made to the government. Money and other satisfactions are distributed to suppliers of materials and services. Products, services, and other satisfactions are distributed to customers for their contribution of money or their pledges of money to be paid in the future.

It is important to note that both material and non-material utilities are created and distributed by organizations. Non-material utilities are usually an important consideration. For example, an employee may be able to receive equal wages for his services at a number of establishments, but chooses to work where "he is appreciated." Being appreciated is a satisfaction high on the list of those sought by most persons. Many contributors to such organizations as churches, schools, and civic clubs receive only non-material distributions.

Figure 8 is a schematic representation of the contribution and distribution of utilities in an industrial organization by classes of contributors. In this figure, the arrows representing distributions to contributors are broader than those representing contributions to indicate that the outputs of utilities exceeds the inputs of utilities in successful organizations.
A person may be expected to continue as a contributor to a particular organization so long as he believes he can receive as much net satisfaction for his activities as he can from any other organization or from his individual enterprise.

On a minimum basis, the contributor must value less the activity he contributes than the satisfaction he receives. The customer values his money less than the product he is purchasing, and thus, performs the physical act of transferring money to the organization. If this were not true, there would be no exchange. In the same manner, the employee values his time and effort less than the money he receives for it. If this were not so, he would cease to contribute to the organization. It is not implied, nor should it be thought that the value of any satisfaction or any activity is a constant, for it is a variable dependent upon many things. Nor is the value of an activity or satisfaction the same for all people. For example, Jim has an apple, but he likes oranges better than apples. Mike has an orange, but he likes apples better than oranges. Because of their evaluations they may cooperate, form an organization, and exchange fruit with a result that they have created satisfactions for both of them.

Managers Aid in the Creation and Exchange of Utilities:

In the center of this schematic presentation of organization is the activity of managing. By proper coordination of activities, resultants are produced and distributed that sufficiently satisfy enough contributors to maintain a system of cooperation. A unit
Figure 8: Schematic representation of contributions and distributions of utilities in an industrial organization by classes of contributors.
organization consists of activities of contributors. These activities when coordinated to yield the resultant, are the source, directly and indirectly, of the satisfactions of the contributors. In an oversimplified manner this may be stated: Managers coordinate the efforts of employees in operating the equipment of the owners to transform materials from suppliers into products for customers so that funds from customers can be used to reward employees, owners, and suppliers. The customers receive their reward in the form of products which they value more highly than the money they exchanged for the product. In all organizations, the contributions of one class of contributors is the source of satisfaction of another class, but usually after contributions have been received, pooled, and transformed into new utilities and then distributed. The function of organization is more than to effect exchange; it is to create utilities so that more may be distributed than is received.

Managers are often thought of as managing large industrial organizations or other complexes of unit organizations, but this view is subject to qualification. Managers manage directly only formal unit organizations and influence activities only indirectly in the chain or hierarchy of unit organizations in an industrial enterprise. The transformation and distribution of utilities in a unit organization is therefore of prime importance, and the over-simplified example above is more illustrative than actual.
Distributions of Utilities in a Formal Unit Organization:

Since manager-coordinated activities take place only in formal unit organization, for purposes of illustration, consider a formal unit organization consisting of the activities of a foreman and three workers. See Formal Unit Organization, Figure 9. This formal unit organization was chosen because it is one frequently found in industrial organizations.

In Formal Unit Organization, Foreman is a coordinative contributor. He selects a resultant and stimulates and coordinates the activities of Worker, Worker, and Worker, to achieve the resultant. In Formal Unit Organization, he is an operative contributor along with other foremen whose activities are coordinated by a superintendent.

Foreman is also indicated to be a member of Unit Organization to take cognizance of the fact that from time to time he is a member of various formal and informal unit organizations to receive information on such subjects as accounting, time study, and production control from staff personnel. The contributions of staff personnel are information useful to Foreman in stimulating his workers and coordinating their activities. Unit Organization represents various formal and informal unit organizations in which the superintendent receives information from staff personnel. A comprehensive and schematic representation of an industrial organization would show a staff member as contributing activities to many unit organizations, as well as to
Figure 9: Schematic organization illustrating the unit organizations to which Foreman contributes activities.
the formal unit organizations in which he is usually either operative or coordinative contributor, or both.

The workmen contribute physical acts in the operation of machines and the movement of material, and receive money and other satisfactions which they value more than the acts contributed. The staff contributes communication activities useful for coordination by contributors. They supply information so that the workmen may contribute their acts at the right time and place and in the right manner. In return, the staff contributors receive money and other satisfactions.

The foreman contributes communication activities that can be classified into three categories related to the three essentials of unit organizations.

Included in the first category are activities to aid operative contributors to know and agree upon the prospective resultant of cooperation. In a complex of formal unit organizations, the material product of cooperation (for example, an automobile) is produced only in the first or lowest unit organizations. In all unit organizations in the hierarchy above the first unit, the product or resultant of cooperation is information or understanding. Supervisors confer to reach a common understanding on the basis of fiat or orders and by suggestions and information; the product of their activity is non-material. The understanding of the product to be produced, which is a resultant of the Formal Unit Organization (foreman and superintendent), becomes, when transmitted to and accepted by the operative
contributors, a guide for their acts. The resultant of the Formal Unit Organization which is distributed directly to the foreman becomes the basis for his activities in the Formal Unit Organization.

The second category of activities consists of communications about the social and physical environment to aid operative contributors to perceive the acts needed to achieve the prospective resultant so that each may contribute acts appropriate as to time, place, and manner of delivery. This category includes more than orders and directives, which are actually only a small part of the total communications, and encompasses all comments about people and their interactions and about the materials, tools, machines, and other physical objects with which a man works.

The third category of activities contributed by the foreman consists of communications to aid the contributors in recognizing the incentives which are available from the resultant of cooperation. Most of the material incentives are received from the staff. For example, the weekly pay check may be delivered by a clerk in the payroll office, but it may be the communication of a foreman which determines the amount of the check. The money incentives available for distribution to the workmen are received from Formal Unit Organization.

Interrelationships of Formal Unit Organizations of a Complex:

Two unit organizations are interrelated by virtue of the activities of a person who is a contributor to both unit organizations. The
interrelationships of unit organizations in a complex are difficult to delineate because unit organizations come into being and dissolve so rapidly and because there are interrelationships between both formal and informal units in organizations.

In Figure 10, two formal unit organizations are represented. Formal Unit Organization No. 1 consists of the activities of a foreman and several workmen, one of whom is represented in the figure. Formal Unit Organization No. 2 consists of a superintendent and several foremen of whom one of the latter is shown. Assume that the activities of the contributors to Formal Unit Organization No. 1 are coordinated and that the resultant of cooperation consists of blades for a electric fan. The fan blades become parts of electric fans which, constitute the resultant of cooperation of the organization.

The worker shown at the bottom of the diagram contributes such efforts as listening, walking, carrying sheets, operating a machine, and communicating information to Formal Unit Organization No. 1. One fact of information is the number of blades completed. This communication may be considered to be a symbolic contribution of fan blades in the form of a report, and may become the basis for future planning and coordination in Formal Unit Organization Nos. 1 and 2, and the basis of the worker's wages. The worker's contribution to Formal Unit Organization No. 1 is represented by an upward directed arrow and a caption in the diagram. The fan blades are actually delivered by the
Figure 10: Schematic representation of the interrelationship of two formal unit organizations.

Information relative to functioning of unit organizations no. 1 and no. 2, including symbolic fan blades.

Communication relative to resultant, incentives and environment including symbolic wages for foreman and workers, and other incentives.

Information relative to functioning of unit organization no. 1, including symbolic fan blades.

Information relative to the resultant, incentives, and environment including symbolic wages for foreman and workers, and other incentives.

Information relative to functioning of unit organization no. 1, including symbolic fan blades.

Communication relative to resultant, incentives, and environment including symbolic wages for workers and other incentives.

Effort and information including symbolic blades.

Information relative to resultant, incentives and environment, including symbolic wages and other incentives.

Staff

Information

Superintendent

Communication relative to resultant, incentives and environment including symbolic wages for foreman and workers, and other incentives.

Staff

Information

Formal Unit Organization No. 2

Information relative to the resultant, incentives, and environment including symbolic wages for foreman and workers, and other incentives.

Formal Unit Organization No. 1

Information relative to resultant, incentives and environment, including symbolic wages and other incentives.

Effort and information including symbolic blades.

Information relative to resultant, incentives and environment, including symbolic wages and other incentives.

Staff

Identification

Pay Check

Fan Blades

Materials, Tools

Staff

Worker
worker as indicated in the diagram to a workman in another unit organization. Materials and tools may be received from workmen in still other unit organizations.

The workman is a recipient of a distribution from Formal Unit Organization No. 1. The distribution primarily consists of information communicated by the foreman. The information is related to the three essentials of unit organization. One element of the information consists of a symbolic payment of wages. This is noted because workmen often feel that they receive their wages from the foreman but this is only true symbolically. What the workmen receive from participation in Formal Unit Organization No. 1 is represented by a downward drawn arrow and its caption.

Before leaving the workman, it is desirable to trace how he receives his wages. One common way is for the worker to go to a pay-master with whom he forms a unit organization. On contribution of his identity, he receives his pay check. He may take his check to a bank teller forming a unit organization to which he contributes the check properly endorsed and in return receives a receipt and so on and on until he has gotten food, clothing, entertainment, and many other items as a result of his efforts in Formal Unit Organization No. 1.

The foreman contributes to Formal Unit Organization No. 1 communications about the three essentials of unit organization; namely, the resultant of cooperation, (number of fan blades required), the
environment (to aid the workman to act appropriately), and incentives (to induce the workman to act as desired) including symbolic wages.

A relationship is established between Formal Unit Organizations Nos. 1 and 2 by virtue of the foreman's transfer of information gained in one unit organization, to the other unit organization.

To Formal Unit Organization No. 2, the foreman contributes information relative to the functioning of Formal Unit Organization No. 1 including symbolic fan blades. He may also relate information received or given to various staff personnel, his observations, and opinions on subjects he deems pertinent.

From Formal Unit Organization No. 2, the foreman receives information relative to the resultant, incentives, and environment including symbolic wages for himself and other satisfactions and instructions to transfer symbolic wages to the workman in Formal Unit Organization No. 1. However, it is probable that the foreman and the workman will actually receive their pay check from the same person.

The foreman may be expected to become a contributor to many unit organizations, formal and informal, which engage in the collection and dissemination of information on such subjects as production methods, scheduling, and accounting. The foreman's relationship with these unit organizations is indicated by horizontal arrows.

The superintendent's contributions and receipts from Formal Unit Organization No. 2 as indicated in Figure 10 are similar in character
It should be borne in mind that the above description of the relationship between two formal unit organizations is incomplete. For example, it may be pointed out that Formal Unit Organization No. 1 ceases to exist and one or more unit organizations composed of the activities of workers comes into being when the foreman ceases to contribute to it, in order to participate in the activities of Formal Unit Organization No. 2. Also, Formal Unit Organization No. 1 is replaced by another when the workman establishes a unit organization by identifying himself to a clerk to receive his pay check. When one person is addressing several others, new unit organizations are formed one after another as the attention of listeners lapses.

Efficiency in Organizations

A basic characteristic of humans is that they seek to maximize their satisfactions and to minimize their dissatisfactions. This is equivalent to saying they wish to be efficient where efficiency is measured in terms of the ratio of satisfactions to dissatisfactions. But, it must be remembered that a set of conditions that causes a person satisfactions and dissatisfactions is measured by him through his subjective evaluation.

Man's quest for efficiency in terms of satisfaction goes on continually and so is a factor in all unit organizations. When a
contributor feels that the unit organization to which he contributes is not efficient for him, he modifies his actions. He may increase, decrease, or alter his activity in the unit organization of which his activities are a part, or he may seek out another unit organization to which to contribute. Thus, every unit organization is, in a sense, in competition with every other unit organization for the activity of contributors. For example, the activity in gathering around the drinking fountain forms a unit organization which for a period is more efficient for the contributors that are there than any other unit organization in the plant at the time.

Because persons are continually shopping for unit organizations that are most efficient for them in their evaluations, the efficiency of unit organizations tends to equalize. This may be inferred to an extent from the following example.

A partial measure of the efficiency of an industrial organization is its balance between its output and input, often expressed as profit per dollar of sales. If it is assumed that the salaries and wages paid are a practical minimum to obtain the essential services and that supplies are bought at the lowest practical price, and that the product is sold at the highest applicable price consistent with volume, then the difference between income and outgo is the margin by which one class of contributors, the owners, are held in the system of cooperation. It is assumed that continuous losses would soon wipe out the
capital invested and that owners are unlikely to continue to put money into a losing venture. If the margin between income and outgo is five per cent of the sales dollar, then the average efficiency of all the unit organizations in the industrial organization cannot change more than five per cent without eventual disaster. Indeed, the allowable margin of error in management is small and consequently a high percentage of industrial, business, civic, and social organizations fail. Organizations fail because other organizations are judged by contributors to offer more in the efficiency of satisfactions.

Summary:

An attempt has been made in this chapter to delineate a concept of organization based on the coordinated physical activities of two or more persons. The broad scope of this definition includes classes of contributors, such as customers and suppliers who are not ordinarily considered in most discussions of organizations, although all recognize that managers spend a considerable portion of their time in obtaining essential activities from these contributors.

Although it was desirable to define several kinds of organizations, this dissertation is principally concerned with formal unit organizations and informal unit organizations. These two basic types of organizations are the units from which all kinds of group activities are structured.

The complex of interdependent formal and informal unit organizations, which is the industrial organization, is maintained by a most
complicated system of exchange of activities for satisfactions. Not only must the industrial organization as a whole maintain a favorable balance for all contributors, but every unit organization must maintain a favorable balance if it is to survive. The maintenance of this exchange of utilities is the subtle and difficult function of managers.
Chapter III

FACTORS OF GROWTH OF ORGANIZATION

All actions of people are purposive and goal-oriented. When the purposive actions of two or more persons are consciously coordinated, a unit organization is formed. Unit organizations consist of the purposive actions of people.

All industrial or business organizations, no matter how large or small, have grown from a single formal unit organization. To this original and first formal unit organization other units are added until there is a complex of unit organizations. Industrial organizations are never born full grown or even partly grown. They may grow rapidly by adding unit organizations, but at the beginning they consist of a single coordinative contributor and some operative contributors that report directly to the coordinative contributor.

Organizations grow in much the same way as biological organisms. The human body grows from an original single cell to which other cells are rapidly added throughout the early growth period until the body reaches maturity; and then more slowly at a rate approximately equal to wastage in order to maintain a stable living organism. Every cell in the human body is in a greater or lesser degree dependent upon every other cell for its survival. The failure of a single cell, if not replaced, may cause the failure or death of other cells and eventually the death of the organism. In much the same way, a complex of formal
unit organizations grows from a single formal unit organization, and the dependency of every unit organization upon the other unit organizations in the complex is similar to one cell's dependency upon the other body cells in the organism.

A cell may fail or die because of a failure of any of its constituent parts. A unit organization may fail because of the failure or the withholding of activity that is vital to achieving the prospective resultant. In the same way that a healthy, functioning cell tends to grow, so a unit organization in which there is a surplus of satisfaction for contributors also tends to grow. But there are limits to size of cells and unit organizations, and continued growth of each may lead to subdivision. The subdivided cells or unit organizations may then grow, be subdivided, and grow again. This is the method of growth of organisms and organizations.

The Origins of Formal Unit Organizations

Formal unit organizations may originate and grow in accordance with the conscious desire and plan of someone, or they may originate largely by chance and grow, like Topsy, in accordance with the demands of particular circumstances and needs.

A formal unit organization may be an outgrowth of an informal organization. The contributors to an informal organization may find that their effectiveness can be improved by the selection of one of them to coordinate their activities. If this is done, a formal unit organization is formed. Or, as frequently happens, the contributors
to an informal organization, having found satisfaction in their cooperation, select a more complex product; and to achieve it select a coordinator to aid in the achievement of the difficult coordination required. An example might be four men in a frequent informal organization of drinking coffee together who find the resulting companionship so enjoyable that they decide to play golf together the next Sunday morning. It is agreed that one of the members shall select the country club where they will play and make the necessary reservations. Also, he is to call for the other three and drive them to the course in his car. This more complex resultant requires a formal unit organization and a manager. It is conceivable that a satisfactory experience with this formal unit organization may encourage them to go into business together and form a more stable or reoccurring formal unit organization, which grows into an industrial organization of thousands of unit organizations.

More commonly, a formal unit organization is formed as a result of someone's conscious and deliberate effort. Someone has an unsatisfied want or need that he is seeking to satisfy. This personal purpose probably cannot be satisfied by the individual's effort alone, or his single efforts would be, in his opinion, less effective than if applied in coordination with the efforts of others. He sees that his personal purpose can be achieved most effectively by cooperation which will directly or indirectly satisfy his need, and for this reason he endeavors to find others who will help him attain it.
An over-simplified example is the man who is hungry and wants food. He decides not to grow his own but to open a store and sell suits of clothing and buy food from the profits. To him, that is the most effective way to assuage his hunger, and so he hires clerks to assist him and thereby forms a formal unit organization. The customers who buy suits become the operative contributors to a new formal unit organization in which the clerks are the coordinative contributors, and immediately the store becomes a complex of formal unit organizations.

In other situations, a resultant will be desired by many and formal unit organizations may be formed in the manner that a citizens group forms a vigilance committee to combat a common danger.

Once an original formal unit organization is formed, it may subdivide endlessly to form other formal unit organizations. A member of one formal unit may be sent out to organize a new church in the religious field, or a branch office in the business field, and from this geographically separated formal unit a whole new complex of unit organizations may be formed by subdividing the original unit.

The Three Essentials of Unit Organizations:

It was stated in Chapter I that a unit organization was formed when two or more persons (1) know and agree upon a prospective resultant of cooperation, (2) recognize incentives that induce the contribution of activities, and (3) perceive the acts needed to achieve the
prospective resultant. These minimum essentials of unit organization must be present simultaneously for a unit organization to exist. The maintenance of a unit organization is dependent upon the maintenance of a favorable balance of exchange of utilities by each contributor and a favorable situation in respect to all other unit organizations. All contributors must believe at the time they contribute their activities that in the long run the satisfactions they will receive will exceed the burdens implicit in their contribution of activities, or that their contribution of activities will result in less net benefit if applied elsewhere. The relationship of the particular unit organization to all other unit organizations must be such that the contributors' expectations of satisfaction are substantially realized. If a particular unit organization's resultant is only partially achieved, either due to a failure of coordination within the unit or between units, there is a reduction of incentives available to satisfy the contributors.

The effectiveness with which activities are coordinated will depend upon the perception by the contributors of acts needed to achieve the resultant; and the strength of the organization lies in the power of the incentives to incite cooperation. Inducements thought capable of satisfying strong wants incite contributors to endure onerous burdens to contribute the needed acts. Overtime pay sometimes causes men to work long hours at great inconvenience and occasionally
at risk of general well-being. The activities contributed will a-
chieve the desired resultant in proportion to the effectiveness by
which they are coordinated. The speed of a rowing scull is probably
as much dependent upon the ability of the coxswain to maintain a
rhythm and the oarsmen's ability to coordinate their efforts as upon
the aggregate strength of the individual oarsmen.

Agreed-Upon Resultant of Cooperation: Every person has many
unsatisfied wants, some of which he is trying to satisfy through
organization. These wants or needs are personal. They may be similar
to wants of other men, but they are unique at least as to intensity or
degree. All men need food, but in a particular instance one man may
be hungrier than another. One's wants vary in intensity from day to
day, from instant to instant.

People contribute physical acts to unit organizations to satisfy
these personal wants. That these personal wants vary is evident from
numerous surveys which show that needs such as security, good pay,
pleasant surroundings, and good supervision are differently ranked.
The purpose of everyone who contributes to a unit organization is
unique. One man desires the security a unit organization provides,
another likes the people with whom he is associated, while a third is
interested in the wage as a means of satisfying his desire for a new
car. These personal purposes have little in common except that all
contributors believe that their personal purposes will be directly or
indirectly satisfied through achievement of the resultant of cooperation.
The agreed resultant is an alteration of the physical environment; toward achieving it all activities are contributed and coordinated. The incidental alterations of the environment may be known to some potential contributors but these are not the agreed objective of coordinated acts of all contributors.

The agreed resultant of cooperation for which activities are contributed is impersonal. It is not directly desired by any contributor, not even the owners of an enterprise. Obviously, no one wants one hundred washing machines per day for his own use. The resultant of cooperation is only the means to the satisfaction of personal purposes. The owner sees in the hundreds of washing machines a resultant that is saleable at a profit that will insure the safety of his capital and return dividends. The worker sees them in terms of the wages and other benefits he receives, the supplier as a source of money to pay him for his goods and services.

In all unit organizations, the contributors must agree upon at least one resultant of their cooperation. There are many incidental resultants of cooperation, but to form a unit organization, contributors need to agree upon only one resultant to achieve by their acts. Contributors may anticipate many benefits from various resultants, but they must agree upon a single resultant as an objective to achieve by their acts. This agreed-upon resultant must be known to all contributors or else they will not know what physical acts to contribute
and how they are to be coordinated. It is not necessary for all the contributors in a complex of unit organizations to know or agree upon the resultant of the complex, although if they do not, the task of managing is greatly complicated. The atomic energy plants at Oak Ridge, Tennessee and Hanford, Washington were constructed and operated by men who did not know the final resultant of the plant, but each and every man did know a resultant to be achieved by his formal unit organization. In the same manner, many who work in our great industrial organizations may not know or understand exactly how their individual contributions become a part of the final material resultant. They may cooperate with the unit organization in achieving its resultant, but may knowingly or unknowingly sabotage the organization as a whole. It is not unknown for inter-departmental rivalry to become so intense that the achievement of the final resultant of the organization is imp aired.

It is a matter of observation that loyalty is built first and most strongly around the unit organization, and to a lesser degree around the complex of unit organizations. The soldier is generally loyal first to the squad, then the platoon, then the company, the battalion, regiment, and finally the division. This rank order of loyalty seems to correspond to the completeness of knowledge of the resultant of the various complex of units. The individual soldier may not know the objective of the army, but he must know the objective of his squad.
Recognition of Incentives: An agreement on a resultant or product of cooperation is not, in itself, enough to incite willingness on the part of contributors to perform the necessary physical acts. The material resultant of cooperation, a strip of sheet steel, may have no immediate value to any contributor in the unit organization in which it is rolled. Through the complex of unit organizations, this resultant is exchanged for the customers' money which is again transferred through a complex of unit organizations to the worker in the shop unit. The shop worker recognizes and responds to this and other incentives by contributing his physical acts.

The net total of the satisfactions from the viewpoint of a contributor is always the positive inducements less burdens or negative inducements. If the net total is a negative inducement, he withholds his contribution. If the net total is a positive inducement, it is a partial measure of his enthusiasm and loyalty for the organization. The value of all incentives, positive or negative, is always subjectively determined and is never constant. The second banana split, even to a hungry boy, doesn't taste as good as the first, and the third may even be refused. The same incentive is never valued exactly the same by two persons. To the man making two-hundred dollars a month, a twenty-five dollar increase may be very satisfactory, but to a man making a thousand dollars a month the same increase may be an insult.
A net positive inducement, inducements less burdens, will not always incite an individual to cooperate in a specific organization, for he may choose to act independently or to contribute an alternative act to another organization. To the contributor, the potential net inducement must be greater than can be obtained in any other way at the moment.

Incentives, positive and negative, are always potential for they must be evaluated by the contributor before they are received. Even when a money wage is a part of the inducement, the satisfactions from the things which money will buy are something to be experienced in the future. Anticipated pleasures are seldom the same as realized pleasures— they are usually more or less.

All activities in organization are contributed willingly as a result of the recognition of the incentives offered. Powerful inducements are sometimes necessary to insure cooperation, but the case of Nathan Hale indicates that sometimes even the inducement of death is insufficient to cause the betrayal of one's country by cooperating with the enemy. A contributor to an industrial organization is sometimes discharged for failure to cooperate, but even in this situation it must be recognized that for the organization to function, someone must respond to the incentive and contribute the necessary physical acts which were withheld by the discharged employee.
One skill of managers in a large complex of unit organizations lies in their ability to inculcate in the contributors the necessary connection between the immediate resultant of the formal unit organization and the eventual satisfaction of their personal purposes. Widespread restriction of production by many workmen indicates that they do not see clearly a direct and immediate connection between unit organization resultants and the benefits they may receive for their efforts. A workman must see the relationship between his personal purposes and the unit organizational resultant. The demonstration and inculcation of this is currently the subject of much educational work in industry under the general title of economic education.

Perception of Acts Needed: The potential cooperator who has agreed upon a resultant of cooperation and has recognized the incentives offered as inducement to cooperate also must perceive the particular activity to contribute in the right time, place, and manner. Of all the activities he might contribute, only certain activities properly and timely delivered will, with the activity of other contributors, achieve the agreed-upon resultant. The mere urge to cooperate is insufficient and the contribution of chance activities, rather than selected activities in a sequential order, may be disastrous. For activities to be consciously coordinated, the activities must be selected in a sequential order. The well meaning friend who laughs at the wrong time at one's humorous story is not lacking in
agreement upon a resultant or in an urge to cooperate—he merely selected an inappropriate moment for a particular activity. In the same manner, the effectiveness of a group of men in "rocking" a car out of a mud hole, is dependent upon each man perceiving accurately the instant at which to apply his strength and at which to relax to let the car roll back.

The contributor selects the activity and performs it at a particular time and in a particular manner as a result of stimuli or information that reaches him, and on the basis of his evaluation of that information. Although an act may be illogical or incorrect to another observer, at the time it was contributed it was not so to the contributor. Conclusions of several persons relative to a given situation may differ either because the stimuli reaching each differs or because they evaluated similar stimuli differently.

Stimuli impinge upon the mind of a contributor through the five senses, all of which may be used to convey information in organizations. Some of the stimuli which convey information are the result of the conscious effort of someone in a formal unit organization; much of it is not. If coordination in organization were dependent wholly on the conscious effort of managers, none but the simplest resultants could be achieved and organizational size would generally be limited to a single unit. This does not imply that organizational communication and coordination can be left to chance; it is only an attempt to put conscious communication into the proper perspective. The variety of information and
stimuli reaching a person in a unit organization is very great and is obviously not limited to that received directly from other members of a unit organization. A person is usually a contributor to many formal and informal unit organizations and all of these experiences become a part of him. All previous experiences influence the perception of contributors and their selection of the activities to be contributed.

Of the five senses through which information is acquired, it appears that sight conveys the most information. It is quite impossible to imagine that a complex of unit organizations, all of whose contributors are blind, could produce a resultant as intricate as an automobile. Organizational communication is largely dependent upon sight. It is not meant to imply that information comes to a contributor primarily through the written word; though written words are an important media of communication for those units composed of managers several levels removed from actual work situations. The selection of a series of acts and the time, place, and manner of their delivery by a contributor is largely dependent upon his observations of the activities of fellow contributors and other environmental factors. Perception of the physical environment is important, and it is best perceived by sight. One can discriminate the physical environment and abstract more information by light waves than by sound waves. Imagine the cacophony of sound that must be interpreted to sense the beauty of autumn foliage or a Raphael
painting. It is the unusual person who will believe his ears rather than his eyes when the information from these senses seems contradictory.

It is probably unnecessary to comment more than briefly on the role of the sense of hearing in the perception by a contributor of the activities needed. Included, of course, in this category of stimulation are the oral reports and orders of superiors as well as direct sounds such as the clanging of the bell in the fire house. Orders are only information to a contributor and do not necessarily or always cause him to act. Putting information in an imperative form does not necessarily change its degree of stimulation. In fact, there is some evidence that this lessens its stimulating effect on many people.

The other three senses, touch, smell, and taste, are less important as means of conveying the information for coordination, although each has a use in special situations where the most careful coordination is necessary. For example, touch is essential in team tumbling and acrobatics. To convey the maximum information and stimulation, a communication should appeal to as many emotions as possible through as many senses as possible.

Evaluation of information may result in a decision to perform a particular activity at a particular time, place, and manner. The deci-sional process involves consideration of the resultant to be accomplished and the alternative activities available to accomplish it. Just as there is specialization of physical activities in organization, so is there
specialization in decisions. The decision reached by the manager in a formal unit organization becomes, usually through speech or writing, a physical act and thus part of the information or the stimuli for operative contributors. Like all other information, it is evaluated in the decisional process of the contributor and an appropriate activity may be performed.

The process of coordinating activities in organization, a major activity of managers, includes the selection of appropriate information or decisional premises and their communication to operative contributors. It is hoped that operative contributors will evaluate the information in terms of the resultant and that their evaluation will cause them to contribute activity appropriate as to time, place, and manner.

**Formation of Formal Unit Organizations:**

The three essentials of organization (1) know and agree upon a prospective resultant of cooperation, (2) recognize incentives that induce the contribution of activities, and (3) perceive the acts needed to achieve the prospective resultant, must be present simultaneously for a formal or informal unit organization to exist whether its origin was the result of someone's conscious effort, an outgrowth of an informal organization, or by a subdivision of another organization.

Organizations generally, and business and industrial organizations particularly, have a strong tendency for growth. From a single
formal unit organization, great complexes of thousands of unit organizations have grown. But before each of these thousands of unit organizations came into being, the three essentials of organization had to be present simultaneously. For each formal unit organization or informal organization to be active, the essentials must be present continuously.

By a process of subdivision, additional formal unit organizations are formed and then integrated by communication into the complex of unit organizations. The ultimate structure of the complex of unit organizations is a result of a manager's attempts to so adapt an organization's structure to cope effectively with the environment. As the physical and social environments that hinder effective cooperation are different, in large or small degree, for every organization, it is not surprising that differences in structure are common even for industrial organizations producing the same product.

Limitations of Size of Formal Unit Organizations: A unit organization can grow when it is believed by present and potential contributors that additional contributions of activities will produce a larger resultant and thus, greater satisfactions for them. The present size of any unit organization is always the result of someone's belief or experience - usually the customers' or the managers' - that additional contributions would result in less satisfactions. The customer fails to buy because he believes that additional purchases of a particular product would result in less satisfactions than are available to him from
purchases of other products. The profitable industrial organization that is profitable to all contributors is a growing organization.

Contributors are added to existing formal unit organizations until it is believed greater effectiveness may be achieved by an additional formal unit organization. Workmen are added to a foreman's formal unit organization until it is believed that efficiency would be improved by forming a new formal unit organization under a second foreman.

Theoretically, at least, a formal unit organization might consist of the contributions of thousands of men under the direction of a single coordinator. In fact, in special situations such as a public lecture or a political rally, unit organizations may be extremely large. But in the usual industrial situations, it seems impossible to attain adequate coordination if there is only one manager with thousands of operative contributors in a single unit organization. Industrial organizations, the government and the Army to name only a few, generally are characterized by a majority of formal unit organizations with fewer than twenty contributors.

As the size of the unit organization increases, the problem of coordinating the physical acts of large numbers of contributors increases. As the number of unit organizations increases, the problem of coordinating the resultants of units increases. The recognition of these two problems has led to the formulation of two conflicting
principles of management, namely, that effectiveness is increased by limiting the number of subordinates reporting to one superior, and secondly that effectiveness is increased by limiting the number of organizational levels. Clearly, both statements cannot simultaneously apply to a particular situation. Obviously there is some optimum combination of unit size and number of units which will result in greatest effectiveness. Thus neither "principle" can be applied alone and indiscriminately.

Methods of Growth of Organizations:

If one is to plan or design an organizational structure, prepare organization charts, and consider such problems as the span of control, the assignment of duties and responsibilities, and the relationships of the various individuals and unit organizations in an industrial organization, knowledge of the methods of growth seems essential.

There is obviously a limit to the number of physical acts of contributors that can be effectively coordinated by a manager. This is a more exact way of stating that there are practical limitations to the size of unit organizations. Organizational growth of a substantial nature consists therefore of adding unit organizations to a complex.

The method of growth may be illustrated by considering a simple example in which, for sake of simplicity, only some of the more important characteristics of unit organizations will be considered. A man wanted to go into the restaurant business and opened a small
hamburger stand where he was the proprietor and only employee. After a short time, the proprietor found it necessary to add a helper to assist him during the rush hours and to allow the proprietor time off for rest and recreation. The helper did essentially the same duties as the proprietor; he served customers, prepared food, collected money, and washed dishes. As the business prospered, a second helper was added, but now it was deemed more efficient to use him exclusively on cleaning and washing dishes to relieve the counter man of these duties. When the third helper was added, he devoted his time exclusively to preparing food. It is important to note that as employees were added to the unit organization, they began to specialize in the physical acts they contributed to the organization as did the proprietor who devoted more and more of his time to coordinating.

As the hamburger stand grew into a complete restaurant, additional personnel were added to the original formal unit organization until it became clear to the proprietor that he could not effectively manage the formal unit organization alone. First he created a new formal unit organization of waiters and waitresses, and appointed a head waiter to coordinate their activities. Later he appointed a chief cook to coordinate the activities of the kitchen personnel. Soon it was necessary to have day and night shifts with day and night chief cooks and head waiters and corresponding formal unit organizations. As the number of waitresses increased, the proprietor subdivided the waiter and waitress
formal unit organizations into two units and appointed a head waitress as well as a head waiter. When the proprietor decided to add a bar and beverages to his restaurant, he further subdivided his waiters into two formal unit organizations, the food waiters and the beverage waiters, each with its own supervisor. Now there were three formal unit organizations concerned with serving food and beverage, so he appointed a service captain to supervise the supervisors of the three units.

So that the proprietor might devote more time to expanding his business, he appointed a manager of this restaurant with an assistant manager for nighttime operation and opened a similar restaurant in a neighboring state. It prospered and grew also, but not in exactly the same way as the neighboring state prohibited the sale of alcoholic beverages by the drink. Thus, the organizational structure was slightly different as a service captain was not needed.

The proprietor continued to add restaurants to his chain until he had a complex of more than a hundred unit organizations with an organizational structure consisting of a minimum of three intervening supervising levels between him and the men and women who were preparing the food and serving the customers, the job he did in his original hamburger stand.

As the proprietor added helpers to his original formal unit organization, there was a specialization in the kinds of activities
contributed. As the formal unit organization grew and subdivided, the
classical unit organizations became specialized. Thus one formal unit
organization was responsible for achieving only a limited resultant,
that of serving the food, and was not responsible for its prepara-
tion. The resultant was further subdivided into food and beverages.

Thus, as the scope and magnitude of the resultant increases, its
achievement may often be facilitated by subdividing it and letting the
sub-resultant be the object of achievement of new formal unit organi-
zations. This seems to be a process by which the number of formal
unit organizations in a complex grows. The activities contributed
by the large number of employees now engaged in the non-supervisory
jobs of preparing food, serving it, collecting money, and washing
dishes are essentially the same kind of activities contributed by
the proprietor when he worked alone in his hamburger stand. There
are more activities, but they are the same kind. But because of the
specialization of activities, coordinators with titles such as head
waiters and chief cooks are appointed and they perform communication
activities that were not necessary previously. The specialized activ-
ities coordinated by communication, achieve specialized resultants.
Proprietor and customers coordinate their activities to form a formal unit organization. For convenience of illustration, all suppliers are omitted from the diagram.

2nd. Phase

Proprietor and helper #1 perform essentially the same duties. Helper #1 relieves proprietor.

3rd. Phase

Helper #2 specializes his activities and clears and washes dishes. He has limited contact with customers. As he coordinates most of his acts with proprietor and helper #1, a new formal unit organization is formed.
All three helpers are specialized; #1 serves, #2 clears and washes dishes, and #3 cooks. The contacts between helper #3 and helper #2 with customers are omitted here and there remain two formal unit organizations.

Helper #1 becomes head waiter and his activities are supervisory. Helper #3 becomes chief cook and his activities are supervisory. Helper #2 becomes a part of the kitchen personnel engaged in preparing and cooking food and washing dishes. Part of the time the proprietor supervises the head waiter and chief cook, thus forming a formal unit organization. His non-supervisory job is cashier. There is now a minimum of four formal unit organizations.
6th. Phase

The span of control of the proprietor expands to four due to a specialization of activities with respect to time. The minimum number of formal unit organizations is now seven.

7th. Phase

The span of control of the proprietor is probably approaching the limit for highest efficiency. The minimum number of formal unit organizations is eleven.
8th. Phase
To maintain a reasonable span of control, the proprietor felt it desirable to add one additional level of supervision between himself and the customers. The minimum number of formal unit organizations is nineteen.
9th Phase

- Proprietor
- Manager

- Service Capt. Day
- Bar Supervisor - Day
- Chief Cook - Day

- Head Waiter Food - Day
- Head Waiter Bev. - Day
- H.B. Waitress Food - Day
- Bar Men - Day
- Kitchen Per. Day

- Waiters Day
- Bev. Waiters Day
- Waitresses Day
- Bar Men Day
- Kitchen Per. Day

- Customers
- Customers
- Customers
To free the proprietor from routine supervisory activities, an intervening level of supervision, the manager and assistant manager, is added. This also reduces the span of control at the top managerial level. The minimum number of formal unit organizations is now twenty-two with four levels of supervision between the proprietor and customers during the day and five at night.
It is expected that each complex of formal unit organizations is different in part from any other complex. Each complex is an adaptation to the environment. In one area, beverages may not be allowed and thus the structure of the formal unit organizations will be different. Each complex grows from a single formal unit organization in a similar but not identical manner to the growth of the original complex.

Figure 118 Schematic representation of the growth of a hamburger stand.
Bases of Specialization:

The resultant of a formal unit organization may be subdivided and each subdivision may become the agreed-upon resultant for a new formal unit organization. For example, a formal unit organization may have as a resultant the production of a table. This may be subdivided and a unit may have as its agreed-upon resultant the legs, another unit the top, and still another formal unit organization may assemble the top to the legs and produce the table. The division of a resultant among formal unit organizations is dependent upon the manager's estimation of the most effective manner to group activities for efficient coordination.

All activities must be performed at a time, in a place, by a person, on something, in a definite manner. If the critical factor for effective coordination is time, then time is the principal basis of specialization, and all other bases of specialization are subordinated to it. The five bases of specialization as they apply to activities of individuals in unit organizations, and to activities of unit organizations in a complex of unit organizations are:

1. the time the activity is contributed
2. the place where the activity is contributed
3. the persons who contribute the activity
4. the things in relation to which the activity is contributed
5. the manner or method by which the activity is contributed

All acts performed in formal unit organizations in a complex of formal unit organizations are specialized in accordance with the above
five bases, but one of the bases is usually dominant. When the number of activities of a formal unit organization becomes too large for effective coordination, some of the activities may be classified on one of the bases of specialization and be coordinated in a new formal unit organization. This classification is done by managers who select from the total activities, those activities which are similarly specialized. The resultant achieved by these specialized activities is combined with the resultants achieved in other units of specialized activities to form the product of the organization.

In the restaurant example above, there are a number of examples of adding formal unit organizations to a complex by grouping similar specialized activities and producing a particular and also specialized resultant.

In the 6th phase, activities are principally specialized in regard to time, and different personnel are employed for each shift. The night shift presumably performs essentially similar activities in the same place and in the same manner. They differ in specialization only with respect to time.

When the proprietor opened his second and third restaurants, as illustrated in the final phase, activities were principally specialized in regard to place. Similar activities are being performed at the same time and in a similar manner, but not in the same place. In the 7th phase, the proprietor formed formal unit organizations that were
principally specialized in regard to persons. He apparently felt it was more effective to achieving the desired over-all resultant if he subdivided his serving personnel into units of waitresses and units of waiters.

Specialization by things in relation to which the activity is contributed is illustrated in the 8th phase where formal unit organizations were formed to serve beverages as differentiated from food.

Although not illustrated in the restaurant example, the first example to come to mind of the fifth basis of specialization, the manner or method by which activities are contributed, is the substitution of left-handed batters against right-handed pitchers and vice versa. This is representative of specialization on the basis of method. The function of motion study is to contrive methods by which to specialize the activities of persons for economical achievement of a prospective resultant.

As each new formal unit organization is formed by division of a formal unit organization, the resultant of the latter formal unit organization is divided and the activities of the new formal unit organization are specialized according to principally one of the five bases of specialization; time, place, persons, things, and manner. The basis of specialization must meet the criterion of efficiency. In many situations, it is extremely difficult to select the most effective mode of specialization. For example, when engineers or other
technical specialists are geographically separated, should the distance be ignored and all engineers organized into a formal unit organization which would be a specialization by persons, or should the engineers be included in the local formal unit organization which would be specialization by place?

Because physical acts are the contributions of persons, men have similar bases of specialization. The specialization of the formal unit organization is dependent upon the availability of persons of that specialization. Although it may not be difficult to obtain unskilled and semi-skilled labor for the "swing" shift, it may be impossible to obtain highly skilled craftsmen such as tool and die makers to work those less desirable hours. The selection of the basis of specialization of activities for the new formal unit is thus always dependent on the estimation of the availability of persons of that specialization. The degree of coordination attained between unit organizations is dependent upon how well the contributors are able to specialize their activities. All the coordinative techniques such as motion study, time study, production planning and control, and plant layout are attempts to attain a high degree of specialization of activities and, therefore, a high degree of efficiency.

The physical and social environment affects the specialization selected. In organizations such as oil producing companies or highly perishable food processing and canning companies, the obstacles to
communication and coordination imposed by wide geographical separation greatly influence the selection of highly decentralized organization, which is specialization by place. The practice of segregating the races in some areas is a recognition of the social environment and is a specialization by persons.

The resultant of the complex of unit organizations is achieved by accomplishing the resultant of each unit at the right time, place, and manner. It is important for managers to always bear in mind that the Ford Motor Company does not produce automobiles; unit organizations of the complex of unit organizations which is called the Ford Motor Company accomplished specified resultants in the right time, place, and manner, and the combination of the resultants of all the unit organizations becomes the Ford automobile. This point is stressed, for the skill of organizing lies in the inventing of new patterns for breaking down a resultant of a complex into sub-resultants to be achieved by specialized units. A great contribution of Henry Ford was the invention of the mass assembly line which was an innovation of organization based on unit organizations highly specialized in respect to time.

Growth of Managerial and Staff Organization:

The process of specialization is obviously not limited to activities that contribute directly to the accomplishment of a specific material resultant. In fact, the concentration of activities of communication for coordination in a single person is what distinguishes
a formal from an informal unit organization, and is a specialization. A manager is a specialist in communication. As unit organizations are added to a complex, the scope of the communication activities needed to coordinate the physical acts of larger groups of men, increases, probably at some exponential rate. A pyramid of unit organizations is formed, and the manager at the apex as well as managers at other levels are not always in direct contact with those whose efforts they are trying to coordinate. To a large extent, they depend upon the stimuli of written and oral reports.

Due to the need for securing proper coordination at the work level of organization when the number of unit organizations is large, there is a specialization of the managerial organization. A manager cannot perform all the activities required to secure the coordination of those he supervises directly and indirectly because of his limitations. For this reason a specialized formal unit organization called a staff may be formed to perform certain activities for the manager. The development of the staff function and the line and staff organization has been the principal organizational change of the past half century. To this innovation of organization can be credited much of the genius of organization that American industrialists are reported to have. Without highly developed staff unit organizations whose function is to aid managers to coordinate the activities of their subordinates, the great industrial organizations could never have come into
being. Formal unit organizations engaged in such activities as production planning and control, purchasing, accounting, budgeting and auditing, time study, and many others were developed to gather and present information to managers. From these specialized unit organizations comes a vast number of reports, oral and written, which are stimuli impinging upon managers at all levels. These are relayed in part in the form of orders and reports down to operative personnel at the lowest level of the organizational pyramid. While there is a specialization in the managerial function, these managerial and staff unit organizations have as their basic function the influencing of the operative group toward a system of coordinated activities. Everyone in the organizational pyramid above the operative group is assisting in bringing stimuli to operators to guide their hands in performing the right acts at the proper time, place, and manner.

It is interesting to note that the number of staff unit organizations in industrial organizations has increased tremendously in the past fifty years and a whole new class of clerical and technical workers has come into being. All indications seem to point to continuing growth in the number of staff unit organizations, particularly those related to techniques. This is an indication that greater overall productivity is being attained not by adding greater numbers of workers but by a higher degree of coordination from highly specialized unit organizations and workers.
Summary:

Cooperative systems that return more satisfactions than the cost in burdens to all contributors as they individually evaluate them are successful unit organizations. Successful unit organizations have a strong tendency for growth, not only because more people want to share the satisfactions of the unit organization, but also because there are satisfactions to current contributors inherent in the growth process.

All industrial organizations have grown from a single formal unit organization. The three essentials of unit organization must be continuously and simultaneously present for every contributor to every formal or informal unit organization. Growth or the addition of additional formal unit organizations is dependent upon the availability of potential contributors who can and do agree upon a resultant of cooperation, recognize and respond to the incentives offered, and perceive and perform the acts needed to achieve the prospective resultant.

The activities which comprise additional unit organizations are specialized. The resultant of an individual unit organization of a complex of formal and informal unit organizations is a sub-resultant of the complex. The principal basis of specialization for a new formal unit organization is chosen by a manager with regard for the over-all efficiency of the complex. The manager considers the contribution that specialized activities will make in achieving the
resultant and the cost in incentives for obtaining the activities. The operation of a plant at night (specialization by time) may not contribute enough to warrant the payment of a night shift differential and a new bay is built on the plant (specialization by place).

The growth in the number of contributors at the primary level of organization (customers and employees) has caused the specialization of the functions and activities of coordination and stimulation of managers, and the rapid growth of staff unit organizations. These innovations of organization are the strength of American industry and one of the principal, if not the principal, reasons for high productivity. Certainly it is the basis for our mass production industries and the basis of the skill of our industrial engineers and managers.
Chapter IV

THE MANAGEMENT ACTIVITY

In Chapters II and III, an attempt was made to describe organizations in terms useful for understanding the activity of managing. This effort led to a concept of organization in which unit organizations are regarded as consisting of coordinated physical acts of persons. Physical acts of persons are capable of sensory perception. Thus, it is possible to "see" a unit organization. This aspect of this conceptual scheme permits the functioning of unit organizations to be quite readily observed and capable of examination and analysis in terms of the experience of many observers. Definitions expressed in terms of a common sensory experience were proposed as a means for avoiding the pitfalls of substituting one linguistic symbol for another without informing.

In the same way, it is believed that a concept of management to be most useful should have as its central thesis physical acts of persons, in order that management may be defined in a manner that is possible of sensory verification. If for no other reason than for teaching in the broadest sense, one should be able to point to a management activity so all can "see" it. Experience and "know-how" can most conveniently be passed on to a new manager if that "know-how" can, at least in part, be demonstrated.

In this and the following chapters, an attempt is made to define and describe management. The concepts of management to be developed
will be developed in terms consistent with the concepts of organization developed previously. They are planned to be as useful as possible in solving problems of the cooperation of people. It should be recognized that all definitions are in greater or less degree arbitrary. They are neither right or wrong, only more or less useful in problem solving.

The terminology used in some literature and practice is inconsistent and sometimes confusing. As used in this dissertation, the term managing or management will be used to denote activities of persons, not the persons themselves. Persons engaged in the activities of managing or management will be known as managers. Persons will be considered to be managers only during the time that they are managing. The term manager is used to include titles such as Administrator, Executive, Coordinator, Foreman, President, and other similar terms commonly used to designate those who manage.

**Management - A Physical Activity:**

A unit organization is a system of consciously coordinated forces or activities of two or more persons. Managers are persons who contribute some of the acts that constitute the formal unit organization. In a formal unit organization, management is the activity that managers contribute, an activity of a special kind that is a part of the system of activities. It is an activity different in character from that supplied by the other contributors to a unit organization. Those who contribute this activity often bear a special title or other distinguishing designation to set them apart from other contributors of acts
to a unit organization. One of the distinguishing features of the managing activity is that its function is to facilitate the coordination of the acts of others. The managing activity does not directly become a part of the physical resultant of unit organizational activities. For example, suppose that two contributors to a unit organization take red and white bricks from a random pile and stack them in a geometric and color arrangement in accordance with the spoken directions of a third contributor. It is clear the transportation of the bricks from the original pile to their position in the second pile is a physical resultant solely of the acts of the two contributors who physically handled the bricks. The manager's contribution of the spoken direction, a physical act, indirectly caused the bricks to be moved in a certain way, but did not directly contribute to the movement of a single brick.

Management is a physical activity. This statement does not exclude or deny the necessity for the mental processes that must precede and accompany all physical acts. But to other contributors, these mental processes are only inferred from perceiving the physical acts. Thought processes are not directly evident to the senses except as they are inferred from physical acts, be they so slight as the furrowing of the brow. Thoughts until translated into acts cannot effect another person.

The mental process of decision-making is not, in the view taken
here, a management activity of itself, but a process that precedes and accompanies the physical activity of management. Decisions unexpressed in actions cannot be perceived by contributors. Decisions made by a contributor to an organization which do not result in some physical act cannot become a part of a system of acts. Mental telepathy is not here considered to be an established fact.

Diffusion of Decisions

Observation of organizations leads to the conclusion that decision-making is widely diffused. Managers fall far short of making all decisions necessary for coordination or even most of them. It is obvious that all contributors must make innumerable decisions pertaining to the acts they perform in coordination with others. A manager may decide to have two pieces of material welded together and issue an order to have it done. The welder must decide on many alternatives, whether and how to grind the ends to be joined, should an electric arc or gas welding process be used, the kind of welding rod to use, the number of beads to lay down, how to position and hold the pieces, and the cooling procedure to be used. In addition, he is constantly making new decisions of when and how to move his torch and rod as he is laying down a bead. Training and practice are extensively used to decrease the time for a decision, to make it habitual or sub-conscious and thus, simultaneous with physical action. But reducing the time for decision or rendering it habitual does not eliminate the decisional process.
It appears that decision-making often can be readily and effectively delegated. In evidence of this, the tendency to utilize large staffs in many industrial organizations may be noted. The functions of staff employees are to determine available alternatives, to reject those obviously unfeasible, to sift and weigh information, and to formulate and recommend courses of action to the managers who implement these by communicating them, and the directions necessary to put them into effect, to proper persons.

It can hardly be overemphasized that the success of an organization depends upon the performance of appropriate activities. The process of coordination is essentially a process of having appropriate acts performed by several persons in proper relationship with respect to time, place, and manner. Staff employees perform much of the exploratory and creative work in deciding what acts are needed, who is to perform them, when, where, and how. This division of effort is quite common in industrial practice and is exemplified by such staff functions as personnel, engineering, time study, methods, production control, and accounting.

The source of the decisions to perform certain tasks is often unknown to the person or persons who ultimately will be called upon to perform them and often is a matter of indifference to them. The source of the communication about the decision is vital to the contributor and determines whether the communication about the decision will be
accepted by the contributor as guiding his actions. Staffs may decide, but only managers may communicate the decisions.

For ease of exposition in this and the following two chapters, the management activity is discussed entirely as a physical activity, and the process of decision-making that must precede all action is discussed separately.

Management is an Activity in Only Formal Unit Organizations:

A formal unit organization has been defined as a unit organization in which coordination is achieved through communication by a recognized manager. In an informal unit organization, coordination is achieved by the operative contributors unaided or as stated previously by self-coordination. The management activity that achieves coordination of the activities of the contributors is what differentiates formal and informal unit organizations. It is desirable to state again that a formal unit organization probably cannot exist without an accompanying informal unit organization. Although the activity of management is intermittent, the system of cooperation may be continuous. Only while a manager is in communication with an operative contributor is there a formal unit organization. When the contributor is out of communication but engaged in activities for carrying out the instructions, he, with the other contributors with whom he is coordinating, is in an informal organization. In the usual industrial enterprise, an operative contributor spends much more time in an informal than a
formal unit organization. For the employee on the production line, this may be 450 minutes in informal unit organization and 30 minutes in formal unit organization.

Contributors to a formal unit organization need a manager to the extent that they cannot completely (1) know and agree upon a prospective resultant, (2) recognize incentives that induce the contribution of activities, and (3) perceive the acts needed to achieve the prospective resultant. The inability of the operative contributors to perform the three essentials of a unit organization gives rise to the need for a manager.

The manager performs the following three functions to the extent they cannot be performed as well by the other contributors: (1) he perceives and selects agreeable prospective resultants, (2) he influences the other contributors to perform the needed acts, (3) he determines the acts and the relationship of the acts that must be performed to achieve the prospective resultant.

Certain advantages may result from a specialization of coordinating activities in a single person. A person of superior natural ability may be selected and given education and training to improve that ability. As a consequence, he may be much superior to other contributors in his ability to select agreeable resultants for the formal unit organization that are related to the resultants of associated unit organizations. He may also be superior in his knowledge of the source of incentives
and their efficiency to satisfy people, and may have superior powers of perception of the total environment so that he can determine the acts needed and the effect of the acts in altering the environment to achieve the prospective resultant. Taylor was one of the first to understand the advantages of specialization and he enumerated four new duties of managers practicing what he called "scientific management." The specialization of managing activities allows, of course, a specialization of operative contributor activities with corresponding increases in efficiency.

Managers have a vantage point from which they obtain information not readily available to the other contributors. By transmission of this information to the other contributors, the contributors are able to coordinate their acts. Great attention is paid in all industrial organizations to the flow of information to and from managers, who have been called centers of communication. Often large staffs are used to aid a manager in maintaining the flow of information and other large staffs, such as accounting staffs, are maintained for the sole function of gathering information.

Management Defined:

Management is the activity of communicating to contributors to aid them in agreeing upon a resultant, recognizing incentives, and perceiving the acts needed to achieve purposeful coordination of
Coordination is achieved when the contributors are stimulated to act in the right time, place, and manner as required to produce the prospective resultant. In a formal unit organization, a special class of contributor, a manager, is needed to communicate information not available or understandable to the other contributors. The manager does not communicate all the information needed. In fact, of the total, he communicates a very small, but vital amount. The remainder of the information necessary for a contributor to act in coordination with other contributors is obtained directly by the operative contributor from his perception of the environment.

**Communication:**

The methods of communication used by managers include all means by which information is transmitted by one person and understood by another. Communication is the only activity of managing. Strictly speaking, managers are managing only when they are communicating with contributors. Managers manage only those with whom they are in communication and who respond to their communication. Communication is

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1 I believe this to be in substantial agreement with H.A. Simon, *Administrative Behavior*, (New York, The MacMillan Company-1948) p. 11, in which he states that influences must be communicated downward and that these influences fall roughly into two categories; (1) establishing in the operative employee himself attitudes, habits, and a state of mind which lead him to reach that decision that is advantageous to the organization, and (2) imposing on the operative employee decisions reached elsewhere in the organization.
the bond of the formal unit organization and the bond between formal unit organizations.

A manager by some method of communication brings to the operative contributor some information which is necessary for him to know to properly contribute his activity. This is the fundamental justification for managers. If operative contributors could recognize for themselves that they would derive enough satisfaction from the agreed upon resultant of their cooperative efforts to be willing to act, and if they could perceive each particular required activity at the right time, place, and manner, then the unit organization would be self-coordinated or informal and a manager would be unnecessary.

The ability of operative contributors to perceive unaided the acts needed appears to be extremely limited and thus, none but the simplest resultants can be achieved by informal unit organizations alone. Except in simple situations, contributors rarely can recognize what satisfaction will flow to them from the accomplishment of a resultant. The basic limitation in informal unit organization is communication. Without a specialized communicator, the position served by a manager, each contributor must keep the other contributors in his immediate informal unit organization, as well as contributors in other informal unit organizations with which joint action is desired, informed of his actions.

These and other shortcomings greatly limit the possibility of
coordinating the activities of one informal unit organization with that of another informal unit organization and also thus limit the formation of a complex of informal unit organizations.

The communication media is generally the written or spoken word. But nonlinguistic symbols such as are found in engineering drawings, mathematics, colored lights, and whistles are sometimes used extensively. Also frequently used are gestures and other behavior such as hand signals to summon a crane or the raising of an eyebrow to convey annoyance.

Undoubtedly managers are not continuously in communication, and thus are performing some non-managerial work. At times, they may serve as operative contributors. Or they may be engaged in observation and thought which must precede the managerial activity of communicating to operative contributors. Such preparation for managerial activity may engage much of a manager’s time.

Managers at all levels occasionally perform the same kind of activities as operative contributors in unit organizations. For example, a manager may add his strength to that of his men when moving a heavy object or he may call on certain customers to sell products. His activity in either instance is not managerial work, although it may have considerable value by itself, and in addition, may thereby improve the quality of his subsequent managerial performance. It is not necessary to be able to perform the activities that one manages,
but the experience gained by performing them may improve the ability of a manager to communicate about them. This type of non-managerial activities, which is similar to the activities of operative contributors, probably consumes less time of the average manager than the non-managerial activities of preparation for communication.

The purpose of a manager's communication is to stimulate each contributor to contribute a particular desired activity at the right time, place, and manner. The manager receives information from many sources and after an evaluation of the information he has, he selects an immediate activity that he believes will be effective in achieving a particular desired resultant. The decisional process which includes receiving information, evaluating it, and reaching a decision is a necessary preparation for communication to stimulate coordination of contributor's acts.

The quality of managerial work is obviously affected by the quality of the preparation for it and thus, it is not unusual for managers to spend much of their time in gathering and evaluating information, and reaching decisions as to what resultants are to be achieved and what actions of contributors will be required to do so. In other words, a manager must investigate, plan, and decide before he is ready to manage. Only to the degree a manager prepares himself, can he effectively manage. In a complex of formal unit organizations, the manager of each formal unit organization is a center of communication
by which information passes from one formal unit organization to another. Information that is received from other centers of communication, plus that received from observation of the discernable environment is evaluated and forms the basis of decision. The manager translates the decision into a message and transmits it to contributors in his formal unit organization and to some or all managers in other formal unit organizations of the organization.

In the selection of managers, the ability to communicate is often given much weight. The structure of most complexes of unit organizations indicates that communication needs have been a dominant factor in their design and development.

Communication about Incentives:

As developed in Chapter III, the essentials of a unit organization are met when two or more persons (1) know and agree upon a prospective resultant of cooperation, (2) recognize incentives that induce the contribution of activities, and (3) perceive the acts needed to achieve the prospective resultant. These three essentials must be simultaneously present for each operative and managerial contributor. One of the functions of managers is to communicate information to operative contributors that will assist them to recognize the incentives. If an operative contributor does not recognize incentives or considers them to be inadequate, he withholding the contribution of a needed activity and this may cause the formal unit organization to fail.
If the operative contributor is able to recognize incentives unaided, communication for this purpose by the manager is not needed. In a complex of unit organizations, such as are considered to be characteristic of business and industry, it is seldom possible for operatives to recognize incentives unaided.

**Source of Incentives is the Resultant of Cooperation**

Contributors in a complex of unit organizations have great difficulty in recognizing the source of incentives because the source is obscure. Although most persons recognize and desire money, money does not beget purposeful cooperation unless its receipt is related in the contributor's mind to the activity he is to contribute. The contributor must understand the relationship of the incentive he receives and the acts he must perform to produce an agreed upon resultant.

It appears to be a common procedure in the training of animals to give a reward of food or to display affection immediately following the performance of a desired act. In this way, the animal becomes conditioned to associate reward with the act and performs the act in the future in anticipation of the reward. Not only must a similar association be made by contributors to unit organizations, as is done with various incentive pay schemes, but also a further and more difficult association is desirable. The contributor to a unit organization should also understand the source of the reward or incentive he receives.
The source of all incentives that are given to all the contributors (employees, owners, suppliers, and customers) to the organization is the resultant of cooperation. In other words, in organizations, incentives are products of cooperative action. It is sometimes difficult for a man in a formal unit organization within a vast complex of unit organizations such as characterize our mass production industries to understand that the benefits he receives are related to the product of cooperation. The very extreme specialization of large industries almost obscures the relationship between what the man on the bench does and his pay check. It is usually difficult to show how an individual's contribution of acts to an organized effort is instrumental in producing a resultant from which rewards for his acts flow. But it is unlikely that a person can apply his efforts most effectively or get the greatest satisfaction from them unless he understands the chain of relationship between the contributions he makes and the rewards he receives.

Most managers regard the communication of an understanding of such relationships as being part of their function. Apparently managers are often not adequately successful in this effort. As a result, some industrial managers have attempted to bolster their employees' understanding of the link between effort and reward by programs of economic education, orientation programs, profit sharing plans, and stock ownership plans.
Purposes of Individuals in Relation to Unit Organizations: Contributors have purposes of self-preservation and self-satisfaction which they are attempting to achieve through participation in unit organizations. The purposes of individuals and the resultant of cooperation are not, in many instances, the same. A resultant of cooperation of a single organization in which an individual participates may not directly satisfy his purposes, and thus in many instances, he will participate in several organizations to achieve them. The money wages an employee receives as a reward for participating in one organization will not satisfy his needs until exchanged for food, clothing, and shelter. Thus, a contributor of acts in one industrial organization becomes a contributor of money, i.e., a customer, of another business organization to satisfy his wants. This interdependency of men and organizations is well understood by most managers. What is probably not so well understood by them is the necessity to so communicate as to interpret the objective incentives, which are received by a contributor and which are products of cooperation, in terms of a contributor's subjective values of self-preservation and self-satisfaction. Advertisers appear to be most cognizant of this necessity for interpreting their objective wares in terms of prospective customers' needs. Highly mechanized automobiles are described in advertisements in terms of subjective satisfactions, such as the comfort and the feeling of freedom, power, and prestige their purchase provides. A similar necessity exists in all unit organizations and a
The function of managers is to aid operative contributors to evaluate the resultant of cooperation in terms of their subjective values in a manner that will result in a maximum contribution. This function is accomplished by means of communication.

Self-stimulated Action: Every contributor is in part self-stimulated just as he is in part self-coordinated. Certain incentives are recognized unaided by him as a resultant of cooperation. For example, the satisfaction of the gregarious instinct, the opportunity for enlarged participation, and prestige are often recognized in some degree. To the extent that a contributor recognizes the source of incentives and evaluates them, he is self-stimulated. This is true whether the contributor is an employee in a shop, or a customer of the organization. It is doubtful that most persons are sufficiently capable of self-stimulation to meet the needs of organized activity except in simple and unusual situations. Thus it is necessary that a manager engage in the special activity of interpreting how contributors' acts will produce a resultant distributable in reward for their acts and of interpreting the significance of the rewards in terms of the recipient's values. An aim in interpreting rewards to contributors is to alter their "Benefits - Burdens = Satisfactions" equation.

The content of communications for the purpose of relating incentives to resultants of cooperation and of interpreting incentives in terms of subjective values of contributors will be discussed in Chapter VI.
Scarcity of Incentives: The incentives that can be distributed to contributors to an organization are limited to those which the system of cooperation can produce. Any unit organization is in competition with all other unit organizations, with unorganized effort and with idleness, for the activities of contributors. The margin by which the incentives offered exceed the incentives available from other sources or exceed the burdens is usually slight, demanding the utmost skill of managers in communicating about incentives. There is probably no other managerial activity as difficult or as subtle as communicating about incentives to contributors to induce them to act. The maintenance of the organization must be considered among the primary responsibilities of the manager and this can only be done by continuing to obtain activities from all contributors, employees, suppliers, owners, and customers. In business, the failure to retain any group of contributors results in the failure of the business. As noted in Chapter I, failure of businesses is the common rather than the unusual occurrence.

It appears that the material resultants of cooperation alone is always insufficient to maintain a system of cooperation. It must be generously supplemented by non-material incentives. This has been recognized and expressed as, "Man does not live by bread alone." Morale surveys in business and industry have indicated the great importance of the non-material incentives to the maintenance of high morale.
It appears to be more difficult to communicate about non-material than material incentives, thus, most communications are about material ones. The less tangible and non-material incentives are so general in a system of cooperation that they go unnoticed while others are so subtle they are difficult to detect. One of the most important causes limiting the success of managers is the inability to communicate effectively about non-material incentives.

Elton Mayo's research at the Hawthorne Works of the Western Electric Company dramatically revealed the importance of non-material incentives. It was found that seemingly trivial changes in the work situation were often incentives for greater production. Books and magazines intended for managers or students are allotting an increasing amount of space to the discussion of non-material incentives. Many of the published case problems prepared for teaching management involve communications about incentives and how they affect the "feelings" of contributors.

Non-material incentives are often erroneously considered to be obtainable without cost. Like material incentives they are the resultant of cooperation and a product of someone's activities. For example, managers are expected to "have the interest of their employees at heart" and to demonstrate it by participating in office parties, company picnics, service award dinners, safety award presentations, and personal visits to the work places. Many managers can attest to the cost in their time of participation in many events where "they are
lending the prestige of their office." Because messages about non-material incentives or about one's "feelings" have seemingly more information loss due to the difference of personal referents of the words, it is usually necessary for managers to communicate more about them than about material incentives. The source of the incentives, their relationship to the activities contributed, and their evaluation in subjective terms are not easily or quickly explained.

The total resultant of cooperation available for distribution as material and non-material incentives is insufficient to maintain an organization unless the contributors are specifically selected and frequently conditioned. Managers select contributors who will evaluate highly the benefits that the resultant will provide and who will minimize the burdens the activity will impose. The manager also by persuasive communication attempts to alter the value of the incentives to the contributor, thus inducing cooperation. The number of contributors who at any given time can be induced to cooperate for the incentives is limited. The purpose of selecting and conditioning persons who like to do the work to be done is that such persons require less incentives. There is true economy when the satisfaction gained from doing a task is sufficient incentive for doing it.

Communication about Resultants:

Enduring organizations generally come into being and function as the result of someone's desire to achieve a personal purpose. The
personal purpose of organizers of business and industrial organizations is profit, but usually there are some other more subtle purposes such as desire for accomplishment, outlet for activity, and desire for prestige. The enterprise thus formed grows by a process of sub-dividing as described in Chapter III. Each unit organization achieves a sub-resultant that is necessary in achieving the final resultant. The way in which a building is constructed is in some measure analogous to the way the final resultant of a complex of unit organizations is achieved. A building is constructed through a series of separate acts of people separately applied to a brick, a tile, a board, a shingle, and a nail at a proper time, place, and manner. An automobile is assembled from parts separately manufactured by contributors in unit organizations. The resultant of a unit organization in turn is accomplished by appropriately coordinated acts of people. The most fundamental factor in accomplishment by organization is the acts of contributors, specialized as to (a) time of contribution; (b) place of contribution; (c) by whom contributed; (d) things to which applied; and (e) method of application.

The process of sub-dividing the resultant of the complex of unit organizations into resultants to be accomplished by single unit organizations is known as planning. The techniques of production planning are quite well developed.

**Material and Non-material Resultants:** The resultant of the organization and the resultants of the unit organizations of an enterprise
producing material goods are generally more easily understood by the contributors than those of an enterprise whose resultants are non-material services. Generally though, the organizations which attain the non-material resultant idealized as "fellowship" by the fraternity or civic club have contributors with an active interest in achieving it, while those organizations which attain material resultants have many contributors who are generally indifferent. Thus, the ease of communicating about material resultants as contrasted to non-material, is offset in whole or part by the indifference of the contributors, which is a handicap to understanding.

"Managers are Contributors to Two Unit Organizations." A manager is a contributor to two formal unit organizations, one unit in which he is the manager and the other in which he is an operative contributor whose activities are coordinated by another manager, a superior in the chain of formal unit organizations. Through his membership in the superior organization, the manager, by communication can aid the contributors in the formal unit organization he manages to know, understand, and agree upon the resultant to be achieved. It is from the manager of the superior formal unit organizations that he receives by communication an understanding of the resultant his unit is to achieve. The process of continually sub-dividing the resultant proceeds from the top to the bottom of the complex of unit organizations and progresses from the general towards the specific. In large organizations,
managers formulate and transmit communications about prospective resultant in broad terms and cannot perceive or know the detailed resultant of each unit organization which is necessary to achieving the large organization resultant. For example, the purposes given in the articles of incorporation of an enterprise which manufactures thousands of different products produced in great volume may be stated in very few words.

Resultants must of necessity be sub-divided for accomplishment in enterprises that are complexes of unit organizations. In the process of sub-dividing the resultant, the resultant of a unit organization is frequently changed or modified by managers and even operative contributors to conform to or to overcome obstacles of the environment. The re-definition of the resultant from level to level in formal unit organizations is not a mere repetition from manager to manager but a re-interpretation in the light of the concrete facts of the environment as the general or final resultant is subdivided into certain specific resultants for the unit organizations. For example, a manager receives a communication to the effect that the production group he supervises should produce a thousand frying pans per day. The manager, in his communications to his operative contributors, may reinterpret this resultant and order the production line to be set up to process pans at the rate of 1100 a day, to allow for unforeseen emergencies and break-downs. If he runs over his quota in any day, he can store the
excess on the production floor and use it on those days that his production group fails to produce a thousand pans. The manager also reinterprets the thousand frying pan resultant into communications for 1150 drawn shells to allow for scrap, 1150 handles, and 100 pounds of rivets. The managers of production groups concerned with producing drawn shells, handles, and rivets, to whom these communications about resultants are addressed, further interpret them to their operative contributors. Thus, the reinterpretation continues from manager to manager down through the complex of formal unit organizations.

Characteristics of Resultants: The resultant to be achieved by any formal unit organization has many characteristics. Managers must not only communicate to operative contributors the resultant to be achieved but also must describe the characteristics of the resultant in some detail. The more completely the characteristics are described, the more perfectly operative contributors may coordinate their activities to achieve it. When operative contributors know but few of the many characteristics of the resultant they are to achieve, their ability to coordinate their efforts appropriately is greatly limited and many mistakes and false starts are made. To achieve the most efficient coordination of efforts, the manager must not only tell the operative contributors that a ditch is to be dug, but also the length, width, and depth, and slope of the sides, the location of the removed material, and all other characteristics of the ditch which are unknown to them, but which they must know.
The effectiveness of a formal unit organization is determined by the clarity of the manager's mental image of the desired resultant and his skill in transferring that image to the minds of others so they may have the basic requirement for action. If the manager cannot shape up in his own mind a clear concept of the resultant, he cannot produce a clear picture in the minds of those who are to achieve it. Without a clear picture of the resultant, the operative contributor is dependent on the manager for detailed instructions for the time, place, and manner of the activities he contributes.

If a characteristic of a resultant is difficult to define precisely as might be the case where the characteristic to be defined is the color or the smoothness of the surface of a table top, a greater volume of communication will ordinarily be necessary to bring adequate understanding to operative contributors than is the case where characteristics are easily defined. The characteristics of a resultant to achieving a goal such as fellowship are especially difficult to define. The manager of an advertising agency which is preparing copy that "sells" a product probably spends much of his time in communication trying to define for his writers and artists just what is wanted. The difficulty of defining the characteristics of this intangible resultant has seemingly encouraged managers and writers to coin many new words and phrases to improve the communication process and the understanding of the resultant.
The number of instances that each of us know of costly and embar­rassing mistakes caused by incomplete knowledge of the resultant is large. This may indicate the complexity of the process of communi­cation about the characteristics of a resultant and the failure of managers to transmit that clear concept of the resultant that is required for effective action.

Resultant Must be Agreed Upon but not Necessarily Agreeable: A resultant is the product of the coordinated acts of contributors. Con­tributors engage in cooperative activity for the satisfaction that may be gained thereby. It is clear that the source of the satisfactions that may be gained from cooperative effort is the resultant of the coordinated acts of contributors. Thus, a prospective resultant is viewed by a contributor in the light of the satisfaction he expects it to hold for him. To attain the prospective satisfactions, the contributor performs acts to achieve a resultant that is known to him and to his fellow contributors in the unit organization. They are agreed that the resultant jointly known is the objective of their acts. However, the resultant need not be directly desired by any contributor to the unit organization that produces it. It may be something that is disagreeable or distasteful to them. But the resultant, whether or not it is personally desired by the contributors, must be recognized and evaluated by them as a source of satisfaction for them.
A potential contributor will not assist in reaching a resultant that he believes is incompatible with his personal purpose. If the potential contributor views the prospective resultant as not being a source of satisfaction for him or as a threat to satisfactions received from other organizations, he withholds his acts. Thus, a resultant must be agreed to by contributors; and bringing potential contributors to agree upon a resultant is a managerial function. A contributor's assent for a resultant need not be enthusiastic; it may be characterized by indifference, but if it is negative, the potential contributor will not or cannot assist in achieving it.

Resistance to change stems from the fact that a new resultant is evaluated by contributors as being less productive of satisfaction for him than a familiar resultant. The contributor who comes to the conclusion that a new resultant will increase his satisfaction will not be reluctant to change from an old to a new.

The resultant of any formal unit organization must appear to the contributors to be consistent with the resultant of the complex of formal unit organizations. This is only a variation in degree to the statements above. Employees will reject or fail to contribute to the resultant of a formal unit organization that appears to them to be inconsistent with the resultant of a complex of formal unit organizations because they will evaluate such a resultant as ultimately being in conflict with their personal purposes.
For example, an experiment was run on some production equipment to determine the length of time before it would fail if it were not lubricated. It seemed so incongruous to the machine operators that several times they interfered with the experiment by lubricating the machines. It was finally necessary to post a guard to prevent such occurrences and to explain that the machines were a part of an experiment to determine the proper time intervals between lubricating the moving parts. In other words, the explanation made the resultant acceptable to them.

Orders and Directives are Communications About the Resultant

Orders and directives transmitted by managers to operative contributors are communications about the prospective resultant. Reports and returns are communications from operative contributors to managers advising of the progress in achieving the resultant. Orders and directives may be given in great or little detail. Their purpose is to provide contributors with information relative to the resultant to be achieved.

"Bake 4000 doughnuts" may be sufficient instructions for an experienced baker to understand the resultant to be achieved in a familiar situation. But even an enormous amount of communication might not be adequate to convey the more subtle aspects of "bake 4000 doughnuts" to an inexperienced baker. One important advantage of skilled and experienced operative contributors is that they require fewer orders and directives. "I can do it easier than I can tell him" is frequently
heard. The ability to understand much from little communication is an important factor in the worth of contributors in cooperative efforts. Enhancement of the ability to communicate is indeed an important factor in education. In reports and returns operative contributors communicate about their progress in achieving a resultant. If the manager is well equipped to understand the situations communicated about in reports and returns, the latter need only be fragmentary. What has been said about orders and directives above applies in its essential aspects to reports and returns. However, orders and directives appear to be inadequate more frequently than reports and returns in industrial organizations.

Orders and directives constitute an important part of managers' communication and later will be discussed in greater detail.

Managers' Communication to Aid Perception of Contributors: The third of the three conditions that must be simultaneously present for a unit organization to function is that each and every contributor must perceive the specific activities required of him to achieve the resultant. A contributor may be willing to contribute activities to a unit organization to achieve a resultant that is known to him, but he may not know the specific acts to apply or the proper time, place, or manner, to apply them. He cannot always perceive from the acts of others or from the environment what he should do. Even a command or order may be unintelligible to him and may be ignored because he does
not understand it or because it does not seem consistent with the situation as he sees it. More frequently, perception is only partially adequate and some act is contributed, but it is not wholly appropriate as to time, place, or manner. For example, a clerk sends out a form collection letter to an overdue account and thereby his firm loses a large account because he did not understand or know the temperament of the client and perceive the need for giving him special treatment. Or a machinist does not change the tool in his lathe because he doesn't know that the material being procured has been changed from mild steel to stainless steel. Many examples of the contribution of acts that were not appropriate to the purpose to be served as to time, place, or manner can be cited. Inappropriate acts are contributed when the perception of the contributor is inadequate because either he does not have or is unable to understand the information necessary to act appropriately.

Knowing and Understanding the Environment: The information that must be known to act appropriately is all the facts of the situation that affect the particular act; that is, a knowledge of the environment. It is impossible to know all the facts of the environment or all the consequences of acts that may be applied to the environment. It is necessary to treat any decisional problem, no matter how broad or narrow, as an isolated and independent system, thus ignoring some factors in the environment and some consequences. This is, of course, a source of frequent but many times unavoidable errors in management.
For purposes of discussion, the environment is classified as being physical, biological, and social. The physical environment consists of matter and energy; the biological environment consists of the life processes of growth, reproduction, and internal adaptation; and the social environment consists of the interactions of the people and their thoughts about their interactions.

It is a knowledge of these three segments of the environment, especially the physical and the social, that is necessary for appropriate action. For example, a knowledge of the physical characteristics of soil is necessary if one is to dig a trench effectively. Certainly one would not use the same motions in digging in hard clay soil as one would use in loose sandy soil. Similarly, the social environment also may determine what will be appropriate acts. Men of one creed remove their hats or caps when entering their house of worship while men of another creed put on a cap.

The function of unit organizations is to alter the physical environment by means of the acts of people and so produce utilities for them. The environment is influenced by, and in turn influences the actions of people. The motions a brick-layer uses are not likely to be those recommended by Gilbreth as a result of his intensive study of brick-laying, but motions taught to him by other bricklayers who considered them appropriate to the task. The number of bricks laid and thus, the number of motions may be conditioned by knowledge of
what a social group such as a labor union considers to be adequate. These examples serve only to point up the fact that acts of persons in unit organizations are selected and conditioned by knowledge of the environment and are more or less successful, dependent upon the completeness of their knowledge of environment.

Perceiving the Environment in Industry: In industry or any other organization where there are almost numberless activities to be closely coordinated, an individual is seldom if ever able to perceive all the appropriate factors in the physical, biological, and social environment. It is an important activity of managers to aid contributors by communication to perceive the pertinent strategic factors in the environment so that the contributors can act appropriately. Orders and directives of managers are almost always accompanied by informational comments about the environment. This is nothing more than the maxim that it is necessary not only to tell a subordinate what, but also how and why.

Managers communicate to the members of their formal unit organization about the environment so that the members know and understand the factors in the environment that have a bearing upon the action they shall contribute. Managers comment upon such aspects of the environment as: the existence of certain factors, the relationships between the factors, and the relationship of the environment to the contemplated action. Managers tell clerks about the temperament and attitudes of a particular client toward form collection letters (the
social environment), or about the characteristics of a steel (the physical environment), or about the effect on a carbon tool when cutting stainless steel (relationship of factors of the physical environment.)

Of all the management activities, communication about the environment is probably the most time consuming. Because of our greater knowledge of the physical sciences, managers probably comment with greater accuracy about the physical environment than about the social environment, although for coordination they are probably equally important. Production of goods and services is probably limited less by inadequacies in our knowledge of engineering and the physical sciences than by inadequacies in our knowledge of the social nature of man and his interactions. This probably has a bearing upon the desire of industry for engineers well grounded in the humanities and social sciences. Limitations of knowledge of the environment limit the information a manager can communicate to contributors. Frequently, cooperation fails because contributors lack adequate information about the environment, particularly the social environment.

**Physical Environment**: A knowledge of the physical environment, in terms of cause and effect, is especially important in manufacturing where the resultant of the activities, the product, is an alteration of some physical matter. All organized effort is directed toward altering the physical environment as in the manufacture of machines, the building of structures and the transportation of things. The
first step in altering the physical environment through organized effort is to determine what acts of the contributors must be performed to do so. This requires communication about the physical environment. A second step is to influence contributors to perform the necessary acts. This may require further communication about the physical environment to enable contributors to recognize physical incentives. But communication about factors in the social environment usually also will be needed to create and maintain willingness in contributors to act as required.

Our industries are based on a complex technology, and increasing numbers of technicians, engineers, and scientists are needed to operate them. The ability of engineers to understand the physical environment has led to the selection of engineers as managers. They are perhaps the best prepared to determine what must be done by physical forces to the materials of nature in fashioning them to satisfy the wants of man. A knowledge of what to do to alter the physical environment is applicable in determining what acts must be applied by persons in unit organizations seeking to wrest satisfactions from the physical environment. The first requisite of communicating information is to have useful information, that is, information that agrees with the facts of the environment.

Biological Environment: The biological environment embraces elements of the total environment that are characterized by life processes. Except where the actions of human beings are concerned, which
are considered to be in the social segment of environment, the biological segment of environment may be treated in much the same way as the physical segment of environment in so far as the activity of managing is concerned.

This may be illustrated by an example. Suppose that an organization operates a farm which produces vegetable and animal products. At one stage of their production, these products were endowed with life and so were a part of the biological environment. To produce the vegetable and animal products required that certain acts, physical acts, be performed by contributors to the organization. Some acts consisted of the operation of farm tools and machinery to manipulate the soil, place seeds in the soil, and harvest and separate parts of plants. The animal products would result from such acts as bringing feed to the animals, driving them by means of shouts or lash from one building or field to another, and finally, slaughtering them.

The point to be made is that after a knowledge of the biological environment has revealed what acts are required of contributors to attain desired resultants, many situations involving biological phenomena may be treated much in the same way as their physical counterparts in the activity of managing.

One aspect of the biological environment of organizations is the biological aspects of the contributors themselves. Contributors must supply physical forces, so their capacities to do so become a factor
to be considered. There are yet places where the physical power of contributors is of importance but in industrial applications it is observable that man's function is progressing to being primarily that of a controller of the physical forces of machines. The field of motion and time study, widely used in industry, is specifically directed to the effective use of human physical powers in conjunction with machine power with due regard to cost. But other than under unusual circumstances a knowledge of the biological limitations of contributors, except as may be obtained from normal association with people, seems not to be an important factor in managing in most industrial situations. Therefore, communication about the biological limitations of contributors constitutes but a minor part of most industrial managers' activities. But it may of course be a large factor in the management of athletes or of military personnel under some circumstances.

Social Environment: The social environment is the interactions of people and their thoughts about their interactions. The acts contributed to a unit organization are conditioned by the operative contributor's knowledge of the social environment. The manager attempts to correct by appropriate communication, any deficiencies of this knowledge that dull the contributor's perception.

The functioning of organized human effort, that is the coordination of the efforts, is social in nature because it involves the interaction of persons, and because the persons whose acts are being coordinated are elements of the social environment. People think about
their interactions and form certain attitudes towards them. A knowledge of another person's attitudes is often necessary so that one's acts can be coordinated with his. Managers aid contributors to perceive the attitudes of other contributors. For example, a manager of a sales organization is intimately acquainted with the idiosyncrasies and the buying habits of a customer, Mr. C, who is in the market for an expensive piece of equipment. The manager has decided that his best salesman, Mr. S, should make the sales presentation to Mr. C, and the manager has called him in to instruct him in what to do in a meeting with Mr. C. A very major part of the instruction is a description of Mr. C's idiosyncrasies and buying habits. Even with a great deal of communication about this subtle aspect of the social environment, only a small amount of information will be conveyed.

**How Managers Influence Operative Contributors:** Managers seek to influence the activities of other contributors by communications. Managers communicate by performing muscular acts that produce spoken or written language or by other behavior possible of interpretation by contributors. Management is certainly not literally the "handling of people" in the usual sense in industrial organizations. A manager functions by altering himself; that is, by engaging in muscular activity that will result in communication. It is hoped that the communication will influence the contributor to act appropriately. If a contributor does not respond properly to a communication, criticism
of the contributor appears to be without point, to accomplish no real purpose. In managing, the responsibility of the communicator is more than the mere transmission of signals to contributors. It includes the inducing of understanding, the evoking of desired responses of contributors. If a desired response is not evoked by a communication, a manager's only realistic recourse is to communicate again in a different way in the hope that the new communication may cause the recipient to respond as desired.

For example, a manager, after warning a worker about a hazard and demonstrating a safe practice to avoid the hazard, may find that the worker has ignored the warning and is not following the prescribed method. The only course open to the manager if he wishes to gain compliance is to communicate again. He may add an incentive such as discharge or disciplinary lay-off to the warning or he may explain the reason for following the prescribed method. In any event, all the manager can do is to try to influence the worker by communication. The only person the manager can "handle" is himself and by "handling" himself, he influences the actions of others. If the worker isn't influenced, then all the manager can do is to "handle" himself differently, projecting a communication differing from the other, or re-enforcing the other until the worker chooses to respond acceptably.

When a contributor fails to respond as desired to a manager's communication, the manager should recognize that the shortcoming lies
Managers Must be Sensitive to Changes in Environment. The environment is dynamic and constantly changing. Within it, the manager is trying to maintain a system of cooperation. A system of cooperation, such as a manufacturing concern, a college, or a civic club, must continually adjust to changes in the environment to maintain an equilibrium. It is the function of managers to note changes in environment, and by means of communication to call forth acts from contributors to cope with the changes.

The successful sales manager is one who may note changes in the buying habits of people, who may detect a growing want for a particular service or product. These are changes in the social environment. A production manager may note a tendency for a mid-morning break in work tempo and decide to initiate coffee service, another adaptation to changes in the social environment.

A manager may note changes in the economic segment of the social environment, changes in the interest rates which affect his instructions to borrow funds, or changes in the general economic outlook that cause him to order an increase or decrease in the over-all production schedule.

The physical environment is an important factor in manufacturing industries, and those engaged in managerial activities, particularly
those at the so-called middle management level, are much concerned with it. It is obvious that where cooperative acts are always directed at altering the physical environment, a knowledge of this segment of environment is valuable in determining what acts should be performed.

**Skills Needed by Managers:** Since managers are communicators, they should be proficient in the skills and art of communication and should have a knowledge of the subjects about which they communicate, namely the environment, incentives, and resultants.

For most industrial organizations, the areas of environment that seem to be most important are those embracing physical and social factors, including economic factors. For communicating to contributors about the physical environment, training to develop skills in the field of engineering and the sciences appears to be desirable. To communicate about the economic environment, a study of economics would seem desirable along with a working knowledge of accounting.

For communicating about incentives, a knowledge of the behavior of people is involved, for the response of persons to incentives is the crux of this aspect of communication. This suggests skill gained from association with people and study of some areas of psychology and sociology.

To communicate about the resultant so that the communicator's mental image of the prospective resultant is received by the operative contributor without severe distortion is most difficult. This skill demands a clear concept, which is generally a mark of high intelligence
and probably is not significantly improved by study of any field of knowledge or particular set of facts. This suggests that managers must be men of better than average intellectual ability.

Summary: In formal unit organizations, managers perform the activity of communication to aid contributors to know and agree upon a resultant, recognize incentives, and perceive the acts needed to achieve purposeful coordination of their activities. Managers manage only when engaged in the physical activity of communication with operative contributors for the purpose of facilitating cooperation and coordination of the activities of contributors.

Observation of the environment, and mental reflection done in preparation for managerial communication are not considered to be managerial activities but are considered to be parts of the decisional process, which will be discussed as a separate process. The decisional process is not an activity that is coordinated with activities of others and thus is a personal, not an organizational, process. Even though a person may have the title of manager, it is clear that he serves in that capacity only intermittently, for communication will ordinarily require some prior preparation and also because most managers perform some activities not related to managerial communication.

In complexes of formal unit organizations such as are represented by industrial organizations, it appears that the managers who are at what may be termed the apex of a pyramid of formal unit organizations, the high executive positions, are engaged in managing a greater
part of the time than do managers who constitute the first level of supervision. Even workers may function as managers for brief intervals of time.

The managerial activities of persons near the apex of a complex of formal unit organizations differ in character from that of persons near the base of the complex. Communication at the apex is concerned largely with the selection and transmission of resultants and secondarily with incentives and environment. As the base of a complex is approached, managerial communication deals increasingly less with the resultants and more with incentives and environment. It is at this level that the physical environment is altered by acts of contributors to produce the resultant.

A manager's communications are accepted by workers because of his actual or believed superior perception of (a) the environment, (b) the resultant of the unit organization and its relationship to the resultant of a complex of formal unit organizations, and (c) the source of incentives. The experiments of Professor Alex Bavelas at the Massachusetts Institute of Technology have shown that there is a relationship between a person's occupancy of a favorable or central position in a unit organization's communication system and his becoming the manager of the formal unit organization. If a small group engages in some cooperative activity, the manager will tend to be that person who has the best information necessary for the maintenance of cooperation.
Chapter V
THE PROCESS OF COMMUNICATION, THE
ACTIVITY OF MANAGING

It seems desirable to discuss first the process of communication without reference to the subject matter of the messages communicated. In the following chapter each of the three subjects of a manager's messages, environment, incentives, and resultant, will be discussed. All communications of coordinative contributors in organization can be classified as messages about these three subjects which are related to the three essentials of unit organization as stated in Chapter I, and to the definition of management as stated in Chapter IV.

In this chapter, we are concerned with the procedures and processes by which a manager influences an operative contributor and vice versa. The word "communication" in this dissertation includes all procedures by which one mind may affect another.

Growth in Interest in Communication:

In the past decade, the whole process of communication has received considerable attention, and for a good reason. The activity of communicating is the essential activity of managing. The increasing attention indicates that either or both (1) the degree of coordination to be achieved has become more precise or, (2) the management or communication activity has become more difficult.

It appears that the degree of coordination has become increasingly precise in some ratio to the increase in degree of specialization
in industry. The assembly line and the emphasis on highly specialized persons, closely controlled material movements, and machine speeds are good examples of the increased precision of coordination; especially when one compares this method of manufacturing to that of guilds of craftsmen each producing a complete product. This increase in precision of coordination is not limited of course to industry and business, but seems to pervade society as a whole. The increase in specialization of individuals resulting in part from the Industrial Revolution and the growth of an urban rather than a rural society has made all of us less independent and more interdependent. Because of this interdependence, coordination of our daily activities as to time, place, and manner is increasingly precise. Although our ancestors carried on their activities without a watch or clock, one is indispensable today. Practically everyone must begin his daily activities at a predetermined hour because of our interdependency, and thus, our need for coordination. One arises at a predetermined hour so one can catch a bus or streetcar that leaves at a predetermined time so that one can arrive at his place of work at a predetermined hour, and so forth.

To achieve this always higher degree of precision of coordination, the volume of communication has increased enormously. This has been especially true in business and industry. The growth of "paper-work" has seemingly grown in some exponential ratio to the increase in precision of coordination. This great volume of inter-unit organization
communication has increased the difficulty of the whole communication process.

But probably more important than volume in focusing attention on communication, has been a realization of the degree of ineffectiveness of some communications of managers in influencing the behavior of those to whom the communications are directed. Orders are issued that are not obeyed or, as is most frequently the case, they are not issued because the manager knows they will not be obeyed. Directives that were acceptable ten or twenty years ago are no longer acceptable. Employees may engage in activities that do not increase the resultant of an organization and may actually detract from it, thus reducing the amount of the incentives available to the contributors. The ineffectiveness of many messages of managers has caused them to be increasingly aware of the whole communication process and to believe in some cases that the problem in their industry is an acute one.

The ultimate goal of communication is to influence the behavior of another person in a certain way. Whether the communication does influence behavior in the manner desired is dependent upon whether the receiver of the message understands and accepts it.

In oral communication, which is the most common, sound waves of a certain pattern impinge upon the auditory system of the hearer or receiver. The interpretation of the sound waves which objectively constitute the message rests with the receiver and is a mental process.
What behavior is induced in the receiver of the message depends upon his personal history.

"Today, a contributor to any organization receives a vast amount of information from sources other than from that organization. All of this information constitutes the personal history of the individual and in turn has its influences on his behavior. The volume of messages directed at a person today has increased so rapidly that many men consciously try to avoid some messages. Certainly the number of messages is so great that the individual carefully selects only a very few to act upon and ignores the rest. From radio, television, newspapers, magazines, to name only the mass media, pour a constant stream of messages and if one responded to every imperative admonition such as, "Rush right out and buy a pack today," he would soon find it physically impossible to comply. An individual who chooses to ignore most of the messages outside of his unit organization in the industrial organization may carry this habit of a careful selection of messages into the unit organization and thus ignore many messages of the manager.

In other ways, the history or conditioning of the individual may have changed markedly over the past twenty years. The language of advertising has been highly developed with the intent to induce a behavior of buying an advertised product. But in part, the process may be self-defeating for as the skill in using symbolic language has increased, so probably has the ability of the reader to
discriminate meaning. It was *Fortune* magazine in a series of articles entitled, "Is Anybody Listening?" later published in book form by Simon & Schuster, that raised the question of the response of the reader to "gobbledygook." One might question how a reader is conditioned by advertising messages from his industry such as, "newest, most modern car in the world," "Sleek luxurious beauty, a result of 50 years of craftsmanship," "This new product takes all the work and drudgery out of polishing your car," in which he discerns meaning not necessarily equivalent to the meaning of each word as commonly used. In other words, he does not believe all each message says. Does this conditioning affect his interpretations of communications attempting to influence his behavior within the unit organization?

It is probably safe to conclude that the activity of managing, which is entirely communication, is becoming more complex and difficult due to (1) increasing specialization causing a need for greater amount of communication, and (2) changing of social and cultural patterns that have reduced the acceptability of some communications.

**Communication Defined**

"In keeping with the established pattern in this exposition of operational definitions, *communication is defined as any activity by which information is transmitted by one person and received and understood by another.""

The definition is purposely broad to include not only the movement of the vocal chords, but also all signs caused by movements of other
parts of the body. A raised eyebrow sometimes conveys more meaning to another than a flow of language. Although the telephone is technically a versatile instrument, it has not entirely supplanted the need for face to face communication where signs are available in addition to language, and understanding is more complete.

Although language, both oral and written, is the main symbolic process used in industry, important messages are conveyed by other symbolic processes, such as numbers and pictures, which have been refined into such communication processes as accounting, mathematics, and engineering drawing. It is interesting to note that in many situations when the transfer of meaning must be precise or rapid, symbolic processes other than language are used. Some examples are music, the architect's plans for a building, or the atomic physicists' mathematical equations.

**Communication is a Physical Process**

If a person is to influence another, a contact of some kind, either direct or indirect, must be established between them.

Consider first the sensible ways in which contact may be made. Persons are able to detect stimuli by means of their senses of sight, touch, hearing, taste, and smell. A person who consciously wishes to influences another does so with manifestations of himself by projecting stimuli. A person may shout an order which can be heard. Under some circumstances, a shouted order will influence a person.
A shouted order as it leaves a sender consists of air waves. These air waves were induced through action of the sender's respiratory system by forcing air over his vocal chords. More simply put, the air waves were induced by muscular action. The final causative factor in willful personal manifestation appears always to be muscular action.

A person may manifest his wishes in ways that are received through the sense of sight. For example, one may beckon for another to come nearer by a motion of the hand. This signal is carried by light waves to the retina of the receiver. The pattern of the light waves was induced by the shape and color of the hand and the motion imparted to it by the muscles of the sender. Similarly, all sight-received manifestations of another person, such as smiles, winks, frowns, gestures, whether friendly or hostile, are muscular poses or motions of elements of the body transmitted to a receiver by reflected light waves. In musculelywritten work the effect of muscular action in the form of traces of ink on paper is transmitted to a receiver.

A stimulus received by a person through a sense of touch requires a contact which no matter how light, must to some extent compress a part of the receiver's body. This effect is caused by a force supplied by the muscles of the sender and transferred directly or indirectly to the receiver, as for example through a rod, or a thrown stone. Heat waves which are received through surface nerve endings are also dependent upon the muscular set of the emitting person in
much the same way that muscular action and set affect the reflection of light waves.

Of the five senses that enable a person to receive stimuli from another that may influence him, hearing, sight, and touch are of primary importance; and the senses of smell and taste are of secondary importance in relation to the activity of managing formal unit organizations. Stimuli received by the senses of smell and taste consist of quantities of matter and will require physical force to transfer them.

If extra-sensory preception is denied it seems reasonable to conclude that all influences of one person upon another are manifested through muscular action of the former. Thus, at the lowest level of abstraction the process of managing, that is influencing persons to act and to coordinate their acts, consists of muscular activity. At this level of abstraction, a failure of subordinates to respond as desired may be attributed to inadequate muscular activity of the manager. At a higher level of abstraction, a similar failure may be attributed to the fact that the sounds, appearances, physical contact, etc., produced by the leader were inadequate. Sounds, appearance, and physical contacts at a still higher level become speech, demeanor, written words, blows, caresses, and so forth. At any level of abstraction it is evident that influence of one person by another is exclusively the result of objective acts.

The subjective thinking of a person may influence his muscular acts, but his subjective thinking is not directly transmitted to
another. The manifestations of muscular action that impinge on the
sense organs of a receiver are objective but the interpretation of
their meaning by the receiver rests with him.

The point in this analyses is to focus attention upon the fact
that a communicator's influence resides in what he does that is trans­
missible to recipient persons. For example, interest that resides in
the mind of a manager has no meaning to contributors until there is a
manifestation of it in concrete terms. Greater cognizance of this point
would lead to greater understanding of the need for adequate communica­
tion. It is not enough for a manager to be sympathetic to the aspira­
tions of his contributors, he must demonstrate this fact by concrete
acts which his contributors will interpret to mean that he is sympathe­
tic to their aspirations.

Communication Described:

The communication process may be represented as follows:

![Diagram of communication process]

Figure 12: Schematic representation of the communication process.\(^1\)

\(^1\)Adapted from Shannon, Claude E., and Weaver, Warren. The Mathematical
Theory of Communication. p. 98. Urbana, The University of Illinois Press,
1949.
The communicator, a manager, at any instant has certain information that he wishes to be understood by a receiver, in this example an operative contributor in a unit organization. He abstracts from the mass of information of infinite detail a finite message that is intended to convey sufficient information to obtain the desired response. This mental process of abstracting the particular and selecting the message is preliminary to the communication process.

To transmit the message, it must first be changed into some signal which includes coding the message. To code, appropriate symbols must be selected to convey the information, which in the case of language is the selection of appropriate words. The words are further translated by the vocal chords into sound waves which are conveyed by the air to the receiver. The process of transmission includes the semantic problem of coding and the selection of the communication channel, which in industry may be varied and numerous.

As the signal is carried from the transmitter to the receiver, some "noise" is always introduced that tends to distort the signal and may even make it unintelligible. Noise is any extraneous signal in the same or other communication media that is simultaneously received tending to reduce intelligibility of the principal signal. For this as well as other reasons, many communications in industry are written to avoid the distortion by noise to which oral communications are prone. For example, if at the time one is saying yes, he is also shaking his head
in a horizontal plane, a symbolic process commonly associated with no, the sound signal and the sight signal will interfere and the receiver, if he is to extract any information, must sort out and discard one signal.

The receiver, the operative contributor, receives a signal by having it impinge on some sensory organ, usually the eyes or ears. He sorts out the noise and decodes the signal, which is the reverse of the coding process.

The message which is now not a word or sound goes to its destination, the brain of the receiver, where it becomes an actual or potential stimulus to action.

Two-Way Communication: This generalized description of the process of communication is also a description of the activity of managing. The manager selects messages from information sources about the environment, the prospective resultant of cooperation, and the incentives; and codes and transmits them to operative contributors to influence their behavior in a manner deemed by the manager as being most efficacious to achieve the resultant envisioned by him. In a process described by Dr. Norbert Wiener of the Massachusetts Institute of Technology as "feed back" the operative contributor communicates to the manager about similar subjects. He sends messages of his feelings about the incentives offered and about his wants and desires; he reports on progress toward achieving the resultant and he also comments on the environment, physical and social. This "feed back" of messages
to the manager adds greatly to his source of information and thus, allows him to improve his messages to achieve coordination. "Feedback" of messages or "two-way" communication is essential in organization.

Dr. Paul Pigors also of the Massachusetts Institute of Technology, has stated that there is no communication until there is a response. He describes a communication system in an organization as a loop with messages traveling from the sender to the receiver and responses traveling from the receiver back to the sender. The response may be the desired

![Figure 13: The loop of communication](image)

behavior stimulated by the message, or it may be a message telling the original sender about the receiver's attitude toward the message or of an effect not discernable to the sender. The response is as
important as the message. Managers' messages to contributors cannot be more effective than the feed-back or response that they elicit. If the feed-back is zero, there is no communication and no management. This fact has been receiving increasing attention and managers are attempting to improve the quality and increase the quantity of communication that flows back from operative contributors to them. Employees through their unions have established a new and effective communication channel, the grievance procedure, which allows employees to express their feelings toward communications of managers. Some managers have recognized the value of these communications as additions to their sources of information which may increase the effectiveness of their communications in altering the behavior of their employees. Two-way communication is progressive. It is greatly handicapped by the fact that a communicator can never learn completely and rarely adequately from the response of a recipient what effect a projected message has had on the latter.

Three Aspects of the Managers' Communication Problem:

The final objective of communication in unit organization is to influence the behavior of the receiver of a communication in a manner desired by the communicator. The method is to transmit information from the information source or brain of the manager to the destination or brain of the receiver. Received information becomes a part of the history of the receiver and will have an effect in determining the way in which he will act now and in the future. Communications of managers
are directed towards guiding the hands of operative contributors so that their activities may be purposefully coordinated.

From the viewpoint of a manager, there are three aspects of the communication problem. These three aspects are: (1) Problem of Abstracting the Message, (2) Problem of Coding, and (3) Problem of Selection of Media and Channels of Communication. Each of these aspects has a bearing on how effectively the received information influences the behavior of a person in a desired way. A communication cannot be more effective than the least effective of any of the three aspects of communication.

Problem of Abstracting the Message: Communications are stimuli. There can be no response until there is a stimulus. The problem for the manager is to select from the mass of information available to him, a message that will not only stimulate the contributor to action, but to action in a desired time, place, and manner.

The prospective contributor of a prospective activity can be viewed as a body held in a position by stimuli whose net effect in any direction is zero.

In Figure 14 the arrows represent the magnitude and the direction of stimuli which tend to cause a contributor to move in a plane. Figure 14 is similar to a "free body" diagram used in the study of engineering mechanics.
Figure 14: Schematic representation of the magnitude of stimuli tending to cause a contributor to move in a plane.

If the manager wishes the contributor to move to the left, he abstracts a message from everything he knows that will so alter the stimuli acting upon the contributor as to cause him to choose to move to the left. The message may strengthen stimuli originally tending to cause the contributor to move to the left or it may weaken stimuli originally tending to cause him to move to the right. In other words, the message may add to the incentives or remove objections.

The information transmitted is selected by the manager for its believed favorable effect in influencing the contributor to choose to respond in the desired way. The extremely high incidence of either total or partial failure is an indication of the difficulty of this problem. This problem will be discussed separately in the succeeding chapter.
Problem of Coding: Once a message has been abstracted from an information source, it must be coded into symbols that can be decoded and understood by the receiver. This is essentially a problem of semantics, for most messages are in oral or written language.

Although most persons appear to perform this process of coding thoughts into spoken words without great difficulty, many become aware of some of the difficulties of the process when they try to write. Often heard are such expressions as, "I know what I want to say, but I just can't say it," or, "I just can't put it into words."

Words are symbols that are used to convey messages. It is probably true that no word ever has exactly the same meaning to the transmitter and to the receiver. Agreement on the meaning of a word by two persons ranges from zero to something approaching but never equaling complete agreement. The fact that different persons interpret words differently is sometimes forgotten, and as a result receivers may be thought to have such undesirable traits as stubbornness, stupidness, and contrariness, when in reality they are but giving meanings to words not intended by senders. Furthermore, the mere fact that a receiver says, "I understand," does not necessarily mean that he does understand.

Words refer to things or our feelings about things, but the words are not the things themselves, nor are they our feelings. This fact is a source of much misunderstanding and thus a bar to successful communication.
As everyone's language differs in some respects from everyone else's language, continual interpretation is necessary. The language of specialists in fields such as chemistry, engineering, and psychology may require an interpreter in much the same way as an interpreter is needed when different tongues are involved. A part of education consists of learning the language of the field being studied. In the same manner, a part of the orientation of a new man in industry is learning the trade or industry terminology.

Much of the need for technically trained personnel in industry arises from the need for interpretation of communications. Industry is based on a complex technology, generally of the physical sciences. Communications among managers in industry tend toward a technical language in which an understanding of basic physical laws seems desirable to both code and decode the messages.

The difficulty of successful communication between the top echelons of industry and the great mass of employees has been noted by many. Among those who saw this difficulty as a problem of coding was Dr. Rudolph Flesch, author of The Art of Plain Talk and The Art of Readable Writing. He devised and popularized a means to measure the "reading ease" and the "human interest" of written communications. The measures of "reading ease" are syllable and sentence count per 100 words, and the percentage of "personal" words and sentences are measures of the human interest. As the reading ease index is numerically related to the different education levels of the adult
population in the U.S., it is claimed that it is possible to determine the per cent of the adult population that can read and presumably understand a communication tested and measured by the Flesch method. The number of large industrial firms that have tested their magazines and other manager-employee communications for readability attest to the impact this new technique has made.

It is obvious that managers must code their messages to employees or to customers in symbols that can be decoded and the information abstracted by the latter. The size of the vocabulary of both a sender and a receiver, is directly related to the amount of information that can be exchanged. For example, if one's vocabulary is limited to words for the primary colors of red, yellow, and blue, then the information about color that can be transmitted is also limited. However, if one's vocabulary contains twenty words for different hues of color, then the information that may be transmitted is greatly increased. The size of one's vocabulary is a measure of intelligence and a measure of the amount of information that one may acquire. Vocabulary tests are frequently used in psychological testing programs to evaluate potential managerial ability.

Messages should be coded by managers in symbols that will transmit a maximum of information. This is a difficult process in many instances. The words selected should convey a maximum amount of information and yet be understandable to the receiver. Words used must be within the
receiver's vocabulary yet must take full advantage of it. The problem is not one of speaking or writing simply, but one of speaking or writing at the maximum level of understandability of the receiver. It probably is as much of a loss to write below the level of the reader as it is to write above his level because in either case less than maximum information can be transmitted. Thus, a manager must select words which, in his opinion, are understandable by the receiver. The real or believed differences in the "readability" of the receivers often causes a manager to write and speak differently when addressing his coordinator than when addressing his operative contributors.

The problem of coding, although important, is probably not the most important aspect of the communication problem in industrial organizations. With the increasing literacy and education level of the adult population, the problem may decline in importance. For managers, probably the most important aspect is the message content, which is the problem of abstracting. It is the problem of what information to send, not how to say it.

**Problem of Selection of Media and Channels of Communication**

After the message has been abstracted and coded, the manager must select the appropriate media and channel in which there will be the least distortion. Although signs and signals are used in industry, most communications are linguistic, and oral and written linguistic communications will be discussed.
As indicated previously, one of the reasons for the written message is to avoid some distortions inherent in the spoken word. But in many instances the message is more understandable to the receiver if the spoken word is reinforced by other signals and signs. One learns very little about the writer of a letter from reading the letter, but one learns much about the speaker from listening to him talk. Facial expressions, intonation, and gestures may serve to convey information to reinforce the spoken word. The word "Help!" even with two exclamation marks doesn't get the same reaction from the reader as a shrill shriek of a woman whose face is contorted with terror and fear.

Precise coordination, the kind required in competitive industry, cannot be obtained solely by communications from managers. Operative contributors must perceive factors in the environment and on their own initiative choose the right activity at the right time and place. In many instances, they must anticipate communications of managers. To do this, they must "know" the manager, and he reveals himself best to them when he is talking. "Learning the ropes" is really learning the social environment in an organization. Social environment is the interactions of people and their thoughts about their interactions, and the most frequent type of interaction is conversation. A silent or laconic person does not reveal himself and this often is a handicap in managing. Thus, his subordinates may not understand him and may be unable to anticipate his communications, and as a consequence be unable
to self-coordinate their activities in many instances. Waiting for leadership, that is to say, waiting for information essential for coordination, is a detriment to maximum accomplishment.

Direct communication is person to person communication without an intermediary. Communication between worker W, through his foreman F, to the superintendent S should not be considered to be a direct and continuous, but an indirect and discontinuous communication. W communicates directly with F, and F communicates directly with S. The discontinuity of the channels such as between W and S is the cause of many communication problems. Ability of persons to relay messages with a high degree of fidelity appears to be extremely limited. Out of this limitation arises the need for short communication lines.

Managers with a message for contributors in other formal unit organizations are always faced with the difficult decision of whether to transmit their messages through established chains of formal unit organizations with the consequent distortion, or to form a new temporary formal unit organization of all the contributors of all the formal unit organizations directly concerned in the complex below the sender as a means for direct transmission of messages. This may require groupings ranging from conferences to mass meetings, depending upon the number of contributors to simultaneously receive the message. There are physical limitations to the size of mass meetings, so the media of written words is generally used for large groups. Company
magazines, newspapers, and letters are all examples of attempts to secure coordination of operative contributors. The decision on whether to announce a new policy to employees or customers through the managers, who are the connecting links of the complex of formal unit organizations, or directly through the company magazine, rests on the estimation of which process will convey the most information. If intervening managers are not to be by-passed or "short-circuited," they must receive the message previously to or simultaneously with their operative contributors.

Factors affecting the efficiency of communicating through chains of formal unit organizations and of establishing new formal unit organizations to permit direct communication will be discussed later.

**A Message as a Stimulus to a Receiver:**

A signal, a spoken or written word, is received by the person to whom it is directed, and then it is decoded and information is abstracted from it. The abstracted information becomes a part of the experience of the receiver and conditions his reactions. Messages are directed by a manager to an operative contributor to stimulate him to contribute an activity that is coordinated with the system of activities in the unit organization.

It is a common experience that only a fraction of all messages is completely effective in obtaining the desired conduct. This seems true for most unit organizations. Children frequently ignore or only partially obey or respond to suggestions or commands of their parents.
Adults frequently ignore laws, statutes, and even clauses of the Constitution. Practically everyone at some time has knowingly violated some traffic ordinance. The Eighteenth Amendment dealing with prohibition was widely flouted by those who professed to recognize the legality of the government and its right to establish and enforce the law. The laws and commandments of the Church are repeatedly violated by members of the Church. Managers' suggestions, orders, and directives are conveniently ignored or only partially obeyed in industry. The mere fact that messages are spoken or written and received and decoded does not mean that they will effectively alter the conduct of a receiver in a desired way. Experience leads to the conclusion that most messages are partially ineffective.

Acceptance of Communications Rests With the Receiver

In the examples in the paragraph above, messages originated by managers who were "recognized" by the contributors were nevertheless partially or completely rejected by contributors. The acceptance or rejection of a communication is an act of the receiver. A sender may try various means to make his communications or orders acceptable to a receiver, but if the benefits as evaluated by the receiver from obeying are less than the burdens involved in performing the activity, he rejects or ignores the message. Managers in all organizations, and especially in industrial organizations, are continuously trying to influence operative contributors to perform acts at the right time,
place, and manner. Orders, directives, suggestions, and other comments are made to employees or customers, some of which are accepted, some are partially accepted, and some rejected—always at the volition of the receiver.

**Four Essentials of Communication**

A communication will influence a receiver to perform a desired activity if the following four conditions simultaneously exist.¹

1. The receiver can decode the communicator's signal and understand the message about the desired activity.

2. The receiver is physically and mentally able to perform the desired activity.

3. The desired activity appears to the receiver to be consistent with the environment as he perceives it and with the agreed-upon resultant of the unit organizations as he understands it.

4. The desired activity appears to the receiver to be consistent with his personal purposes.

Managers manage by communicating to operative contributors for the purpose of stimulating and coordinating their activities. Managers secure cooperation and coordination only to the extent that their communications meet these four essentials. If their communications are not accepted, the manager's authority is denied and the manager is not managing.

Decoding and Understanding the Message: It is obvious that only messages that are understood can be obeyed. If a receiver cannot decode a signal and evaluate it appropriately, he cannot receive the intended stimulus from it. The message need not be in a foreign language to be incomprehensible to a receiver; it need only employ words for which the sender and receiver do not have a common meaning. As indicated previously, understanding can never be complete as no symbols or words have exactly the same meaning for two persons.

Ability to Comply: Messages to stimulate activities beyond the capacity of the receiver must be disobeyed or disregarded. Even if an attempt is made to comply, the message has not been obeyed if the activity is not performed. To order a person to perform an activity clearly beyond his capacity is to destroy discipline and morale, for the order will surely be flouted. But the more usual case, and equally damaging in the long run to morale, is to issue an order just a little beyond the capacity of the receiver. Such orders as, "Stop worrying," or, "Don't be nervous," seldom achieve the desired results. They may be only a little impossible, but still impossible.

Probably no better advice can be given to a new manager than for him to refrain from issuing orders that cannot or will not be obeyed. The continuous use of directive communications leads eventually to rejection of some communications. The rejection of many communications leads finally to the rejection of all communications of the manager.
and he can no longer stimulate and coordinate activities of contributors.

**Consistent With Environment and Resultant:** One of the three essentials of a unit organization is the necessity for all contributors to know and agree upon the resultant of cooperation. Further, each contributor must believe that by achieving the agreed-upon resultant, he will, in part, satisfy his personal purpose. He must believe that the resultant of his and other contributors' activities will gain satisfaction for him. Any communication to stimulate activities which jeopardize the achieving of the prospective resultant as the receiver understands it, may be evaded and disobeyed. It has been reported that in several instances during the war orders to destroy property to prevent it from falling into the hands of the enemy were not carried out, for apparently it seemed incomprehensible to the worker to destroy machinery and plant that he had been using and protecting for a period of time. If orders must be given that seem contrary to the agreed-upon resultant, explanations must precede the orders to demonstrate that the apparent conflict is illusory.

**Performance Must Promise Satisfaction:** It has been a fundamental assumption of this dissertation that no one will perform an activity unless it appears to him at the time of his decision that the immediate or long-run satisfactions to be gained by contributing the activity will be greater than the dissatisfactions to be suffered by
contributing it. A communication will not be accepted unless the receiver believes that its performance will benefit him and help him attain his personal purpose or the satisfaction of his wants. The receiver evaluates all communications he receives and the only reason for accepting any is the net satisfactions he believes will be forthcoming. Every communication has an actual or implied net incentive which, if valued by the receiver, causes him to accept the communication as guiding his actions. When managers believe the implication of an incentive will not be clear to operative contributors, it is usual to incorporate a statement about the incentive in the communication. Incentives may be expressed as bluntly as, "You will stop smoking in the shop or I'll fire you," in a communication to an employee or more subtly as, "You will save ten dollars a month by buying this stove," in a communication to a customer. The latter case is an attempt to make a communication more acceptable than it might be if only the words, "Buy this stove," were used.

The Acceptance of a Communication is an Acceptance of Authority.

Messages that simultaneously meet the four essentials of communication are acceptable by receivers as controlling the actions they contribute. A communication that is accepted by a contributor as controlling his activities is authoritative. Thus final authority rests with receivers of communications. The decision of acceptability is not the manager's who issues the communication but the contributor's to whom the communication is addressed.
Authority is defined as the control of incentives by which acceptability of communications is attained.

Authority is not imposed by the manager; it is accepted by the contributor. At any instant a contributor may ignore or refuse to obey communications of a manager. In essence, a contributor evaluates the incentives offered by a manager against the burdens of the directed action and decides that complying with a communication will or will not help him attain his personal purpose. One of the manager's recourses to gain compliance with a denied communication is to offer more incentives. Even the threat of death is insufficient to establish authority in some instances. Nathan Hale gave his life rather than reveal secret information to the enemy. Threats of discharge or physical force are strong incentives, but are not always effective in inducing cooperation.

The incentives controlled by a manager are incentives only to the extent that contributors consider them of value. Thus similar communications addressed to two persons may cause one to obey and one to disobey because each evaluates the benefits and the burdens differently. Also, communications that are acceptable today may be unacceptable tomorrow. Authority is not a fixed condition for incentives, or evaluated consciously or subconsciously by receivers each time an order is issued. A receiver decides for each communication or order that he receives whether it is acceptable to him.
Zone of Acceptance Without Reflection:1

Because many incentives of any organization are general and cannot be ascribed to any particular activity, there are many activities that are contributed without a conscious or reflective weighing of benefits and burdens. For example, when a person accepts employment as a clerk in an industrial enterprise, he expects to perform certain undefined acts for the salary he expects to receive. The clerk expects to be at his assigned place at the starting time and to remain there reasonably (as he interprets this) constantly throughout the day, performing clerical duties. He accepts directions within his expectations on how the work is to be done and at what time.

The scope of activity which the contributor will perform for the general incentives is called his zone of acceptance. The extent of this zone at any instant is dependent upon how the contributor evaluates the general incentives and the burdens of activities. The zone is never a constant, but varies from time to time with the subjective evaluation of benefits and burdens. As every person is different from every other person, there are no two zones of acceptance for the same general incentives. This is an important point for managers to know. One of the criteria for selection of employees should be the acceptability and value of the general incentives to prospective employees,

1This concept is adapted from Barnard (op.cit., pp.168-169) and Simon (op. cit., pp. 133-134)
for it will determine the scope of the orders and directives that will be acceptable without additional specific incentives.

It appears that the scope of the zone of acceptance for industrial employees is narrowing. The communications they expect to accept, especially in regard to the quantity and variety of activities they are to perform, has apparently changed in the past half century. This has probably been due to the reduction in the value of the general incentives, particularly wages and salaries, and a possible change in the social attitude that one ought to want material things. The reduction in value of the general incentives has increased the complexity of the managing activity. There has also been fundamental change in social attitudes of what one ought to accept in organizational communication. This change has been reflected in legislation that limits the authority of the employer.

Within the zone of acceptance, managers may issue orders and directives without including in the communication a specific incentive to overcome the reluctance to perform a particular activity. When a manager issues an order which is outside of the expectations of the contributor, the order must contain or imply a specific incentive. For example, an employee expects to perform certain activities for the general incentives, but if a particular time limit is to be met, the order might be phrased like this, "I'd certainly appreciate it if you could machine these ten castings by 5:00 o'clock so that the night
shift could begin assembly." This order contains a specific incentive of approbation that is related to a specific series of acts. The general incentives plus the specific incentives were believed by the manager sufficient to cause the communication to be acceptable to the employee, thereby stimulating the desired activities.

The Origin of Authority:

Authority has its roots in the actual or believed control over the incentives valued by persons to whom communications are addressed. In any formal unit organization the manager is the person who has the best perception of (1) the environment including particularly the activities of other contributors, (2) the resultant of the formal unit and its relation to the resultant of the complex of unit organizations, and (3) the source of the incentives and their ability to satisfy contributors.

Contributors join unit organizations voluntarily because they want the incentives that the unit organization provides. Managers are not imposed on the operative contributors but are demanded by the operative contributors as a means of more efficiently obtaining more incentives. A particular manager in a formal unit organization may not be the selection of the contributors but his communications are to an extent accepted as being essential to accomplish the contemplated resultant from which contributors benefit. If this were not true, the unit organization would be informal or the contributors would
obtain alternate incentives by individual effort outside of organization.

Contributors expect and demand leadership. It appears wrong to explain authority solely in terms of coercion. Coercion is seldom used to gain acceptance of communications. The self-imposed discipline or the discipline imposed by contributors on each other is evidence of their desire to obtain the incentives that the unit organization provides.

The Control of Incentives

The control of incentives by the manager is inherent in the structure of the formal unit organization. The manager with his superior perception of the three essentials of unit organization is viewed by contributors in the long run and in the total situation as an aid to the attainment of their personal purposes and not as a threat. The contributors partially delegate control of their acts to a manager because of his inherent superior perception. Such delegated authority is known as the "authority of position."

A manager, by virtue of his position, has control over some incentives that are considered of value by contributors. These incentives can be used to induce compliance with communications and thus the incentives may be considered to be a delegation of authority to the manager. Contributors will support weak managers because they want the incentives the organization provides and because they know
that a person in a managerial position has control over some incentives.

Certain men have superior ability of perception regardless of their position in an organization. Their communications are acceptable because men believe that this personal superiority of perception of the essentials of unit organization will provide them with more satisfactions. This is the "authority of person." It is an observable fact that certain persons gain compliance where others fail.

The "authority of person" together with the "authority of position" have important effects on the zone of acceptance. The superior person in a high position has his communications widely accepted without specific incentives.

Lines of Authority: In a complex of formal unit organizations, the resultant of a unit organization is symbolically transferred from one unit to another until it reaches the hands of a contributor called, in industrial organizations, a consumer. The material incentives obtained are similarly symbolically transferred from unit to unit until they reach another contributor, an employee. The path of the transfer of resultants and incentives is called the "line of authority" or the "line of communication." Delegation of authority is the transfer of the control of incentives. If a manager controls the division of incentives by determining wages and salaries or by withholding incentives entirely by discharge or banishment, then he has authority in the amount that these incentives have value to the contributors.
Authority has two aspects. One is the subjective value placed on the incentives by those who desire them and the other is the actual objective incentives themselves. If we consider the first a constant, then differences in authority are only differences in the magnitude and scope of the incentives offered. For example, a foreman may be empowered to recommend an increase in compensation for an employee, but the superintendent may be able to put increased compensation into effect for an employee. The magnitude of the objective incentives that can be offered by the foreman and the superintendent is a measure of their objective authority insofar as compensation is a factor.

The delegation of the control of incentives must always be sufficient for the manager, to whom the authority has been delegated, to gain acceptability of his orders and directives. When it is said that "Authority must equal responsibility," the meaning is that the incentives must be at least equal in value to the burdens of performing the activities desired. If the incentives are inadequate, the orders and directives will be denied, and the contemplated resultant will not be achieved.

Communication by Behavior

So far, linguistic communications have been almost exclusively considered but communication is not confined to words. All behavior can be communication to one who observes it. Behavior may reinforce, weaken, or even belie what has been expressed in words.
Every manager should realize that contributors are continually interpreting his behavior with reference to their personal purposes. Behavior not consciously performed for the purpose of stimulating and coordinating activities of contributors is not here considered to be a part of the activity of managing but to be a part of the social environment. As a part of the social environment, it is perceived by contributors and may greatly influence the activities they contribute to the organization. For example, it is common for contributors to observe the behavior of their manager in an attempt to discern his mood before communicating with him about some sensitive topic, such as an increase in pay.

Behavior performed for stimulation and coordination of contributors' activities is conscious communication and therefore an activity of managing. Such behavior includes the intonation and vehemence of speech such as was noted previously in this chapter, but it also includes all movements of body members. Some of the qualities frequently mentioned as necessary for success as a manager are vitality and enthusiasm. These qualities are inferred from the quantity and quality of bodily movements and often communicate something about either the environment or the incentives. The manager who walks with speed and power, shakes hands with a firm grip, and sits alert at his desk, is probably attempting to convey information to stimulate his contributors and to reinforce his words. Contributors may
interpret physical action as enthusiasm and confidence that the prospective resultant will be achieved and thereby be influenced to contribute activities that might otherwise be withheld.

The contributor never knows with certainty whether the behavior of a manager that he observes is consciously performed or not. For example, if the manager slammed the door as he left the accountant's office, should the accountant interpret it as a communication signifying displeasure or only that his door closes easier than the manager's, a factor of the physical environment. Whether the accountant interprets this as a communication or a factor of the environment may make a considerable difference in his future behavior. One hesitates to speculate how much time contributors spend in trying to interpret managers' behavior. Certainly it is substantial, especially for the contributor who feels insecure.

The Effectiveness of the Managing Activity:

It is the thesis of this dissertation that communication is the activity of managing. The effectiveness of managing is dependent on the effectiveness of the communication process. Certainly a manager cannot secure consciously coordinated activities without information being transmitted and understood. The coordination cannot be more effective, except by sheer chance, than the contributors' knowledge and simultaneous understanding of the three essentials of unit organization. It is the function of managers in formal unit organizations
to aid contributors to perceive environment, resultant, and incentives so that they will contribute their activities at the right time, place, and manner. The failures of perception are in part failures of the manager's communication. A communication may be ineffective because it cannot be understood or because it is not accepted by contributors, or both.

**Means to Increase the Understandability of a Communication:**

Although some of the means to increase the understandability of communications have been mentioned previously in this chapter, it seems desirable to group them here for ease of reference and to discuss each more thoroughly. The first four means to be discussed must be performed specifically for every message and pertain to understandability, while the next three are related to messages generally and pertain to their acceptability.

**Select the Right Message:** Of all the messages that might be abstracted from an information source, the "right" message is that one which is effective in obtaining the desired response from a receiver. From all the incoming communication, past and present, about all environmental conditions considered to have an appreciable effect on the desired resultant and the activities needed to achieve it, the manager selects a message that he believes will be understandable and acceptable to operative contributors as stimulating and guiding activities to be contributed by them. Knowledge of the environment embraces several complex technologies and therefore it is unusual in
large industrial enterprises for any individual to possess the personal qualifications necessary to understand all of the incoming communications, the environment itself, and the relationship of the environment to the contemplated resultant and the necessary activities. To aid in this problem of selecting the right message, large staffs are formed to advise the manager. The chief executive officer of an industrial organization usually has technical staffs, such as in accounting, law, engineering, personnel, finance, and taxation to transmit and interpret information and to suggest messages that will achieve the desired resultant.

The problem of abstracting the right message is so complex that the next chapter is devoted to an attempt to explain it. The structure of the complex of formal unit organizations is designed to aid the manager in fulfilling the requirements of his position in large companies.

**Code the Message in Understandable Symbols:** The symbols in which the message is coded must be understandable to the receiver of the message. To be understandable, they must refer to a common experience. It is unusual for messages to be coded in words that the receiver cannot decode in terms of his experience. But the message may not be understood because the experiences of the manager and the contributor have been different. A company president and a labor union leader may not understand one another's messages and yet not
realize that they do not understand. Each has no trouble decoding the words spoken by the other, but each decodes in terms of his experience. Abstract terms such as "social justice" and "free enterprise" should be avoided if understanding is to be achieved. Managers must code their messages in symbols that they believe refer to common, not different, experiences. Words about observable phenomena are probably most likely to be understood. If desired, such words can lead to common experiences and be verified by persons concerned.

All behavior is symbolic and messages can be coded in winks as well as in words. Unfortunately, understanding is often difficult and, thus, managers must exercise a great deal of care in using gestures alone as a communication media. Supplementary behavior in conjunction with speech usually increases understandability, but non-coded gestures alone may be nearly unintelligible. Managers will probably find that any but the most obvious gestures are subject to frequent misinterpretation.

**Select a Media:** For brevity, the discussion of media will be limited to oral or written languages as they are the predominant communication medias in industry. It is usually advisable to write a message when the information predominantly pertains to coordination of activities. If the predominant intent of the message is to stimulate, oral communication will probably prove to be more effective. It seems doubtful that a reading audience can be roused to riot, although a
listening audience frequently is. Most of the "paper work" of industry is to achieve precise coordination. If a number of persons must receive an identical message within a short time span, the message is usually written. If there is some doubt about the understandability of the message, it is usually oral. Oral messages are generally more understandable because of facial expressions, intonations, hesitations, inflections, and other signs that convey information that supplements the verbal signal. This is one of the reasons for the college lecture, the widespread use of the telephone, and for the extensive travel of managers. Face to face communication is apparently more understandable than communication by telephone, and by telephone more than by letter.

Select a Channel: Lines of communication in a complex of unit organization are discontinuous, not continuous. As each intermediate communicator relays a message, continuity is broken. A message a person receives to re-transmit often differs greatly from the message he sends on. Each intermediate communicator must decode an incoming message and make it a part of his total experience. He then abstracts a message from his total experience and codes it for transmission to a receiver where this process may again be repeated. It should be noted that an intermediate communicator transmits a new message with somewhat different information and coded in different symbols. The intermediate communicator's function is to discriminate the environment in the light of the communication he receives, formulate a new
communication which when transmitted to a recipient will cause him to take action appropriate to the original message and to the environment. The recipient does not necessarily do literally "as he is told" but more likely he in turn will discriminate the environment and take such action as he believes appropriate to the environment and the message as he has interpreted it.

Communications from top managerial positions are usually quite general. Intermediate communicators interpret messages in terms of their total experience, adding information of a specific nature so that the intent of the communication as the intermediate communicator interprets it will be understood by the next communicator. The president of an automobile company may say that a million cars will be produced this year. If this communication were not interpreted and information added at intermediate managerial positions, it would not achieve the desired resultant. The purchasing agent may interpret this communication in terms of his experience and transmit the message, "Buy eight million spark plugs."

Communications on the way up from operative contributors tend to become less specific and to lose information as they are transmitted by intermediate communicators. The customers' very specific complaint about the failure of a product and the inconvenience caused by the failure may become only a statistic when it has passed through intervening managers. The final communication may be, "Three failures of
the driving cam were reported last month." Generally, only that information will be relayed that will not have unpleasant consequences for the transmitter.

If information must be relayed with a minimum of distortion, then the communication lines should be as short as possible. The communication line is shortened by reducing the number of intermediate managers. This is frequently done in industry by the formulation of new and generally temporary formal unit organizations. Managers from several levels of organization may be called together for consultation and instruction, committees may be formed, and in some cases intervening levels by-passed. To shorten communication lines upward, "open-door" policies are instituted, regular procedures are established for operative contributors to confer directly with managers several levels above, or mass meetings may be held.

A manager's selection of a channel of communication is in effect a selection of an organizational structure. A linkage composed of the formal unit organizations determines the path of a communication. If the path is to be altered, then the formal unit organizations and their linkage must be altered. The number of levels ranges from a minimum of one (a mass meeting) to about ten in our largest industrial organizations, or the army, or the church.

Means to Increase the Acceptability of Communications:

A message from a manager may be understood and yet not be acceptable to the receiver as guiding the activity he is to contribute.
"Please re-read Chapter IV now," is a message. It is expected that the reader understood the message but did not perform the stated activity. In addition to the four essentials of communication, which are minimal, the following means will increase the chances of acceptability of communications.

Select the Incentives to be Offered: Because of the importance and complexity of the selection of incentives, complete discussion is reserved for a later chapter. Every communication in a formal unit organization is accepted or rejected on the basis of the general incentives and the specific incentives. The selection of members to contribute activities to unit organizations is based partly on the value general incentives have for them. The more universal the general incentive or the wider scope of general incentives available, the larger will be the potential membership. The value of any incentive or inducement is subjectively determined. Managers should select incentives and inducements to be offered on the basis of the priority of values of a receiver of a communication. One's value system determines the priority of acceptability of competing communications. The Flesch method of measuring "human interest" is based on the percentage of "personal" words and sentences. He also advocates utilizing the human interest story and states that there is nothing on earth that cannot be told through a hero or heroine who is trying to solve a problem in spite of a series of obstacles. This is another way of stating that
communications must be in terms of the receiver's values and that the egotistical "I" is of major value.

Identify the Source of the Communication: All communications must be authenticated to be acceptable. For written communications, this usually means the signature and title or position of the transmitter. This allows the receiver to know the source of the incentives which are offered for acceptance. If the source of a communication is unknown, a receiver does not know if promised incentives will be received even though the communication is put into effect.

Identify the Lines of Communication: Lines of communication are the paths that the control of incentives follows in a complex of formal unit organizations. The control of the money received from the customers flows upward as a resultant through sales unit organizations and then part of it flows downward as incentives through the production unit organizations until finally it reaches the production worker. The line of communication must be known for it identifies the ultimate source of incentives for contributors. The practice of drawing organization charts is to establish the paths of communications and incentives for all to see. Dual reporting, that is, situations in which a person reports to two managers is usually considered bad practice. The person who reports to two managers usually does not know who controls what incentives and thus he has great difficulty in deciding which message to accept, particularly if some are in conflict.
Provide Opportunity for Feed-back: Managers must expect that no matter how carefully they word a message, usually someone will not understand it and will want to raise some questions or will seek additional information about it. Feed-back of information such as this is a means of completing a communication link. Careful attention to the information coming back is an important means of improving understandability and acceptability of future communications.

Communications from operative contributors are often phrased in terms of sentiments and feelings. To understand human values, it is sometimes necessary "to read between the lines."

Amount of Communication:

A frequent error of managers is to underestimate the amount of communication necessary to successfully influence a contributor to act at the right time, place, and manner. A constructive viewpoint for a manager is for him to regard failure of his communications to produce desired results to be failure on his part in not forming an adequate message, and not a failure of a recipient. If the manager fails to get the desired action, he must communicate either a new message that is more acceptable or a new message more understandable. It is of no avail to blame a receiver for not accepting and understanding a communication.

The loss of information in communication is usually marked. This loss can be partially compensated for by increasing the -
amount of communication. In telephoning, it is impractical to use
message signals sufficiently powerful to span great distances. So
a rather weak signal is sent out on a wire and is used to control a
repeater which sends the message on to another repeater and so forth
until the desired destination is reached. A repeater functions by
receiving a weak signal and using it as a control for the release
of energy from an independent source to an outgoing circuit as a
repeated signal. The repeated signal, save for unavoidable distor-
tion, is nearly identical in pattern to the received signal but of
greater magnitude. A telephone repeater has its human counterpart.
In a simple situation, A may wish to communicate by spoken word to B,
but finds the distance between them too great. Therefore, C is inter-
posed between A and B. A converts his ideas into shouted words di-
rected to C. C converts the sounds that come to him into ideas and
then converts ideas into shouts directed to B who receives and inter-
prets them. Wherever communications pass through intermediary persons,
humans serve as repeaters. Even under unusually favorable conditions,
there is distortion and loss of information in each person to person
communication. Losses of information are multiplied as the number of
repeaters is increased. For example, if 80 per cent of information
in a message is conveyed for each person to person transmission,
\[ .80 \times .80 \times .80 = .512 \] or 51.2 per cent of the information will be
conveyed to the last person in a series of four.
Managers may not need instruction as much in means of improving the efficiency of a particular communication as they need to be impressed with the necessity for a large amount, especially in a large industrial organization composed of hundreds or thousands of unit organizations. The relationship between cost and value of communication may be approximated in the following diagram presented in Figure 15.

![Diagram]

Figure 15: Percent of operative contributor's time spent in communication.

In this illustration, which is not accurate but only a rough approximation, the cost of communication may be considered to vary directly in a straight line relationship with respect to the time...
spent in communication. The cost of zero communication would be zero and the cost of communication for 100 per cent of the time would be the wage for that period of time.

The value of communication in terms of increased coordination and therefore output would also vary with respect to the time spent in communication. If there were no communication, there would be no coordination, no output, and zero value. Similarly, if the contributor to the unit organization was engaged in communication 100 per cent of the time, there would be no time for other activities, and the output would again be zero. Other points of the value curve are assumed on the basis of what appeared to be reasonable for a typical situation.

The point where the value curve exceeds the cost curve the most is the optimum amount of communication for the operative contributor. This occurs in Figure 15, when about 25 per cent of the contributor's time is devoted to communication. If communication requires less than about 10 per cent or more than about 60 per cent of the contributor's time in the diagram, cost exceeds value. If 25 per cent of an operative contributor's time should be spent in communication for maximum return, and if operative contributors communicate individually with a manager, then the manager cannot supervise more than four men.

Summary:

Management is the activity of communicating to achieve purposeful coordination of operative contributors' activities. This chapter
has been devoted to a discussion of the activity itself without reference to the subject matter of the communications.

Increased specialization and decreased self-sufficiency have made everyone more dependent on cooperative effort for life's satisfactions. The larger number of unit organizations to which one contributes specialized activities has made necessary a more rigid time schedule. The precision of coordination is constantly increasing. To achieve precise coordination in cooperative effort requires a large amount of understandable and acceptable communication from a manager.

The communication activity for understandability was discussed in three parts, (1) abstracting the message, (2) coding and decoding, (3) selection of media and channels. It is in these processes that great strides will probably be made in the near future.

The four essentials of communication for acceptability are: (1) the receiver can decode the communicator's signal and understand the message about the desired activity, (2) the receiver is physically and mentally able to perform the desired activity, (3) the desired activity appears to the receiver to be consistent with the environment as he perceives it and with the agreed-upon resultant of the unit organization as he understands it, and (4) the desired activity appears to the receiver to be consistent with his personal purposes.

If a communication simultaneously meets these four conditions, it will be accepted by a contributor as controlling his actions. If it
is accepted, the receiver recognizes or accepts the authority of the transmitter. Authority is the control of incentives by which one person may induce another to comply with a communication. Variations in authority are variations in the scope and volume of things controlled by one which are valued by others.

Increasing the effectiveness of the process of communication is to increase the effectiveness of the activity of managing."
Chapter VI

THE PROCESS OF PREPARING TO MANAGE

In previous chapters, the concept that the activity of managing is a communicative activity was developed. The purpose of communicating to contributors is to aid them (1) in knowing and agreeing upon the prospective resultant of cooperation, (2) in perceiving acts needed to achieve the resultant, and (3) in recognizing prospective incentives for cooperation. The activity of transmitting a message to contributors as a means of stimulating contributors to desired actions was discussed in Chapter V. It was shown that persons can be motivated to act by means of communicated messages and that the nature of the acts which are performed in response to a message, depends in part upon the informational content of the message and in part upon other factors such as the environment and the recipient's knowledge and previous history.

A person wishing to stimulate another to act in a certain way may attempt to do so by means of a communication whose informational content will be limited only by his ability to formulate messages. The probability of randomly selecting informational content that will motivate the performance of a specific act seems extremely remote. For this reason, a manager is confronted with the need of selecting appropriate information from his knowledge to formulate into messages to stimulate contributors to act and to coordinate their acts. The selection of informational content for messages will be discussed in this chapter.
By definition, managerial communication may be divided into three subjects, (1) communication to aid contributors to know the prospective resultant, (2) communication to aid contributors to perceive the acts needed to achieve the prospective resultant, and (3) communication to aid contributors to recognize incentives to cooperate. A manager's communication may encompass more than one of the subjects enumerated above. For example, a manager might say, "I'll pay you five dollars if you will take that shovel and dig a hole here two feet in diameter and three feet deep." In that message, the manager has referred to an incentive, partially described a resultant, and inferred by reference to the shovel some of the acts needed. None of the three subjects have been completely described, but all have been mentioned. Multiple subject messages are always difficult to classify. They are probably used more frequently than single subject messages.

Preparation to Manage:

The process of selecting the appropriate subject or subjects and then appropriate messages within each subject is not managing within the meaning of the terms as used here, but is preparation for managing. The discussion to follow will be directed to the process of selecting appropriate messages for transmission, as contrasted to the activity of transmitting messages.

It may seem that the separation of the decisional process from the activity of communication is an artificial one. But, certainly, some
thought process or other conditioning to arrive at informational content must precede all communications.

In complex organizations the separation of the selection of informational content and the communication of messages is often easily observable. Staff employees are in large measure concerned with investigation to determine information for transmission by line officers. In this case, the staff employee makes a first selection of message content in formulating each standard procedure and the line officer makes a second selection in determining which of many procedures to transmit to contributors under his direction.

Though a single message may and often does embrace more than one of the three subjects, the preparation preceding communication about each subject will be considered separately for ease of exposition in Sections I, II, and III of this chapter.

Section I
Preparation Preceding Communication to Know Resultant

Everyone in a unit organization must know, in some measure, what the prospective resultant of cooperation is. For, without some knowledge of the resultant, it is doubtful that any contributor can be given sufficient information to enable him to regulate appropriately his acts to achieve the resultant; and it is equally doubtful that he can recognize incentives that may flow from its achievement sufficiently to motivate him to action. A contributor need not know all of the characteristics
of the alteration of the physical environment, but he must know enough of them to be able to visualize the contemplated change in the physical environment. He must be able to form a before and after "mental picture".

A contributor, even a manager, probably never can have a complete and perfect knowledge of any resultant. No person can know everything about even the simplest object. Thus, each contributor has a unique and individual concept of the resultant to be achieved.

It appears that prospective resultants of complex organizations can be stated in only the most general terms. In illustration of this fact, consider "life, liberty, and the pursuit of happiness" of the Declaration of Independence; the "promote the general welfare" of the Constitution; the "We shall build good ships here at a profit if we can, at a loss if we must, but always good ships" of the Newport News Shipbuilding and Dry Dock Company; or the statement of the American Brake Shoe Company:

Our Aim

Our ambition is to make our Company
A better place to work
A better neighbor in our communities
A better company to sell to
A better company to buy from
A better company to invest in.
Each of us can help in some way every day.

Such general statements are possible of wide interpretation by contributors. It is probable that differences of interpretation often cause action to be taken by some contributors that are counter to the
actions of others. But, because a statement of objectives in general terms is a very common practice, there may be fundamental reasons for this. Some plausible reasons are: (1) difficulty of doing otherwise; (2) easier to get concurrence when inference of details is left to contributors; and (3) persons appear to idealize their desires. In viewing the future achievement of a resultant, it is probable that contributors infer greater rewards for less burdens than will be considered satisfactory by them later. The number of ducks and the discomfort endured in the duck blind are seldom equal to expectations -- the ducks are fewer and the morning colder and wetter.

The prospective resultant of a unit organization may be stated in more specific terms than those of organizational complexes, but never in exact terms. The statement of a foreman to a contributor to make 50 pieces of part number 125 in accordance with the specifications number 267 still leaves much unsaid. Every statement one makes assumes certain prior understandings by the receiver.

**Resultants are Objective:**

Resultants of an organization are achieved by the coordination of the physical acts of contributors and always consist of alterations of the physical environment. This is to say, that resultants of cooperation as achieved are always physical and objective. This is also true of the businesses and industries that are considered to render a service rather than produce a product. A laundry doesn't make clothing, but it
alters clothing by removing dirt from it. The filling station attendant serves you by changing the location of the gasoline from his tank into yours and by removing dirt from your windshield.

Further, a given series of coordinated acts of contributors can have only a single resultant. This does not mean that a specific resultant — a specific alteration of the physical environment — cannot be produced except by one specific set of coordinated physical acts. A nail may be driven into a board in many different ways. Frank Gilbreth recognized this and developed a system of motion study to find "the one best way".

Because of the near impossibility for all contributors to gain identical concepts of a resultant to be achieved, it may be expected that some acts of contributors will be unfruitful or negative in effect.

**Personal Purposes**

Individuals have personal purposes that they hope to satisfy through participation in cooperative effort. These personal purposes may be satisfied through achieving the resultant. The relationship of a contributor's personal purpose and the resultant of cooperation must be clear to him; he must understand that the former is achieved through achieving the latter. The individual's purpose is always to maximize his satisfactions. Thus, all contributors to a complex organization are contributors because they hope to gain satisfaction thereby.
The Ultimate Goal in Organization is the Satisfaction of all Contributors:

As a consequence of the achievement of a resultant, rewards become available for distribution to contributors. The rewards themselves are always objective. But the satisfactions that contributors gain from rewards stem from their subjective evaluations of them. A resultant of an organization that builds and sells automobiles is one specific automobile conveyed to a buyer. A person who buys this automobile receives the physical entity which is the automobile in exchange for his contribution, consisting of a transfer of money or a physical equivalent symbol of money, such as a check. But the satisfactions he derives from the automobile depend upon his subjective evaluation of it. Similarly, a person who receives wages, a pat on the back, or a kindly spoken word for a contribution in the building of the automobile has received a physical thing; and the satisfaction it gives him depends upon his subjective evaluation of it. The net satisfaction that a contributor enjoys from the achievement of a resultant depends upon the difference of his subjective evaluation of the physical reward that is distributed to him and his subjective evaluation of the physical contributions. Since persons contribute to organizations as a means to maximize their satisfactions, the ultimate purpose of an organization is the satisfaction of contributors. The achievement of a cooperative resultant is a means to this end. Thus, it partially misses the point to say that the purpose of the Ford Motor Company is to provide
automobiles or to make a profit. These two objectives constitute satisfactions for only two classes of contributors; namely, the company's customers and owners.

The Means-End Relationship:

The physical acts of contributors to a unit organization are the means by which the unit organization achieves its resultant. The resultant of one unit organization is combined with the resultants of other unit organizations as means to achieve the resultant of a complex of unit organizations. This process of combining is repeated until the resultant of a complex composed of all unit organizations in a continuum is achieved. Such an ultimate resultant, illustrated by an automobile in a previous example, is in turn a means to the ultimate goal, for it makes possible a distribution of incentives to contributors. A contributor may receive his reward for acts before, while, or after they are contributed to an organization. In any event, it is the desire for satisfaction that motivates contributors to act. An organization may be thought of as a cycle in which contributors supply acts as a means for achieving a resultant which in turn is a means for providing benefits to reward contributors for supplying acts.

The ultimate desire of a contributor is to realize his aspirations. This seems to be intuitively recognized by successful managers as may be noted from their statements of objectives. Such statements of objectives as were quoted previously are statements of human aspirations at a high level of abstraction.
It would seem that rather than a specific statement of objectives for a complex organization, one needs to formulate a broad statement that is in accord with the subjective value judgments of many potential contributors. Statements such as "life, liberty, and the pursuit of happiness," appear to be of inestimable value in achieving cooperation. If the founding fathers had attempted to describe specifically how life, liberty, and happiness were to be achieved, it is doubtful that this democracy would have been born. A broad statement of the resultant allows wide interpretation of the end to be achieved. A detailed statement of resultant allows little interpretation and is therefore restrictive. Restriction is contrary to freedom. Restriction of freedom is generally a cause of dissatisfaction.

Selection of Resultants:

It seems to be apparent to most people that satisfaction of the needs of contributors is the ultimate objective of such organizational complexes as civic clubs, fraternal orders, country clubs, churches, and educational institutions. But this view of the objective appears not to be held by all in regard to industrial complexes. This difference may exist because the "customer" of the service organization is generally considered a "member" while the customer is generally not considered to be a member of an industrial organization.

Because an individual customer becomes a contributor, or ceases to be a contributor to a specific organization on the basis of his subjective evaluation of a concrete and readily discernible product or resultant
of cooperation, the selection of the resultant of cooperation is to a large extent guided by the desires of this class of contributors. Thus, shifts in the desires of customers are cause for changes of resultant. The automobile that excited demand a decade ago would be inadequate to motivate a purchase today. Because specific details of resultants are subject to change, statements about the resultant, if they are to endure, must be sufficiently broad or general to encompass changes that develop. For example, the statement, "to build and sell high quality motor vehicles" is applicable to an almost infinite range of motor vehicle manufacture.

A manager selects a resultant for a complex of unit organizations that he hopes will have utility for customers and which other contributors will recognize as a means for attaining some of their aspirations. To be acceptable to the customer, the range or variation in the resultant may be severely limited, while to the other contributors it may be extremely broad. The employee on the assembly line recognizes that either a truck or a passenger car may be a means to his satisfaction and will contribute activities; but a particular customer may contribute the activity of transference of money for only one vehicle. In the final analysis, the subjective value judgments of customers influence the selection of the resultant of all organizations.

Resultants and Sub-Resultants: In large industrial organizations, the final resultant is achieved through sub-dividing it for accomplishment by thousands of unit organizations, each to achieve a specific
This process of sub-division, predicated on the five bases of specialization was described in Chapter III. Every unit organization has a resultant to achieve. This resultant is a means to a further resultant and it, to a further resultant.

The success of a complex of unit organizations depends in no small measure upon the wise subdivision of the final resultant. But, the ultimate goal of the unit organization is still the satisfaction of its contributors. Therefore, each unit organization must provide sufficient incentives to reward its members for their contributions, or fail.

**Managers Planning Function**

Planning is a mental process that precedes the activity of communicating. In regard to resultants, it is projecting a course of action by sub-dividing a resultant into sub-resultants or activities to be achieved in a pre-determined place, time, or manner. The purpose of planning is to make activity more effective in achieving the desired final resultant. Since human effort and attention is costly, the objective of much planning is to minimize burdens so that fewer incentives are necessary to motivate contributors. Planning is the mental visualization and evaluation of various ways of achieving a resultant. For example, the process of planning to build an out-door fireplace may consist of the mental processes and decisions enumerated below. First, a somewhat hazy concept of a fireplace may be compared to the purpose the fireplace is to serve. If there is a decorative as well as utilitarian purpose, the
color and shape of the stone will influence its selection. The size of the fireplace may be partially determined by functional requirements. Next, the now clearer concept of the fireplace may be compared to the setting. Its location may be influenced by the shape and size of the plot of ground and the house, shrubbery, and trees on it. It may be faced to take advantage of prevailing winds. The type of soil may influence the size of the foundation. As a consequence of these comparisons, the fireplace now has many characteristics not originally conceived. The step by step course of action cannot be projected in more detail than the scope and clarity of the concept of the ultimate resultant will permit.

The planner of the fireplace now begins to reduce his concept of the final resultant to sub-resultants and sub-resultants to individual acts. In the planning stage, this consists of imagining sub-resultants in some detail. Imagined sub-resultants usually reveal difficulties that may cause reconsideration of the concept of the final resultant. This is to say, planning alternately involves synthesis of parts to form a whole and an analysis to determine the sub-resultants of which the whole is comprised -- all done in the imagination. One may first sub-divide the fireplace into sub-resultants such as pour base, lay stones, insert grill. The sub-resultant of pour base may be further sub-divided into dig hole, set forms, mix concrete, pour and trowel concrete. The sub-resultant of dig hole is finally sub-divided into
muscular acts of grasp shovel, shove and kick shovel into soil, remove shovel and cast soil aside. The purpose of all planning is to perform the required acts at the right time, place, and manner.

**Steps in Planning for Communication About Resultant(s)**

Planning for communication about a resultant may be considered to be embraced by the following steps:

1. Conceive a prospective resultant which will be a source of benefits to contributors in excess of the burdens its achievement will impose.

2. Sub-divide the resultant into sub-resultants for achievement by unit organizations and combinations of unit organizations.

The two steps enumerated above are mutually interdependent. It should be realized at the outset that the method of achieving sub-resultants and the incentives required to motivate achievement of sub-resultants must be taken into account in planning the division of a resultant into sub-resultants. Final resultants are often modified on the basis of the feasibility of achieving some sub-resultants or on the basis of the value judgments of contributors.

Plans, in regard to resultants, to be effective, must always be translated into communications to aid contributors to coordinate their activities. Communication by managers is necessary only to the extent that information is needed by contributors for them to coordinate their acts. Therefore, detail plans should be made only to the extent that
communications may supply needed information not known to the contribu-
tors. This means that the detail to which plans in regard to the result-
ant need be made by managers and transmitted to contributors is dependent
upon the latters' knowledge about the resultant. For managers of unit
organizations who are able to perceive the sub-resultant to be achieved
by their unit and for contributors who are able to perceive the acts re-
quired to achieve them, plans of others expressed as communications about
resultants are unnecessary. For example, an architect's plans for a
house assumes that carpenters know the number and size of the nails to
be used to fasten one board to another.

Conceiving a Prospective Resultant: A manager in a hierarchy of
unit organizations receives a communication from his superior about a
resultant to be achieved by the manager's unit organization. The com-
munication may attempt to describe the prospective resultant in little
or great detail. In any case, the description can be only partially
complete. The vice-president's communication to the controller, "Have
your group work up the figures on the cost of producing that lot of
desks for the Biggers Company," is only a partial description of the re-
sultant that the vice-president has in mind. The message contains
nothing about how much detail should be shown, whether it should be
presented graphically, pictorially, or statistically, whether any com-
parisons should be made to budget or standard costs, and many other
things. Therefore, before the controller can communicate with the
supervisor of the cost accounting section, about the figures to be obtained, he must clarify his concept of the resultant. He must "see" the resultant in greater detail than is apparent from the message he has received from the vice-president.

A sub-resultant is conceived in greater detail by comparing it to (a) the resultant of which it is a part, and (b) to those factors of the environment that will affect attaining it. These comparisons are usually made so rapidly, first one then another, that for most practical purposes they can be thought of as being made simultaneously. The mind seems alternately to scan the superior resultant and the environment in arriving at a clearer concept of a sub-resultant. However, for ease of exposition, each comparison will be considered separately.

Comparing to Superior Resultants. As was noted previously, every sub-resultant is a means to another resultant. The sub-resultant of "hubcaps" of a unit organization is more meaningful when the contributors know that it is a part of a wheel and that the wheel is part of an automobile.

The controller, in the example above, knew from previous experience, that the vice-president probably wished to use the requested figures to discuss methods of reducing manufacturing costs with his manufacturing superintendent. Thus, knowing the superior resultant, the controller surmised that the cost figures should be detailed, presented statistically, and compared to budget or standard costs.
One of the principal reasons why everyone in a complex organization should know the final resultant, and the hierarchy of sub-resultants from his unit organization to the final resultant, is to reduce the amount of communication necessary about the sub-resultant with which he is directly concerned. The message from the vice-president to the controller could not have attained the resultant pictured in the mind of the vice-president had not the controller known something of the way this resultant would be used by the vice-president as the means to a still superior resultant in another unit organization.

At each level of organization, the partial description of the sub-resultant must be compared by the manager to the superior and the final resultant so that he can conceive the sub-resultant more completely.

Comparing to the Environment: Secondly, managers compare their conception of a resultant to be attained by the unit organization they manage to the environment as they perceive it, in order to more completely conceive the contemplated resultant. A resultant is always achieved by altering the physical environment. Therefore, managers note the physical resources available, physical obstacles to overcome, favorable and unfavorable social attitudes, and all such environmental conditions which appear to influence the attaining of the resultant.

The process of organizing as commonly described in literature on managing is a recognition of the physical factors of the environment, and communication to contributors about resultants in terms of these
physical factors. The controller in the previous example received the partial description, "Work up the figures on the cost of producing that lot of desks for the Biggers Company," and compared it to pertinent facts of the environment, as known to him; such as, whether the basic information was already on I.B.M. cards and needed only to be sorted or tabulated, the typewriters, mimeograph machines, and other equipment needed to make the report, the people available to contribute the acts needed to operate the office machines, and their relationships one to the other. In the light of this comparison, "the figures" become more meaningful and meaningful messages about a sub-resultant such as "Sort out all the cards on the Biggers job" could be transmitted to the I.B.M. supervisor.

The greater his knowledge of the environment, the more completely a manager can realistically conceive of a resultant. If he has a good knowledge of the physical sciences, he better understands the physical environment; if he has a good knowledge of the social sciences, he better understands the social environment as it relates to resultants. A resultant can only be conceived in terms of the environment. It cannot be conceived more completely than the manager's knowledge of the environment. Therefore, planning, which is sub-dividing the resultant, cannot be in more detail than is the planner's knowledge of the environment.

Often managers make the mistake of attempting to plan beyond their knowledge of the environment. The consequence is a communication that is almost unintelligible to managers of subordinate unit organizations.
in terms of their knowledge of the environment as it really is. It is
not uncommon to receive an order to do something, which to the manager
seemed plausible but which to the receiver of the communication seemed
ludicrous.

In this case, the communication is formulated on the basis of an
imagined environment and it is evaluated on the basis of the environment
as it exists. For example, the message, "Bring the piano to Room 202
by way of the back stairs," may seem to be a plausible step for attain­
ing a desired resultant if it is imagined that conformance with the
message is physically possible, but it will be considered inappropriate
by a person who knows that the piano is larger than the back stairs
passageway.

Sub-Dividing the Resultant:

As the concept of the resultant begins to form in greater detail,
the means of attaining this resultant should also be considered.

As explained previously, the resultant is the product of coordinated
acts of people. A complex resultant is achieved by a complex of unit
organizations by combining the resultant of one unit organization with
that of other unit organizations.

When managers plan they visualize the reverse of this process;
that is, they sub-divide the complex resultant into sub-resultants and
if possible and desirable, the sub-resultants into acts. The particular
sub-resultants chosen depend upon those factors in the environment the
manager believes will help or hinder the achievement of each sub-resultant. This checking of sub-resultants against the environment is generally such a rapid process that one may not be conscious of it. For example, suppose a tool pusher has been ordered to move a drilling rig from one location to another. He will probably drive to the new site and there will visualize the rig in place. Now, he will begin to break this concept up into sub-resultants. These might be: preparing the site including leveling, building the road, digging the cellar and mud-pits, dis-assembling the rig, and transporting it to the new site. To the grading supervisor, the tool pusher may communicate about the sub-resultant of preparing the site something like this. "We'll set up here and face the derrick to the west. The road will come in through that draw, around that tree and over to there. And be sure to make the mud-pits deep enough this time." If the grading supervisor is experienced, the above may be sufficient for him to visualize the resultant wanted.

Controls

After a first communication about a prospective resultant, it may be observed that the action being taken by contributors to achieve it will not achieve it unless there is further communication about the resultant. This re-communication after the contributors have begun their activities, is called control communication, or just control. Control is necessary when it appears to a manager that a prospective
resultant substantially equal to his mental concept will not be achieved by the activities that are now being contributed. To regain control, the manager redefines or redescribes the prospective resultant.

Much recommunication about resultants is to prompt corrective action. Who has not heard such communications as, "Please hang the picture in about the middle of the west wall. It's a little too far to the left. Now it is a trifle too high. That is good enough."

It should be noted that control requires observation of the deviation of progress from a concept of what is to be achieved. Only after deviations have been observed can corrective actions be taken.

As related to communications about resultants, the steps in control are:

(1) Observe the progress toward achievement of a resultant.
(2) Compare observed progress with concept of normal progress.
(3) Redescribe resultant in whole or in part as deemed necessary to prompt appropriate actions.

Observing Progress: A manager may observe progress toward achievement of a resultant of a unit organization by direct scrutiny or by means of reports designed to transmit the observations of others. Cost accounting and production control systems are common means for observing and reporting progress in the achievement of a resultant. It is clear that such reporting systems are essentially systems whereby contributor's acts and their effect in achieving a resultant are
observed and transmitted to managers to enable them to take corrective steps if necessary.

**Comparing Progress:** A manager compares an achieved resultant or progress towards achievement with his prior concept of it to measure performance. The comparison may be on the basis of actual costs to standard costs, actual production to planned production, or actual size to standard size. If the characteristics of the resultant have been recorded in an engineering drawing and specifications of a part, the comparison is quite simple. It is not as simple if some characteristics haven't been clearly conceived. For example, it is difficult to define smoothness, finish, polish, and other characteristics that do not readily lend themselves to expression in numerical terms.

**Redescribe Resultant:** A manager's concept of a resultant is his standard for comparison. If a report indicates to him that a resultant is being achieved that deviates from his concept, he may find it desirable to formulate and transmit new messages to redescribe the resultant or an element of it. Also, it is not unusual to modify a concept in consequence of a report from a contributor. For example, a tool-room foreman might say to a design engineer, "I have noticed that your design calls for brass to be used. It seems to me that it might be better to substitute aluminum because it is cheaper and lighter than brass. I think that aluminum might reduce the cost by 50 per cent." If the engineer agrees to the change, he has modified
his concept of the resultant. When a manager notes a discrepancy between his concept of a resultant and the one actually being achieved, he must communicate if he wishes to alter the trend of progress. If a manager does not respond to a contributor's report about a resultant, he has chosen not to exercise control.

**Difficulty of Communicating About Resultants**

It seems to be a common fallacy to believe that clear mental concepts are easily transmitted from one person to another. Probably this is best illustrated by the experience many have had in asking directions when motoring, when, after receiving a rather lengthy description involving unfamiliar names and terms, the person ends his message by saying, "You can't miss it." To realize the difficulty of explaining a desired resultant, one need only recall trying to explain to a strange barber how to cut one's hair.

There seem to be three principal sources of over-estimation of ease of transmitting concepts which lead managers to a paucity of communication, and they are:

1. Over-estimation of the efficiency of the communication process.
2. Over-estimation of the receiver's knowledge of the superior resultant.
The characteristics of a good communication about the resultant are:

1. Understandable. (Conveys to the receiver the information intended by the communicator).
2. Indicates relationship of the sub-resultant to the superior resultant.
3. Describes all the characteristics of the resultant not known by the contributor and which he needs.

The process of communication and the difficulty of transmitting a message without excessive loss of information were described in a previous chapter. It suffices here to repeat that a word transmits information only to the extent that it relates to experiences common to the transmitter and receiver. Directions in the household shouted from one room to another, such as "Get that thing out of the cupboard" have their counterparts in industry and are effective to the extent that they have a common meaning for sender and receiver.

It has been emphasized by many writers and speakers that supervisors should always explain the "why" of commands and orders. Perhaps the reason this has received much attention recently is not because workers are more curious now than formerly, but, because the high degree of specialization in industry has obscured the relationships between resultants of the hierarchy of unit organizations to contributors. Communication about the resultant should include an indication of its
relationship to superior resultants and eventually to the satisfaction of the personal purposes of the contributor of the acts who achieves it.

Just as the three blind men described the elephant by the part they touched, so do managers tend to describe the resultants in terms of characteristics most familiar or pertinent to them. However, the characteristics most pertinent to a manager may not be most pertinent to a contributor.

When Concepts of the Resultants Are Lacking: As was indicated previously, the resultant desired can never by fully conceived because of the lack of knowledge, some of it unknowable, about the environment. What cannot be conceived cannot be transmitted.

However, it is not uncommon for the lack of a clear concept to be obscured by a mass of verbiage that seems to describe a resultant. Probably, more than one new supervisor has received instruction on the resultant to be obtained by his unit organization in about the following words:

"Joe, you're taking on a big responsibility, but I know you can handle it. If you'll get in there and really work, I know you can put your section over the top. Now, the first thing you've got to do is really organize things, get it clicking and everything going smoothly. Get the men up on their toes and keep them pitching. Remember we're all part of the team and we've got to work together. Keep your eye on costs, watch every penny. If you don't keep your eye on that ball,
you're sunk with the old man. Now get out there, get results like this, and you're made."

This message is almost entirely lacking in informational content. It does not describe the resultant in precise terms. Joe will not learn from it the characteristics of the resultant he is to achieve.

If a clear concept of the desired resultant is lacking, precise coordination cannot be achieved. A clearer concept may be obtained by passively listening to communications of others or by actively participating in delineating the resultant. Participation in the delineation of the resultant leads to a much better concept of the resultant by the participating parties. The democratic method of management is not so much superior because of participation as such, but because participation tends to increase participants' knowledge of the prospective resultant. The clearer concept of the resultant allows the contributor who democratically participated in its delineation to contribute his activities in informal organization without frequent control communication from the manager. His activities are self-controlled rather than manager-controlled. Self-controlled activities are generally viewed as less burdensome by contributors, thus less incentives are required to induce them.

Completeness of Communications About Resultants:

The difficulty of communicating about the resultant is heightened by the fact that effectiveness may be impaired by too much information.
A message containing information known to a recipient may foster boredom, inattention, and even disgust if it leads him to believe his knowledge and abilities are underestimated.

If the description, in the mind of the contributor, unduly limits his choice of alternatives, this may be considered to be a dissatisfaction that must be overcome by the provision of additional incentives. Few, if any, like to be told exactly what to do, when and how to do it. As a general statement, the wider the opportunity for choice, the less incentives required.

The architect gets the greatest satisfaction from his work, if the client describes the house he wants in the broadest terms, leaving the architect great latitude in design, room arrangement, choice of materials, and other features. If the client specifies every detail, the architect's task is principally that of a draftsman and he may get little if any satisfaction from his work. In the same way, most carpenter foremen would consider it an insult if the architect would attempt to describe the proposed house in such detail as to include the number, size, and placement of all the nails.

Therefore, it appears that descriptions of the resultant should give the widest feasible latitude to those who are to attain them. Each person should be given the opportunity to utilize his decisional capacities to the fullest. When he is utilizing his capacities, he is receiving satisfaction. When he is thwarted by rigid and inflexible procedures, he
demands large incentives as compensation. One of the problems of a high degree of specialization with minutely divided tasks highly coordinated, is the dissatisfactions incurred in performing them. The unrest of the worker on the assembly line is an illustration. Our mass production industries are ample evidence of the economic value of specialization. However, it appears there is also an economic limit where the gains of further specialization are offset by increased demands of workers for incentives to compensate them for the loss of choice. A democratic society is a productive society because it maximizes the individuals opportunities for relevant and realistic choice. This appears to be true for the industrial segment of that society as well as the society as a whole.

Summary

The purpose of managing is to influence the contributor to act at the right time, place, and manner. So that they can act appropriately, managers communicate to contributors about the resultant. The selection of the proper message is preparation to manage and is usually called planning. In industry the planning function has been greatly elaborated and is largely performed by staff specialists. This exposition has not concerned itself with particular planning procedures, but only with the reasons for planning and how one plans. It should always be remembered that the whole planning function in industry exists so that contributors are aided in performing the proper acts to achieve the contemplated
resultant. The end product of planning is a communication by a manager describing the resultant.

Section II
Preparation Preceding Communication to Aid Contributors to Perceive Acts Needed

This second aspect of the managing process is closely related to communications about resultants. Communications about resultants are about contemplated changes in the physical environment; communications about needed acts are related to the means to achieve the contemplated resultant.

A more complete body of knowledge has been developed to aid managers and contributors to perceive efficient systems of activities than has been developed to aid in the selection of resultants or the recognition of incentives. Beginning with Frederick W. Taylor, who was one of the first to write his advocacy for study of the methods of production, the techniques of methods or motion study were rapidly developed. Frank and Lillian Gilbreth were early pioneers and are generally credited with the development of micro-motion study. Ralph Barnes, through his excellent books and articles, popularized motion study and encouraged the present widespread use in industry of methods and motion study techniques. An important end of most scientific investigations is knowledge which will aid man to perform acts to alter his environment to satisfy his needs.
Taylor recognized that, in a complex industrial organization, workmen were unable to perceive the system of activities that would produce the product at the least effort and cost. He conducted his now famous experiments on the art of cutting metals and later developed the four duties of managers. The first two of these duties were to develop a science for each element of a man's work to replace the old rule of thumb method; and to select, train, and teach the workmen in the new science or method. Today, methods analysis, operations analysis, motion and micro-motion study, and work simplification are some of the techniques used to study the acts needed; and a whole system of charts including the process chart, man-machine chart, activity chart, and the simo-chart has been developed to communicate the new method to the workmen.

Acts must be Appropriate on all Five Bases of Specialization:

All acts of a person are performed at a time, in a place, by a person, on something, in a definite manner. For an act to be effectively coordinated each of these five phases of the act must be appropriate. In an industrial organization, this means that the workmen requested to make a shaft, must know when to make it, where to work, what material and what machines to use, and the sequence of acts. It is unusual for workmen to be able to perceive adequately all five phases of the act for effective coordination, and thus managers are needed to communicate to them. A complete communication about an act would include information
on time, place, contributors, machines, tools, materials, and method. An example might be, "Jack, (contributor) when you have finished that (time), will you get your maul (tool) and a stake (material) and drive it flush (method) into the ground at the northeast corner (place)." If Jack were an experienced workman, the manager would assume some prior knowledge and might shorten his communication to, "Jack, will you drive the stake." If Jack knows the appropriate time, tool, material, method, and place, the message may be adequate but if he lacks knowledge of any one, the resultant contemplated by the manager may not be achieved. Managers reduce the risk that their communications about acts will not be understood when each communication mentions the five bases of specialization for each act needed.

No one, manager or contributor, can easily select the most efficient sequence of acts to produce even a rather simple resultant such as a chair. As indicated above, this involves the selection of machines, materials, factory layout, manufacturing methods, and many other things. Managers, particularly in manufacturing organizations, utilize large staffs to aid them in the selection of appropriate series of acts to be performed by workmen. The staffs may be specialized; that is, they may concentrate their activities to the study of a particular base of specialization of contributors' acts. This is illustrated by the following tabulation of a few staff positions normally found in industry.
The rapid increase in their numbers attests to the value of employing staff specialists to aid managers in the selection of better methods. Developmental research, which comprises a major portion of industrial research, is a seeking for new and better means to attain desired resultants through the organized acts of men.

It is not enough for a contributor to know what physical acts are needed to achieve the resultant; the acts that are selected should entail the least burdens. This is another way of saying that the resultant must be achieved at the least cost. The costs of achieving a resultant are the incentives paid to contributors—incentives of wages for the worker, money for the material supplier, and money for the owner. If the total of the incentives paid out is excessive, the cost of the product may be so high that it cannot be sold. Then, the manager tries to devise new specializations of acts for achieving the resultant at less cost. Purchasing agents attempt to obtain materials at a lower cost, engineers try to design more efficient machines, and methods analysts try to design a better motion sequence. This requirement of "least burden" or "least cost" so complicates the selection of the series of acts needed, that some managers in manufacturing organizations seem to spend much of their time thinking
about the best sequence of acts to accomplish the resultant.

Standardization. Because of the complexity of selecting the enormous number of acts required for an appropriate sequence, an attempt is often made to standardize, insofar as possible, a particular sequence of acts that seems most efficient at that time. This may be a standard method as recorded on an instruction card or other appropriate form with a standard time as determined by time study and recorded on the time study sheet, and other information relative to tools, machines, and materials to be used. Standards may range from broad policy statements to detailed instructions and may be about any or all of the five bases of specialization of acts. Production planning and scheduling departments, methods and procedures departments, and motion and time study departments are all concerned with standardizing the most economical system of acts. Standardization of acts to achieve a resultant is economical only when similar resultants are achieved repetitively.

Communications are About the Acts or the Environment:

It is seldom, if ever, possible to tell a contributor everything he needs to know to contribute a particular act. Some prior knowledge, large or small is always assumed. For example, the request "Get the wrench" assumes the contributor knows what wrench is needed and where it is. The simpler request "Grasp the lever" assumes the contributor knows how to grasp and which lever to grasp. Although in many situations, contributors have adequate prior knowledge to perform the
requested acts, in other situations they do not, and communication may be ineffective.

Communications to aid contributors to perceive the acts needed are either primarily about the acts themselves or primarily about some factor in the environment. A similar physical act might be induced by shouting "Duck!" or "The crane is coming!" The first communication is about an act; the second is about a crane, a factor in the environment which, when perceived by the person may cause him to duck.

*About the Acts.* In general, a manager communicates about the act itself when he knows in some detail the act required to achieve the contemplated resultant. In some cases, communication about acts to be supplied consist of a demonstration by the manager. This method is much used by coaches and others when it is difficult to communicate in verbal symbols.

In routine repetitive operations, the manager or a member of his staff, usually has closely studied the resultant and knows the acts needed. The known alternative sequences of acts have each been analyzed and evaluated and the one considered most favorable, all things considered, is selected for use. The more detailed the manager’s knowledge about the acts needed, the more likely the communication will be principally about the acts required. An example of a communication emphasizing acts is the abridged simo-chart about a highly repetitive
An operation shown below.

**Simo-Chart**

<table>
<thead>
<tr>
<th>Description</th>
<th>Therblig</th>
<th>Time in 2000ths of a Minute</th>
<th>Therblig</th>
<th>Time</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Left Hand</td>
<td></td>
<td></td>
<td>Right Hand</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reaches for bolt</td>
<td>TE</td>
<td>10</td>
<td>TE</td>
<td>10</td>
<td>Reaches for bolt</td>
</tr>
<tr>
<td>Select and grasp bolt</td>
<td>St G</td>
<td>2</td>
<td>St G</td>
<td>2</td>
<td>Select and grasp bolt</td>
</tr>
<tr>
<td>Carries bolt to position</td>
<td>TL</td>
<td>28</td>
<td>TL</td>
<td>28</td>
<td>Carries bolt to position</td>
</tr>
<tr>
<td>Position bolt</td>
<td>P</td>
<td>5</td>
<td>P</td>
<td>5</td>
<td>Positions bolt</td>
</tr>
<tr>
<td>Assembles bolt and releases</td>
<td>A RL</td>
<td>8</td>
<td>A RL</td>
<td>8</td>
<td>Assembles bolt and releases</td>
</tr>
</tbody>
</table>

**Figure 16**: A portion of a simo-chart.

**About the Environment**: As the manager's knowledge of the acts required becomes less complete, his communications tend to be less about the acts and more about the environment. An example of this is the abridged position or job description of a managerial job illustrated below:
Position Description

GENERAL SUPERINTENDENT

FUNCTION

Under the direction of the Vice President, Production Department, the General Superintendent, as a line number of management, directs and supervises all field work involving drilling, development and producing operations, and the maintenance of properties. Supervises District Superintendents and through them all field personnel. Supervises the Chief Clerk insofar as he performs clerical functions for the field operations.

RESPONSIBILITIES AND AUTHORITY

Within the limits of company policies and control procedures, and Production Department policies and procedures, the General Superintendent, is responsible for, and has commensurate authority to accomplish the duties and activities listed below. He may delegate to members of his section appropriate portions of his responsibilities together with proportionate authority, but he may not delegate or relinquish his overall responsibility for results nor any part of his accountability.

Activities

1. Assists Vice President, Production Department, and the Chief Engineer in the formulation of plans for the development and operation of properties.

2. Directs and supervises drilling operations and operation of properties through District Superintendents.

3. Assists the Vice President, with the Chief Engineer and District Superintendents, in the formulation of the annual operating budget and the quarterly revisions thereof.

4. Represents, with/or in the absence of the Vice President, the company in the negotiation of contracts.

5. Reviews, with advice of Chief Engineer, Administrative, and Exploitation Geologist, prognosis of well-drilling or work-over operations and takes appropriate action.
6. Inspects the properties operated by the company or its partners to assure proper operation and to remain familiar with general operating problems of the area.

**Figure 17:** A portion of a position description.

In many cases, the particular acts that will be required cannot be foreseen by either the manager or the contributor. In many situations, the possible alternative sequence of acts are unknown and therefore a "best" sequence cannot be selected. This is true in most organizations for the non-repetitive parts of repetitive jobs and for all non-repetitive jobs. When the acts cannot be foreseen, the manager communicates about those factors of the environment that the contributor might consider in arriving at his decision of what acts are appropriate. The coach of the football team might say to the quarterback going into the game, "You have the wind at your back. Their right tackle is charging hard and fast and their left end drifts wide on plays around his end. There's twelve minutes remaining to play."

These are comments about factors of the environment that a quarterback might consider in selecting the plays, but they are not messages about the plays themselves. It is, of course, as impossible to tell the contributor about all the factors in the environment as it is to tell him about all the acts needed. Those factors of the environment which the manager believes should or might affect the contributors choice of acts are mentioned.

Communications in the higher level of unit organizations tend to be almost exclusively about the environment; and in industrial
organizations particularly, the economic environment. They are comments such as, "Your selling costs per thousand dollars of sales is up this month." "Production is off a thousand barrels on the Osage leases." "The Union is giving us a lot of trouble - the grievance committee had forty grievances in the last 90 days about wage inequities alone." It is the hope of the communicator that this additional knowledge of the environment will enable the receiver to formulate now or in the future a communication about acts, not foreseen by the original communicator, that will most efficiently achieve the contemplated resultant.

**Limitations on Perception**

In Chapter II, a very simple formal unit organization consisting of the activities of three blindfolded men and a manager was described. The resultant to be achieved was to move a plummet by the means of strings attached to a plummet into a container. Because the men were blindfolded, a manager was needed to tell them the acts that were needed from each man.

In every organization, each contributor is partially blindfolded; that is, he cannot always perceive all the appropriate acts. He lacks knowledge. Knowledge consists not only of an acquaintance with or perception of separate facts, but includes the ability of dealing with facts collectively, especially in their practical relationships.

A contributor's perception is aided by removing limitations in his knowledge. Limitations in knowledge are removed by additional knowledge
of facts and their relationship. In the example involving the three blindfolded men, the manager observed the fact that each man held his hand holding the string attached to the plummet, higher than the plummet. He also knew that by increasing the tension on the strings, the plummet would be raised. His knowledge of the relationship between the force applied to the string and its effect in counteracting the effect of gravity on the plummet was only approximate, but adequate in this example. However, in other situations, a more exact knowledge of the relationships of the force, angles, and weight of the plummet might be required which would require a familiarity with trigonometry and engineering mechanics.

To aid contributors to perceive acts needed to accomplish a resultant, facts and relationships of facts must be transmitted to them. It is easy to confuse exhortations with facts. "Be careful, around that saw or you'll be hurt," is a communication primarily about incentives not about acts. The message added no new information about the force that might be exerted by a fast rotating saw, the sharpness of the teeth, or the low shear strength of fingers. Facts have little or no meaning by themselves. To tell a worker using a grinder that he's grinding a magnesium casting is of no avail in inducing the appropriate acts unless he knows that magnesium dust from grinding operations is readily combustible.

Communicating Facts and Relationships: To effectively supplement a contributor's knowledge, the manager must know the extent of
the contributor's knowledge of the particular subject. To aid contributors to perceive acts needed, the manager must know what the contributor doesn't know.

It is difficult if not impossible for a manager to know the limits of a contributor's knowledge. Therefore, his comments on the acts or the environment should be at a level of abstraction at which the manager and contributor have had common experiences.

For example, "Tie an underwriter's knot" is a meaningful communication to an experienced well-trained electrician because it is at a level of common experience. But, most of us would be unable to comply with this directive. For those who cannot comply, the manager should communicate again at a lower level of abstraction, a level at which he hopes there is common experience and say, "Grasp the wire in the left hand about four inches from the end. With the right hand, uncoil the two strands of wire separating them into a narrow V. With the right hand, grasp the right strand and make a right hand loop passing the end of the loop in back of the main strand. Now grasp the left strand and bring the wire back to the left, down and around the end, in front of the main strand and through the loop. Now grasp both ends, pull and with the left hand work the knot snug." To many, this communication is also insufficient to aid the contributor to perceive the acts needed.

1Adapted from Training Within Industry Job Instructor Training programs of the War Production Board.
Still seeking a common level of experience, the manager may then take a stranded wire and show the workman while he explains the various movements. It may be noted that a demonstration is a communication at a very low level of abstraction. A demonstration circumvents many of the difficulties of verbal communication.

Training establishes habitual sequence of acts so that managers may later induce these acts by a short communication at a high level of abstraction. "Tie an underwriter's knot" was assumed to be an adequate communication to a trained person.

Acceptability of Communications About Acts and Environment: A manager's choice of whether he should tell a contributor what to do or comment on factors in the environment does not depend alone on which message will best enable a receiver to perceive the acts needed, but also on the acceptability of the two communications. All men desire some freedom of choice — some men demand more opportunities for choice than others. Orders and directives about acts to be contributed are usually considered by a contributor as limiting his choice, while comments about the environment may not be so considered. Thus, communications about the environment are generally considered to be acceptable with less incentives than communications about acts.

Excessive communication relative to acts needed is also a factor that is related to incentives. Communication of information about acts already known to contributors is often a source of irritation. The
inference is that the manager believes that contributors know less about a situation than they do in fact. This may cause negative reactions in contributors ranging from boredom to extreme disgust. Such reactions increase the burden of supplying the needed acts and must be offset by compensating incentives.

Summary:

Managers communicate about acts and the environment to aid contributors to perceive the acts needed to achieve the contemplated resultant. As every act is performed at a time, in a place, by a person, on something, in a definite manner, the contributor must know all five phases of the act to effectively coordinate it with other acts. The limitations on the contributor which are limitations of facts and relationships of facts must be removed by communicating to him appropriate information. The communication must be in terms of the contributor's experience to be intelligible to him.

Section III
Preparation Preceding Communication to Recognize Incentives:

The third important function of managers is to stimulate operative contributors to act. As noted in Chapter IV, it seems doubtful except in simple and unusual situations that most persons are able to sufficiently recognize and evaluate incentives to meet the needs of organized activity. Managers are needed to communicate to contributors about the incentives that are offered for the contribution of acts and to interpret the incentives in terms of the contributor's values.
As noted previously, incentives must be offered in sufficient quantity to overcome the burdens that the contribution of necessary acts will impose on the contributor, or to overcome his reluctance to act. The process of evaluating incentives and equating them to burdens is not necessarily, and frequently is not, a matter of logical thought. If the incentives do not seem adequate to potential contributors, managers must aid potential contributors to re-evaluate the satisfactions and burdens in the hope that they may come to regard the satisfactions in prospect more highly and the burdens less arduous.

To discharge their function of stimulating, managers first choose the message about incentives that they believe will motivate contributors. The message chosen is then communicated to contributors. Preparation to manage which consists of choosing and formulating messages about incentives will be discussed first.

**Nature of Incentives:**

All persons are satisfaction seeking. Anything that satisfies a person is regarded as being an incentive for him. Incentives are utilities that have want-satisfying power. They satisfy by relieving bodily tensions.

A source of incentives available for distribution to contributors to unit organizations is the utilities that are created by the coordinated physical acts that constitute the unit organization. Another way to say this is that the incentives available for distribution flow from the achievement of the resultant.
Apart from the incentives that may flow from the achievement of the resultant a contributor may receive satisfactions incidental to supplying acts to a unit organization. Such incentives are internal to the contributor and since contributors are always a part of the environment of unit organization, they are external to unit organizations. An example of such incidental incentives is the satisfying warmth that may be experienced by a contributor on a cold day incidental to supplying muscular forces in an organization.

Incentives are of many forms and kinds, but for ease of exposition, they will be classified as producing two kinds of satisfactions; namely, bodily satisfactions and ego satisfactions.

Those incentives that are essential to maintain bodily integrity produce bodily satisfactions. These include sufficient air, water, food, clothing, shelter, medication, and other things necessary to maintain life and health. With few, if any exceptions, body satisfying incentives are material and tangible.

All incentives beyond the quantities needed to preserve life and all other incentives unessential to preserving life are considered to produce ego satisfactions. Incentives that satisfy the ego may be material or non-material. Food in qualities and quantities beyond the needs for health will be considered to be ego satisfying rather than body satisfying. The incentives of desirable social conditions
including all status symbols, many of which are non-material, will be considered as ego satisfying.

In most industrial organizations, the major portion of all incentives offered are ego satisfying. Only a small portion of the material incentives or a minor portion of the wage or salary is required, in most cases, to maintain health and life. Thus, wages, which have received so much attention, must be considered and studied from the standpoint of how they allow one to differentiate himself from those considered inferior and to equate himself with those considered equal or superior. Money is not a strong incentive for most industrial employees as a means to live, but it is strong as a means to attain a desired status and standard of living.

**Direct and Indirect Incentives:** Some incentives offered to contributors directly satisfy the body or the ego. The receipt of such incentives immediately produces satisfaction. For example, praise is a direct incentive which has an effect at the moment it is received. Other incentives indirectly satisfy the body or ego and the receipt of these incentives does not immediately produce satisfaction. A common example of an incentive that is largely indirect is money or wages. The satisfactions that money may bring such as food, clothing, and shelter are delayed until the money is exchanged in a different unit organization from that in which it was received.

To the receiver, the direct incentive is often the most tangible while to the manager who offered the incentive, it tends to be intangible.
Similarly, the indirect incentive is often more intangible to the operative contributor and more tangible to the manager. Managers tend to offer as incentives what is tangible to them, but which to the receiver is indirect. Immediately, this introduces a problem of evaluation for the operative contributor who must determine how well the incentive offered will produce satisfaction in some other exchange.

Generally speaking, the material incentives offered in industry, principally money, are indirect and thus somewhat intangible to the operative contributor. An indirect incentive, because of the delay between receipt and satisfaction, tends to be less powerful in inducing contributors to act than a direct incentive. For example, money deposited by a company into a sinking fund for pensions appears not to have a great stimulating effect on employees to attain higher productivity. The non-material incentives of praise, approbation, participation, and others that satisfy personal ideals, because they are largely direct to the receiver, are powerful stimulants. These are the incentives used to stimulate men to great self-sacrifice. Men die for ideals. It is noteworthy that in war soldiers face death from a sense of duty, when on the home front high wages fail to prevent absenteeism of civilian personnel engaged in munition making.

The material incentives used in industry are principally ego satisfying and indirect. The wages of the worker are largely used to purchase goods and services to provide a standard of living, which
establishes his status in the society. Material goods are symbols of that status. Because the attainment and maintenance of status is such a powerful incentive in our social system, money has seemingly become one of the chief goals of men. It is probably also true that our society has created attitudes in people that they "ought to want" material things. Not only has our educational system tended to stress "proper" ambitions, but industry and business through intensive advertising has tended to stress material possessions as symbols of social standing.

The Incentive of Status:

As generally used, status means that condition of a person in an organization that is defined by a statement of his rights, privileges, immunities, duties, and obligations in the organization; and, obversely, by a statement of the restrictions, limitations, and prohibitions governing his behavior.1 Symbols of status, such as the academic hood, titles, insignia, and the carpet on the office floor, are necessary so that others to whom communications are addressed can know the rights, privileges, immunities, duties, and obligations of the possessor of the status symbol who is communicating.

Status seems to be a necessary condition of individuals in an organization and it is doubtful if a unit organization could come into

being or endure without the incentive of status for contributors.
Occasionally organizations and societies are conceived in which some
of the status symbols, particularly those related to ostentatious con-
sumable goods, are eliminated only to be replaced by titles, insignia,
or differentiating dress. It is doubtful if the true classless society
can ever exist, for differentiation of contributors seems to be a neces-
sary condition of sustained cooperative effort.

Status appears to arise out of some fundamental biological and
social needs of persons. It is one of the principal, if not the prin-
cipal incentive that satisfies the ego of the contributor. To omit
status from any discussion of incentives, is to fail to recognize one
of the most important incentives in any organization. As noted pre-
viously, the ego satisfying incentives appear to be the most important
in most organizations, including industrial organizations. This has
been noted, discussed, and described by industrial sociologists and
social psychologists.

The conferring of status by managers is a systematic procedure in
organizations that requires the most careful attention. Status is
seldom, if ever, rigidly defined and symbols of status are many and
varied. Turning a desk around to face a row of desks in an office is
a means of conferring status on a chief clerk. The size of the desk,
the proximity to a superior's desk, the kind of typewriter, almost
everything may be interpreted as symbols of status in organizations.
Many managers have been surprised to find that a minor re-arrangement of desks in an office in the interests of efficiency caused turmoil among clerks because the new arrangement upset the existing system of status. Managers use the preoccupation of persons with status symbols as a means of influencing behavior.

A second function of status is to make communications in organizations acceptable. As indicated in Chapter V, a communication will be accepted as authoritative only when the source of the communication is identified. The source of the communication must be known to identify the source of the incentives. The kinds and value of incentives controlled by managers, in large measure establishes their relative status in a hierarchy of status in the organizations. Managers may confer status by transference of some status symbols to other contributors. To insure that operative contributors will recognize the incentive-bestowing capacity of coordinative contributors, the latter are equipped with easily recognized organizational status symbols. In a large complex organization where everyone cannot be known by name, a system of titles appears to be indispensable to insure acceptability of communication. In controlling a crowd, a policeman's uniform is an important factor in gaining compliance with his orders.

Non-interchangeability of Incentives

Incentives have been arbitrarily and for convenience classified into ego satisfying and body satisfying. Within each class there are
many sub-classes, of which only a few of the more important have been mentioned previously. A particular incentive does not necessarily satisfy all the bodily and ego wants of the individual; and, there is evidence it satisfies a very limited range of wants. It is easily recognized that if a person is hungry, giving him shelter will not satisfy his hunger. It appears not so easily recognized that if a person wants praise, an increase in wages may not satisfy him. Or more difficult of recognition is that the lack of the symbol of status of a large, carpeted office may not necessarily be offset by the conferring of a title. In fact, the conferring of the title may increase the desire for an appropriate office, not diminish it.

Only to a limited extent can one incentive be interchanged for another. A story is told of a night watchman whose job required him to do much walking, and who unfortunately was having foot-trouble. He finally reported to his foreman and said, "I'm going to quit -- the job just isn't worth it." The foreman was aware of the regularity and thoroughness of the watchman and didn't want to lose a valuable man, so he said, "I'd like for you to stay; and to make the job more worthwhile I'll raise your pay five dollars per week beginning today." That pleased the watchman and he accepted and walked painfully out. In a couple of months, he returned. He confronted the foreman and said, "This job is just too hard for the money I'm getting -- I'm going to quit." Again the foreman, wishing to retain his services, made a
counter offer and said, "Look, in addition to a two-dollar-a-week raise, I'll put in a pension plan for you." And again the night watchman was appeased and he accepted the offer and began making his rounds. But his feet were more painful than ever. Finally, he could stand the pain no longer so he went to his foreman and said, "The job is too tough for the money — I quit." By this time the foreman was exasperated and said, "What's the matter with you anyway? Here I've raised your pay twice. Besides that, I've given you a pension plan. Aren't you ever satisfied?" To this the watchman replied, "No, my feet hurt!"

Additional monetary incentives will not make an unfair or domineering manager a fair and democratic one, nor will money lessen the pain in a watchman's feet. It only makes the burden temporarily endurable, but the burden remains. It is of the utmost importance for managers to recognize the non-interchangeability of incentives. The managerial task of offering incentives for cooperation is difficult not only because of the scarcity of incentives, but because of the necessity of determining the particular incentive to satisfy a particular need, and the necessity to control the wide variety of incentives needed. It is not enough just to have plenty of one incentive, such as money; but a variety of incentives to satisfy the variety of needs of potential contributors must be present.

Incentives are Individually Subjectively Evaluated: Because of the ease of falling into the error of thinking that an incentive is of equal
value to all potential contributors, it is again emphasized that incentives are individually, subjectively evaluated. Money wages are fictitiously concrete. The satisfactions that one dollar may bring to each of two men are not equal and thus one man may value one dollar more than another man. One man may attach great importance to the status symbol of a Cadillac automobile and another may be content with the Ford. The war-time experience of high absenteeism is indicative of the declining value of money as quantity increases. Incentives are constantly, subjectively evaluated, but not necessarily by any process that is generally considered logical. Thus, it is to be expected that a given incentive will be evaluated differently by all contributors and differently by an individual contributor at different times.

A Scheme of Incentives:

Previously, some aspects of the nature of incentives have been discussed. To maintain a system of cooperation, a manager must adopt some scheme of offering available incentives to potential contributors. Such schemes are so complex for large organizations that a high degree of efficiency in the distribution of incentives is seldom if ever attained. The actual resultant of cooperation or the actual factory production is usually considerably below the theoretical or possible production attainable if each contributor would contribute his maximum effort, without endangering his health, and if his efforts were perfectly coordinated.
As explained in Chapter III, managers have available only the resultant of cooperation to distribute as incentives to the contributors. A complex of unit organizations can be considered a closed system. In a sense, the contributors collectively consume what they collectively produce from their collective acts.

The manager, who is a contributor to the organization, like everyone else in the organization, is trying to maximize his satisfactions. He, better than anyone else in the formal unit organization, recognizes that the incentives are derived from the resultant of cooperation and therefore, he tries, to the limit of this recognition, to maximize the resultant as a means to maximizing his own incentives. The scheme of incentives that he tries to employ has as its objective, the stimulation of effort from contributors to maximize the resultant that the manager recognizes as affording him a maximum of incentives. This appears to be not well understood. Managers divide the resultant of cooperation by a scheme of incentives so that it will motivate contributors to act in such a manner as to produce a resultant which is desired by the manager, and which he views as producing the most satisfactions for him. If a manager gives a large share of the incentive to his brother-in-law, he does so because, all things being considered at the time of his decision, he believes this will maximize his satisfactions. It is not intended to impugn the motives of managers, only to recognize that as contributors to organizations, they too require incentives. A manager
is to an extent, an entrepreneur. He prospers by virtue of arranging for operative contributors to prosper. The source of a manager's incentives is the same as that of operative contributors and managers are working not only in their own self interest, but also in the interests of all contributors when they try by the judicious employment of a scheme of incentives to attain maximum effectiveness of coordinated effort to produce a maximum resultant.

From the above, it should not be inferred that the scheme of incentives each manager uses is identical or that there is any one best scheme of incentives for all unit organizations or for one unit organization over a span of time. It should not be inferred that managers of all unit organizations recognize to the same degree the correlation between resultant and their incentives, nor that they are influenced to the same degree by the incentives offered by their managers in unit organizations where they are the operative contributors.

Maximizing the Resultant: An important factor in the choice of the scheme of incentives is the objective of maximizing the resultant of the organization. The believed growth of an organization, as measured by the resultant achieved, is so important a source of incentives that it seems doubtful that few, if any, organizations can long survive without it. Because of the diminishing value of the same incentives with time, it appears that a contributor will continue his contribution to a particular organization only if he believes more of the same
incentives or additional incentives will be provided from a larger resultant in the future. Faith in growth of the organization can best be sustained by evidences of that growth. Once that faith is lost, the contributors have lost an important segment of their total incentives and may withdraw from the organization. The demoralization and surrender of disciplined armies once all hope of victory is irrecoverably lost is well known.

The competition between organizations for acts of contributors is real, and in the long run, the organizations that survive are those that grow in terms of achieving resultants and affording incentives, and thereby maintaining faith in future growth. To the manager, with his stronger urge for opportunities for prestige and advancement in status, faith in growth seems indispensable.

Selecting A Scheme of Incentives: At any moment, the kind and amount of incentives available to a manager may be considered fixed. He attempts to divide these incentives among contributors in such manner that the latter are stimulated to produce a resultant embracing utility greater than the incentives that were required to produce it. As an organization is considered to be a closed system, this greater resultant is distributed to contributors of the complex organization in the form of new incentives, again in a manner designed to achieve a still larger resultant. This process continues unless the manager is unable to select a scheme of incentives that will produce a larger
resultant. Although a single unit organization may reach and maintain an equilibrium between the input of incentives and output of resultant, the organization as a whole cannot do so for long, for then it will be unable to maintain the faith of the contributors in growth.

**Diminishing Value of Incentives:** All incentives follow the law of diminishing returns; that is, repeated application of a constant amount of the same incentive produces progressively smaller satisfactions and weaker motivations. This is illustrated in figure 17.

![Figure 17](image)

Figure 17: An assumed relationship of incentives to satisfactions.

An input of increment $dI_1$ produces a satisfaction of increment $dS_1$, while increment $dI_2$, which is equal to increment $dI_1$, produces a satisfaction of increment $dS_2$, which is considerably smaller than increment $dS_1$. The specific shape of this curve varies from person to person,
and with time for each person. The diminishing value of incentives is recognized where a $10.00 a week increase is considered adequate for a $50.00 a week clerk but totally inadequate for a $500.00 a week movie actress. The curve at some point may turn down; that is, produce a negative satisfaction or a burden. For example, a word of praise is welcome. A few minutes of praise is not objectionable, but continuous fawning praise is embarrassing.

Each person has at any moment many unsatisfied wants that may be illustrated by a series of curves of diminishing value of incentives. The following curves do not represent any particular relationship, they are only illustrative.

Figure 18: Assumed relationships between particular incentives and satisfactions for a particular individual at a particular time.
The amount of the incentives currently being afforded to the individual is represented by the dotted line.

Now, when the manager is in the process of dividing the incentives and formulating a communication about them for the contributor, he considers what incentive he may offer to obtain the greatest satisfaction and motivation to maximize the resultant. Assuming that the cost, which is the value of the incentive to the manager, is equal for one unit of each incentive of money, praise, security, working conditions, and agreeable associates; then the manager will give that incentive which will give the greatest return.

If, in each of the several curves, increment $dx$ is considered to represent a unit of incentive of equal cost, then the greatest satisfaction to the contributor will be obtained if the incentive is praise. The manager would, other conditions being equal, offer praise first. However, if a second unit of incentives, as illustrated by increment $dx_1$, becomes available, the manager would probably offer money, for a second unit of praise would only produce a small amount of satisfactions, less than a unit of money.

It should be noted that the curves diminish with increasing amounts of the incentive. This illustrates that the application of additional incentive may not produce enough satisfactions and motivation to warrant the application of the incentive at that time. This situation appears frequently in a unit organization. The contributor may still
have unsatisfied wants, but they are so weak that he will not accept heavy burdens to satisfy them. For example, the use of over-time pay for a longer and longer work week soon becomes uneconomic.

The relationships illustrated in figure 18 are not constant, but vary with time and other external conditions for each person. For example, after the application of a \( dx \) increment of praise, the relationship between incentives and satisfactions was illustrated by the solid line. However, after a passage of time in which no praise was given, the relationship might return to that illustrated by the dotted line, and the contributor now would obtain a considerable amount of satisfaction from the receipt of another \( dx \) increment of praise. In much the same way, at one moment the relationship between money and satisfactions may be as illustrated by the dotted line in figure 18. However, conditions may change; the contributor may learn that his son needs costly and extensive medical treatment, and immediately, the whole relationship is changed. The new curve expressing the relationship between the incentive of money and satisfactions would probably be steeper and much higher as illustrated in figure 19 below.
Figure 19: A new assumed curve after a change in external conditions.

Now the satisfactions and motivations would be greatly increased by the application of additional units of the incentive of money.

To maintain a contributor at a particular level of satisfaction and motivation requires the application of amounts of incentives equal to the change in relationship between the incentive and the satisfactions, caused by time and external conditions.

At the present state of knowledge, the problem of selecting a scheme of incentives for an individual in order to obtain his maximum cooperation in organization is a difficult one. To be most effective, a manager must not only know all of the unsatisfied wants of a contributor and the incentives that will satisfy these wants, but he must know
the relationship between the incentives and satisfactions for each want for each moment.

**Complexity of a Scheme of Incentives for Several Contributors:**

The problem of selecting a scheme of incentives for a formal unit organization composed of even a few operative contributors is an extremely complex and difficult one, probably never possible of perfect solution. Not only must the manager know the wants, the incentives, and the relationship of incentives to satisfactions for each operative contributor; he must also know something of the relationship of the state of satisfaction between the operative contributors and the relative importance of each contributor's activities to the contemplated resultant.

As indicated previously, it is seldom if ever possible to completely satisfy a contributor. Due to the diminishing value of incentives, the application of additional incentives may produce a small and probably uneconomic return in satisfactions and motivation, and the incentive cannot be offered. Thus, at any moment, a formal unit organization is composed of contributors who, because of different external conditions, are probably at different states of satisfaction. That is, one contributor may be very willing to work at a rapid rate, another may be willing to work at a leisurely rate, and another may be unwilling to contribute any act. Assuming the acts of the three contributors to be equally valuable in achieving a stated degree of the resultant, a
point to be treated later, then the manager must divide the scarce incentives so as to bring each contributor to the same state of satisfaction or equal willingness to work. This might be illustrated with a story of a Board of Regents for a number of colleges in a state. The Board received an appropriation of money each biennium to allocate to the two senior colleges, eight junior colleges, and five teachers colleges in the state. The president of each institution presented his budget to the Board and tried to persuade the Board to allocate the funds he requested. As might be expected, the sum of the fifteen budgets presented by the fifteen presidents greatly exceeded the appropriation to be allocated and thus, some, if not all of the institutions could not receive all the money requested. After a particularly long and acrimonious meeting at which the allocations were finally made, one of the members of the Board of Regents was accosted by a friend who asked, "Well, were all the presidents satisfied?" The Board member's rejoinder was a sharp and explicit, "No!" "Well," said his friend, "that isn't important anyhow; but did you divide the dissatisfaction equally?"

In the above discussion, it was assumed that the acts of each contributor were equally conducive in achieving a stated quantity of the resultant. In an organization, this is seldom if ever true. Consider a stake driving team composed of one man who holds the stake and another man who swings a heavy sledge hammer, driving the stake slowly into the ground. The acts of both men are essential to achieving the
resultant of driving the stake into the ground, but it seems safe to say that the speed at which the stake is driven depends more on the man with the sledge than on the man who holds the stake. To a large extent, the helper either holds the stake or he doesn't; that is, he coordinates his acts or he doesn't. But the sledge man may vigorously hit the stake and drive it quickly, or he may tap it and drive it slowly. In this example, which seems typical, it is probably more important to provide incentives to achieve a high state of satisfaction for the man with the sledge than for the helper. The division of the incentives must be such that the helper is willing to coordinate and the sledge man to swing his sledge vigorously and often.

**Persuasion:**

The complexity of devising a scheme of incentives for a group of contributors is such that a manager must frequently employ persuasion. He must overcome his inadequacies in devising a scheme of incentives for contributors as they are, by attempting to change their evaluation of the incentives the manager has to offer.

Persuading is the activity of altering another person's subjective value judgments by rationalization of the incentives. The manager persuades by interpreting the incentives offered in terms of the contributor's values. He communicates about the effect of the incentive in satisfying some want of the contributor. For example, if a manager says, "You'll make out on this rate or I'll fire you," he is only
offering incentives. However, if the manager had added to that communication about incentives, "and your family will starve," he would be persuading, for he was attempting to interpret the effect of the objective incentive on the subjective values of the employee.

An effective scheme of incentives is more easily devised if all contributors evaluate incentives by similar systems of values. Managers not only select potential contributors for their similarity of values, but attempt to inculcate similar value premises by a system of training and indoctrination.

It is evident that every society inculcates a system of values in its members. This is particularly true of the government and the church, which rely on education of the children as well as propaganda for adults to mold the value judgments of its adherents. Our society partially relies on a system of material incentives made valuable by inculcation that one "ought" to want things. One of the objectives of product advertising is to demonstrate that the way to happiness is to possess the product advertised. The success of some nations in inculcating a nationalist spirit so that large numbers of their young soldiers will willingly and knowingly give their lives in suicide ventures is indicative of the extent to which rationalization of incentives is effective when carefully planted and nurtured by a system of education and inculcation.
To a lesser degree, a manager in an industrial organization attempts to establish a similar system of values among contributors or to select contributors who have a similar system of values. Generally he attempts to take advantage of the indoctrination of the society, but occasionally by extensive and intensive advertising, he may try to establish new values. As an example of this, consider an attempt to establish "B.O." as an ever-present and harmful condition as a means of persuading potential customers to buy a particular brand of soap.

The effect of all incentives that satisfy the ego may be modified by persuasion. Ego incentives are the most numerous and powerful in most organizations, and persuasion frequently is employed to increase their effectiveness.

**Methods of Offering Incentives:**

Once the manager has selected an incentive from a scheme of incentives to offer to contributors, he must then select one of two methods of offering it. He may offer the incentive to the potential contributors as a whole or he may offer it specifically to particular contributors. The former will be called a general incentive and the latter a specific incentive. A general incentive is general only insofar as all the operative contributors to a formal unit organization are concerned. A specific incentive is one offered to less than all operative contributors in the unit.

If the incentive is general, the same quantities are offered to all operative contributors. If their system of values is similar in
regard to this incentive, they will tend to anticipate approximately the same amount of satisfactions. For example, the manager who offers an identical wage to a group of ditch diggers is employing a general incentive. General incentives are useful to attract potential contributions to a formal unit organization, but are weak inducements unless the group can be persuaded to compare themselves to some other group. Because various organizations tend to offer the same kind of incentives in similar amounts, group rivalry in terms of this incentive is difficult to generate. Again, using wages as an example, the rate paid for a particular job or class of work tends to be very similar in any given geographical area. The rate paid lathe operators in the automobile industry in Detroit is nearly identical and thus, insofar as the incentive of wages is concerned, there is little, if any, advantage to the lathe operator whether he works for Ford, General Motors, or Chrysler. As the range of wages narrows between skilled and common labor, it will be increasingly difficult to induce cooperation by wages, as rivalry between groups will decrease. General incentives tend to be weak incentives probably because they do not provide much ego satisfaction.

A specific incentive is offered to a limited number of contributors within a formal unit organization. Among contributors with the same system of values, a specific incentive establishes status and thus provides for the receiver of the incentive, ego satisfaction.
For example, if one of several ditch-diggers were offered an increase in wages from the $1.50 received by the others to $1.75, he would probably receive more satisfaction from the specific 25 cents increase, than if he had received a general 25 cents increase along with all the other ditch-diggers. Because specific incentives tend to differentiate, they provide satisfaction to those who receive them. However, it may also depress or subtract from the satisfaction of the other members of a unit and thus the gain in satisfaction of the receiver may be more than offset by the losses of the others. The total satisfaction flowing from a resultant of a formal unit organization may be decreased by a manager's inappropriate method of offering specific incentives. In the example above, the ditch-diggers who did not receive increases in pay may become very dissatisfied and may greatly decrease the activities they are willing to contribute to the unit organization for the $1.50 hourly wage.

Any specific incentive offered to men who have similar value systems elevates the status of the receiver and depresses the status of all others unless the difference of status can be rationalized in some way; such as by greater difficulty of the job, increased output, greater need, or seniority. A system of merit increases as a part of a scheme of incentives to increase productivity will be successful only if the merit of those increased in pay is recognized by the other contributors. If not, the cry of favoritism is heard and aggrieved contributors may limit their efforts.
Specific incentives are frequently used when the value systems for the particular incentive are different among the contributors to the unit. For example, one contributor may greatly desire individual recognition while another may be embarrassed by acclaim. Thus, the specific incentive of a by-line on anything written by the person who desires recognition may be given without depressing the status of the person who does not want a by-line and the accompanying acclaim. The ideal specific incentive is one that is greatly desired by the contributor who receives it, and to which other contributors are indifferent or negative.

Summary:

In a society or an organization where contributors perform highly specialized acts, the contributors are unable to recognize all the incentives available to them from the resultant they achieve. The manager's function of communicating to aid contributors to recognize incentives to cooperate is most difficult and complex. Normally, unit organizations are composed of activities contributed by only partially stimulated men and the organization fails to achieve its potential.

The preparation to manage, which includes formulation of a scheme of incentives, involves knowledge which at this time is unknowable in precise terms. Nevertheless, man is considerably expanding the knowledge of himself, and if managers would use what is now known, their communications about incentives might be more successful in stimulating contributors to act.
Chapter VII

CONCLUSION

The previous six chapters are devoted to the development of a framework of concepts pertinent to the general fields of organization and management. The concepts have been defined in terms of activities that can be perceived by the senses. The purpose of developing these concepts is to describe some uniformities in cooperative systems, whether they be families, churches, civic clubs, or industrial organizations. The concepts are intended to be applicable in the actual present experience of people who contribute to cooperative systems. The objective is to develop useful concepts of organization and management that will assist managers in all formal organizations to aid contributors to attain the satisfactions they seek through cooperative systems.

The Importance of Concepts:

Unit organizations, the basis of society and the instrumentality with which managers work, have not often been the subject of critical inquiry. Managers, even within the same kind of organizations, such as industrial organizations, do not have a widely accepted conceptual scheme with which to think about and exchange ideas about their activities. The purpose and accomplishment of the scientific method is the objective description of recurrent events. In activities of organization and management, there are recurrent events and some useful way should be found to record them. A conceptual scheme is not a
formula. It is not likely that human interactions in cooperative systems soon will be reduced to a formula as universally applicable as Newton's laws of motion. But, on the other hand, we cannot say that human action is too complex and variable to admit statements of some uniformities. Statements of the uniformities in cooperative systems in terms of concepts based on common experience should prove useful.

Concepts are not universally true or false, but useful or useless. The Newtonian concepts of mechanics are useful in solving problems of mass and motion within rather wide limits, but are less useful in problems involving atomic particles. The Bohr concept of the atom as a nucleus surrounded by electrons forming a miniature solar system made possible great advances in physics although it now appears to be incorrect.

Concepts which serve as a framework for thinking and also for the interchange of ideas, and which describe some uniformities from which predictions of future events may be made are useful. When Torricelli, an assistant of Galileo, observed that mercury would stand in a glass tube, he conceived the idea that the mercury was sustained by atmospheric pressure on the mercury bath and not due to some repugnance of nature. From this concept, the invention of the barometer was only a short step; and thereby man was aided in explaining, measuring, using, and overcoming the environment in which he lived.
The Conceptual Scheme Developed:

The conceptual scheme developed in this dissertation relies on two basic assumptions: one, that man always is seeking satisfactions; and two, that his coordinated physical acts constitute a unit organization.

The assumption that man always seeks to satisfy himself appears to be widely held by psychologists. A few of the diverse incentives that satisfy some of the wants of men were discussed in Chapters IV and VI. The method employed by men to satisfy themselves is to perform acts. Men often seek to satisfy their wants by coordinating their acts. When the acts of men are consciously coordinated, a unit organization is formed. It is the coordinated acts of men, unit organizations, and complexes of unit organizations that are under examination in this dissertation. Greatest emphasis is placed on the phenomenon of complexes of unit organizations which constitute industrial organizations.

A complex of unit organizations so conceived is not static, but dynamic and undergoing constant change. This concept of organization is similar to the concept of a gas composed of molecules in constant motion in a vessel. To understand some of the characteristics of a gas, it is necessary to know something about its molecules and atoms. By analogy, the molecules of organization are the unit organizations and the atoms in the molecules of unit organizations are physical acts of persons.
The concept of acts as being the basic elements of a unit organization permits rather rigid classification and definition of different kinds of organizations, such as formal unit organizations, informal unit organizations, and complexes of unit organizations. The study of structure of organization is simplified by a consideration of specialization of acts.

The Essentials of Organization:

Three essentials of unit organization form the core of the conceptual scheme that has been developed herein. The three essentials necessary for the existence of a unit organization are contributors of acts who (1) know and agree upon a prospective resultant of cooperation, (2) recognize incentives that induce the contribution of activities, and (3) perceive the acts needed to achieve the prospective resultant. These are considered to be fundamental for explaining the managing activity. The development of the conceptual scheme of managing begins with these three essentials of unit organization. All the techniques to aid managers in large industrial organizations such as accounting, motion and time study, and production planning and control are means to achieve one or more of these three essentials of unit organization.

Management can be analyzed in terms of these three essentials, and the solution of managerial problems lies in performing appropriate acts of communication about one or more of these three essentials of unit organization.
The Activity of Managing

Consistent with the above concept of the nature of unit organizations and the concept of the three essentials of unit organization is the concept of managing as the activity of communicating to contributors to aid them in agreeing upon a resultant, recognizing incentives, and perceiving the acts needed to achieve purposeful coordination of their activities, which is developed herein.

The separation of the communicative activity from activities of preparation to communicate permits an observer to see when a person is managing and when he is not. It also allows a more rigid definition between so-called line and staff activities. Study of the process of preparing to communicate and the activity of communicating may be facilitated when each is separately considered.

This concept of managing has been found very useful for instruction of potential managers. An act of managing can be perceived by instructor and student. It can be analyzed and the effectiveness determined. The conceptual scheme has also been useful in managing.

Summary

This conceptual scheme has arisen out of my experience as a manager in a variety of organizations. The concepts have been developed as a means of instructing students of organization and management. The stimulus to develop and record them has come from a desire to impart them to others so that they may have the tool that has been valuable to me.