MANAGEMENT PERCEPTION: PHASE I

The Concept of Event-Structure As a Perceptual Aid to the Manager

By

JUSTUS THEODORE SCHREIBER

Bachelor of Science

Oklahoma Agricultural and Mechanical College

Stillwater, Oklahoma

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Thesis Approved:

Thesis Adviser

Head of the School

Dean of the Engineering School

Dean of the Graduate School

PREFACE

In our time, job specialization has become increasingly common and has given birth to greater specialization in the mental pictures which we carry around with us. It has also caused the creation of unique vocal noises and written symbols which we use to represent these "ideas." The net result is that you and I are having a harder and harder time talking to and understanding the fellow in the next office or the neighbor down the street.

Nowhere is this situation more sharply shown than in the old and "new" Social Sciences. Each of the specialities - Psychology, Sociology, Human Relations, and others - have their own peculiar mental concepts. To describe these thought images our friends, the theorists, must attach new definitions to common words, or coin new words and symbols to stand for them.

In either case we, as users of Social Science discoveries and techniques, are forced to rearrange our thinking methods. Since we are creatures of habit, this is an extremely difficult process and we may wonder whether it is worth the effort. It can only be worth the effort if these concepts provide us with sharper tools for analyzing and dealing with our problems in management.

You will find, as I did, that the concepts presented in this thesis are abstract mental pictures almost totally different from any which you might now retain in your own personal "mental library." Because of this, both the vocabulary and its usage may seem strange and unwieldly.

However, if you will remember that the words and symbols are strictly secondary and that only the "ideas" for which they stand are of real importance, you will be able to see and to understand both the "forest AND the trees."

I would like to express my personal thanks to Dr. Solomon Sutker for his initial inspiration; to Professor H. G. Thuesen for the loan of manuscript material and for his kindness in reading and commenting on this thesis; and to my adviser, Professor W. J. Bentley, for taking the "role" of the patient listener. The staff of the Oklahoma Agricultural and Mechanical College library were of immeasurable aid and the physical plant of the library itself provided the best possible atmosphere in which to work.

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CHAPTER I

INTRODUCTION

This thesis deals with organization and management theory and the relation which F. H. Allport's Concept of Event-Structure has to it. Any contribution which it might make to the science of management comes as a result of a curiosity provoking analysis by the inventor and aircraft designer, Igor I. Sikorsky. In his autobiography, The Story of the Winged - S, Sikorsky associates his success as an inventor with a "mysterious faculty" which he calls "creative or inventive intuition."[1] This faculty permits the inventor to see a space-time framework through which he travels during his life-time and to extract from it informational keys needed in his work. That this line of reasoning is analogous, in a more scientific way, to that of the perceptionist, and in the same area of study with the organization and management theorists, will become more apparent when referred to a fundamental problem of modern management.

Modern management has been confronted with an almost overwhelming variety of techniques, some or all of which are intended to be the most effective and efficient ways of understanding and manipulating the strategic factors of the environment. Recently there has been a strong

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[1]Igor I. Sikorsky, The Story of the Winged - S (New York, 1938), p. 222 and Chapter XXII, pp. 223-241.

movement in Industrial Engineering to quantify ALL of the elements in the sphere of management and to provide the executive with a series of mathematical models showing the relationships of the various quantities involved.

These purely mathematical approaches either implicitly assume some framework, organization, or dynamic structure within which the model operates, or state that the functional relationships serve all of the requirements for structure. This approach has given rise to a number of problems, problems which are perhaps most clearly spotlighted by the multiplicity of conflicting techniques and results available to the interested reader.

The lack of a meaningful and, therefore, non-quantitative dynamic structure with which to organize experiences and quantities, appears to be one of the basic reasons for the confusion and for the less-than-successful use of the pure quantitative approach. Those instances of satisfactory installation and operation of mathematical models cited in the literature have two elements in common which may be used to prove the point. First, the model builders involved have a relatively large amount of industrial experience. And, second, the time period for construction and installation of the model is in terms of months and years. It would be reasonable to conclude from these two facts that an implicit, meaningful structure is present in the model builder or that one is unconsciously developed over time through the adjusting of the model.

Since no way has thus far been found to quantify meaning, it becomes necessary to postulate some kind of dynamic structure of a non-

quantitative nature which will include a place for quantities and the functional relationships. The fact that dynamic, meaningful structure IS organization as defined in its broadest sense in management theory should be noted.

Chester I. Barnard, in his book, The Functions of the Executive, discusses organization in terms of the "field" theory of the Gestalt Psychology "School" and with this as a base reconciles various facets of his experience as a manager into a theory of organization and management.[2] While this "field" theory base is extremely flexible and quite useful it appears to lack some of the potential necessary to cope with the problem of meaning in relation to mathematical constructs.

Therefore, it was decided to follow Barnard's lead by reviewing, as he did, the social science disciplines with the express intention of looking for a theory or theories which would extend Barnard's hypotheses to meet the new conditions.

As a result of this decision, a sampling of literature in the fields of Anthropology, Group Behavior, Information-Communication Theory, Learning Theory, Perception, Psycholinguistics, Psychology, Psychiatry, Semantics, Sociology and Social Psychology has been made. It has brought to light Floyd H. Allport's Concept of Event-Structure and shown that this theory has possible application potentials to the problem as outlined.

So, to accomplish the purpose of this thesis - to give management a postulate of dynamic structure or organization as a perceptual aid -

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[2]Chester I. Barnard, The Functions of the Executive (Cambridge, 1951), p. 75 and p. 308 ff.

the plan of presentation will be:

1. To review and summarize the organization theory of Chester I. Barnard

2. To review and summarize the dynamic event-structure theory of Floyd H. Allport

3. To show the relationship between the two theories

and, 4. To apply the concept of event-structure to Barnard's management theory.

It is hoped that this work, Management Perception: Phase I, will provide the manager with a basic "blueprint", "map" or tool of analysis with which he might perceive or objectively visualize, in proper perspective, the large variety of management techniques now available in the Industrial Engineering and Social Science fields.

Beyond the scope of the material presented in this thesis is, Management Perception: Phase II, in which it is planned to draw together those factors which general perception theory has shown alter the manager's accurate understanding of the physical, biological, and social environment. Management Perception: Phase III will take the more molar approach and attempt to correlate those group and cultural factors involved. These three phases would then, together, form a broad, immensely practical theory of Management Perception.

CHAPTER II

THE ORGANIZATION THEORY OF C. I. BARNARD[1]

> Would a thoroughly scientific approach to the problems of cooperative systems and organization provide a useful tool for the executive arts? It is my belief that it ultimately would, and that the development of such a science is important in future progress in these arts and hence in cooperation generally. This belief is based upon reflection concerning the failure observed in many concrete instances to take into account all the elements of the situation as a whole. This failure is promoted by a specialization in thinking that arises in part from the specialization of the sciences. The action which is the essence of organization, or the coordination of action which is the function of the executive, relates to the synthesis of physical, biological, and social factors.[2]

This statement of basic assumption through which Barnard sets the tone for his presentation of organization and management theory may well act as a guide or trail marker for the review and summary which the present writer will offer in the material which follows. This review and summary deals with just one segment - the segment concerned with theories of organization - of Barnard's book, The Functions of the Executive.

All ideas concerned with organization have been abstracted from the book and arranged in the following order: 1, Abstract Systems and Their Levels of Operation; 2, Physical, Biological and Social Systems, and

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[1]Chester I. Barnard, The Function of the Executive (Cambridge, 1951).

The material which follows in this chapter is a condensation and interpretation of the organizational parts of this work and Barnard's vocabulary is carried over.

[2]Ibid., p. 290

Human Activities; 3, "Informal Organization"; 4, Communication, Common Purpose, and Willingness to Serve; 5, Unit Formal Organization; 6, Cooperative Systems; 7, Comprehensive Cooperative Systems; and 8, Complex Formal Organizations.

To aid the reader in understanding such highly condensed material, a flow diagram will be used for illustration and reference, and will gradually be built up into final form as the discussion progresses.

Abstract Systems and Their Levels of Operation

A system is the continuous, dynamic resultant which comes into being when a number of variable components are coordinated so as to remain in equilibrium with themselves and with the external factors which furnish material and limit action. A system may start: (a) spontaneously; (b) be planned from the beginning by one or more persons; (c) be consciously set out from some existing system; or (d) be split away from an existing system by some external or internal force.

In any event, a system starts from the bottom up when coordination creates something new which is more or less than or different in quantity and quality from anything present in the sum of the component parts.[3] Because it is something other than the direct summation of its parts, each element must be interrelated and interdependent, and variable not only in itself but also as the result of this interrelation-interdependence and the pressure of external factors. A system can, therefore, be treated successfully only as a whole.

Limits are set by the system-as-a-whole within which the components

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[3]Ibid., p. 79.

might vary without causing a change to or a reaction from the system. If the change in the components or their relationships falls outside the limits, either a new system will be created or there will be a change of state of the system. This establishment of a new system or set of conditions is usually the result of either a controlled or uncontrolled change in the timing, the form or the place of some component. This component becomes, by definition, the "limiting or strategic" factor.

In the process of adjustment a system always has a propensity to expand until equilibrium can no longer be maintained. When this situation prevails, the system, in order to continue to exist, will tend to divide into a number of partial systems. These new systems may be complete, incomplete, subordinate, or dependent. The partial systems build on the same level and then, level by level until a complex is operating.

Elemental components thus become related to the whole complex system though many levels of subordinate systems and the inherent properties of both the basic and the complex system mutually limit each other as to size, purpose, operating methods, as well as the number, type and status of components.

As the complex develops by the addition of systems, it is, at every progressive level, an organic whole system tied together by parts which are interacting with two or more subordinate systems at the same time.

For purpose of this chapter we shall be concerned with physical, biological, social, and unit organizational systems at the basic level, which together provide the elements for a cooperative system. We shall also go beyond the cooperative system to superior organizations which are components of formal organizational complexes.

Physical, Biological and Social Systems, and Human Activities

Three systems at the basic level are the physical, biological and social systems. These are called systems because the variable components, from the separate environments, are coordinated so as to remain in equilibrium with themselves and with the environment external to them. Since they are systems, all of the general characteristics of systems noted in Section 1 above apply.

For example, the environmental elements from which they are formed are interrelated and interdependent. This is the same as saying that the geographical aspects of the physical environment - location, topography, climate - interact with the property aspects such as buildings, machines, and tools. That the "faculties" and "abilities" of individuals - mechanical power, sensory ability, perceptive capacity, imagination - operate in combination one with the other. And that, the social factors which prevail: (a) when individuals interact within a cooperative system; and (b) when the individual acts on the group and the group, in turn, exerts influence on the individual, are mutually dynamic.

Carrying this premise - that system elements are interrelated and interdependent - to the next higher level, we can state that the physical, biological, and social systems are three of the four interacting partial systems which go to make up a more superior complex.

This may, perhaps, be made more readily understandable by referring to the following block diagram which shows the three systems and their paths of interaction.

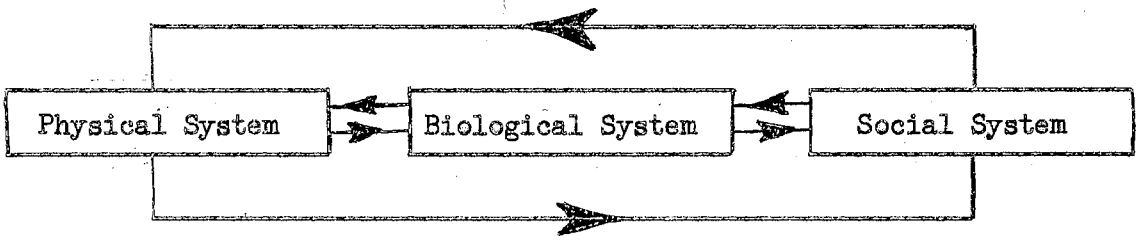

Figure 1. Block Diagram of Physical, Biological, and Social Systems

A fourth partial system will be started by splitting out from the physical, biological, and social systems acts or activities of human beings which can ultimately be consciously coordinated. These acts may be the result of deliberate, calculated thought or may be unconscious and responsive. For the purposes of our study it should be noted that we will in the end be most interested in those significant aspects of acts which are not personal but which are determined by the impersonal system as to their manner, degree, and time.

By using this device of analysis, variations resulting from physical, biological, and social forces are relegated to the position of external factors and the new partial system might then be an aspect or component which is common to all complexes on the next higher level.

The preceding block diagram may now be modified to illustrate this step. Since the processes under discussion are dynamic, the diagram portrays interrelationships and interactions and <u>is, therefore, a flow diagram</u>. With this in mind, single lines will be drawn to represent the two-way flow and the reader is asked to bear this in mind.

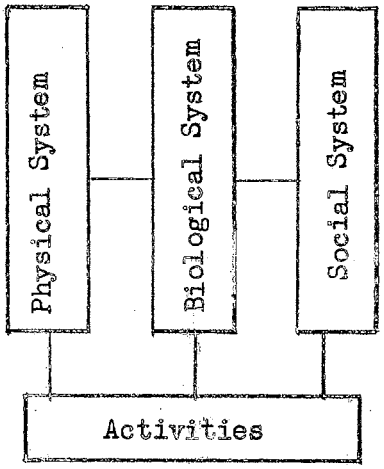

Figure 2. Flow Diagram Showing the Origin of Activities

"Informal Organization"[4]

Those human contacts, activities and acts which result: (a) consciously through personal choice or motive; (b) accidently through random contact because of geographical proximity; or (c) incidently through operation in formal organization for joint purpose, are loosely grouped together by their interaction with the physical, biological, and social systems into "informal organizations."

Since these "informal organizations" have no common, non-personal, joint purposes of their own, they must be indefinite and structureless, a mere grouping of activities without subdivision. As aggregates of interactions they give rise to means or averages and sets of limits of

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[4]It should be noted that the phrase "informal organization" is an anomaly - a contradiction of words - since Barnard's definition of "organization" precludes such a thing as an "informal organization." Therefore, whenever the term is used in this review it will be placed in quotation marks and the reader should mentally substitute a term such as "informal grouping" in its place.

variability.[5] In this manner activities of people are accumulated and their means or averages become the unconscious processes of society such as customs, norms of behavior, habits, ideals, and institutions.

This accumulation process can only operate as long as there are activities of a type which can be aggregated, and a particular or specific "informal organization" will only exist when this is true. The life of the specific "informal organization" is thus dependent upon the types of activities available, their quantity, and the external factors of the environment which group them together.

Because of the dependency of people - the contributors of activities - on the end products of "informal organization" there is built into the process an inertial factor which normally prevents any large scale or abrupt changes from taking place. Such inertia requires that some device be formally set up which will more immediately take care of departures outside the limits of the "informal organization" and which will insure a continuous supply of activities that can be aggregated. This phase of organization will be developed further in the sections of the chapter which follow.

It may be profitable to digress slightly at this point and to offer a crude and imperfect analogy to "informal organization" which might clear up some of the confusion which Barnard's explanation and useage of the term has caused.

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[5]The term "aggregate" as used in this chapter may be defined as a loose grouping.

In the operation of a non-automatic production lathe the machinist, the tool setter, and the tool grinder supply mental and physical efforts through adjusting and running the machine for the production of parts to a certain specified size. The machine, its components and the raw stock are the physical environment. The machinist, the tool setter, and the tool grinder compose the biological system. And the two together interact with the social environment.

Now, the product of the machine is a series of activities such as the movement of the lathe tool across and into the work piece to bring it to final diameter and length. If the consecutive work pieces made in this way are measured it will be found that while the activities of the lathe have varied irratically, they fall into a loose grouping with top and bottom limits.

This loose grouping is what the statisticians call a universe or a distribution and is quite comparable to Barnard's "informal organization." It is structureless, indefinite and has no subdivisions. Its mean or average can be determined mathematically, just as the norm of the activities of a group of people can be developed by analysis. When the machinist is changed, a new type of material substituted or new tools used, the limits of the activities of the lathe may change considerably and thus create a new universe. In the same manner, new and additional "informal organizations" come into being.

The variations in the activities of the lathe require that formal organizations be established to insure that the behavior falls within acceptable limits. These formal organizations are usually known as statistical quality control and production inspection.

Based on this line of thinking our flow diagram will now look like

this.

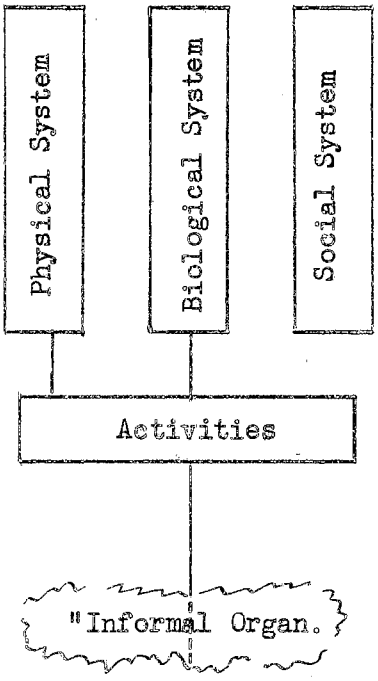

Figure 3. Relation of "Informal Organization" to Activities

/The connecting pathway between activities and "informal organization" is shown running to and through "informal organization." The reason for this will become apparent when the later sections of this chapter are explained./

Communication, Common Purpose, and Willingness to Serve

One of the human activities found in "informal organization" is communication. In fact, whenever human interactions or social relationships occur, communication in some form takes place.

The methods of communication normally available in human interaction are: (a) oral and written language; (b) motions or actions of obvious meaning; and (c) signaling by various means. Combinations and variations of these methods have been developed to take care of many special needs.

The codes of mathematics, vector analysis and chemistry are responses of this type. Demonstrations using visual aids and operating models have become almost standard practice in the teaching field. Signaling can take place either physically, mechanically, electrically, or electronically.

If the participants can see each other, and the whole situation, the amount of communication needed may be small. The same is true where activities are habitual and skilled, or where they take place in long established team operations. On the other hand, if the interactions involve complex material which is difficult to transmit, a large amount of communication may be required. To handle the volume, special channels might have to be created or a combination of methods used.

When the demands of personal interaction and the pressure of external factors exceed the capacity of the participants (a) to utilized the known methods of communication or (b) to create new methods or new combinations of old methods, the existence of the "informal organization" is threatened. If in this situation the participants, because of their reliance on the constancy of its end products, find that it is of personal interest to all of them to preserve the existing "informal organization," the environment has provided the conditions under which common purpose may be discovered.

Common or group purpose, then, comes into existence through the process of limiting the conditions of choice which the participants may make. These limitations of choice are imposed by the physical, biological and social environments individually and in unison. For example, repeated personal contact takes place in "informal" and formal organizations and is limited as the result of the interaction. Participants

are then in the position of being able to recognize the similarity of their needs and interests. Common or group purpose is the product of this recognition. The same resultant can appear through the conscious efforts of a single individual. He can limit the choice of a number of people in such a manner that common purpose is forthcoming.

In order to appeal to a range of people and to insure their contribution of activities to the aggregate, common purpose must be social but non-personal. It must be something which the participants believe can be carried out. And it must suggest to them foreseeable satisfactions which, when judged on a personal, subjective basis, outweigh the burdens involved and the offerings of alternative purposes.

Only when the conditions noted above have been fulfilled will there be a general willingness to serve or to contribute efforts in pursuit of a joint or common purpose. Such a contribution of activities means that the individual must redirect the energies he originally devoted to immediate personal satisfaction of needs and wants. He will only make this reapportionment when he believes the net satisfactions to him will be greater than any he could achieve on an individual basis. With this belief confirmed he will surrender control of his personal conduct to the impersonal system of acts created by the formulation of a common purpose.

Whether communication, common purpose and willingness to serve develop in the loose grouping of activities which Barnard has called "informal organization," or whether they directly result from an immediate, spontaneous combination of activities from the physical, biological and social systems, depends upon the conditions of the environment and the intensity of demands. In either case, they are added to our

flow diagram in the following manner, the pathway coming directly from activities or from "informal organization."

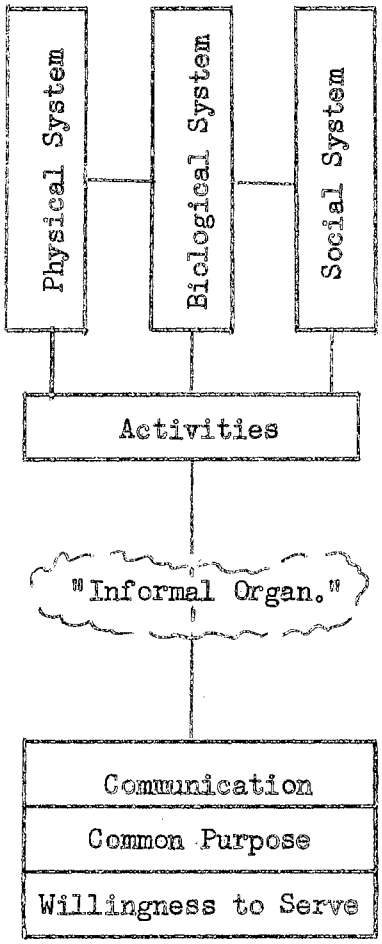

Figure 4. Connection Between Communication, Common Purpose and Willingness to Serve, and "Informal Organization"

Unit Formal Organization

In Section 2 it was stated that the physical, biological and social systems are three of the four interacting partial systems which go to make up a more superior complex. A device of analysis - that of splitting out from these three systems the acts of human beings - was to be the means of drawing together the elements which compose the fourth

partial system. Since then we have seen how this technique spotlights the elements of communication, common purpose and willingness to serve.

It is now possible to say that a combination of these three elements, and the activities of human beings to which they are related, form the basis for the fourth partial, impersonal system. The ability to communicate leads to common purpose. Common purpose, in turn, acts as the "coordinating and unifying principle" to the system made up of essential activities or forces. These efforts of human beings are predicated on a personal willingness to serve.

When the combination of the elements is appropriate to the external conditions of the moment we have what Barnard calls "organization." He defines organization as "a system of consciously coordinated personal activities or forces" or "a system of cooperative activities of two or more persons."[6]

As we stated earlier, and have since shown, this definition comes into being through the use of a device of analysis. "An organization is a field of personal 'forces'" analogous to the gravitational or electromagnetic fields which the physicists use to structure the data and experiences of their specialty.[7] Like all fields of forces, an organizational field can not be directly described, but must be dealt with in terms of the evidences of the effects of the field. Since the evidences of the field are the actions of human beings, Barnard takes these personal activities and builds the "construct" definition noted above to provide a useful tool for the study of business operations.

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[6]Ibid., p. 72 and p. 75.

[7]Ibid.

Since an organization is a system, it may start: (a) spontaneously; (b) be planned from the beginning by one or more persons; (c) be consciously set out from some existing system; or (d) be split away from an existing system by some external or internal force. The beginning is always small. Once started, it will expand until equilibrium can no longer be maintained. The strategic factor limiting this expansion is the necessity for communication. As a result, communication limitations, through their interaction with the other elements of the system, largely determine the form and extent of organization.

The unit organization is at the most basic level and our flow diagram shows, in summary, that it has its origin in the activities of human beings which are extracted from the physical, biological, and social systems. These activities furnish materials from which communication, common purpose and willingness to serve are molded, the molding taking place through "informal organization" or directly from the activities themselves.

It should be noted that Barnard, when applying his construct "organization," calls it "formal organization" to distinguish it from "informal organization." This procedure will be followed here to conform to his usage, although it is not necessary as mentioned in the footnote at the beginning of the section, "Informal Organization."

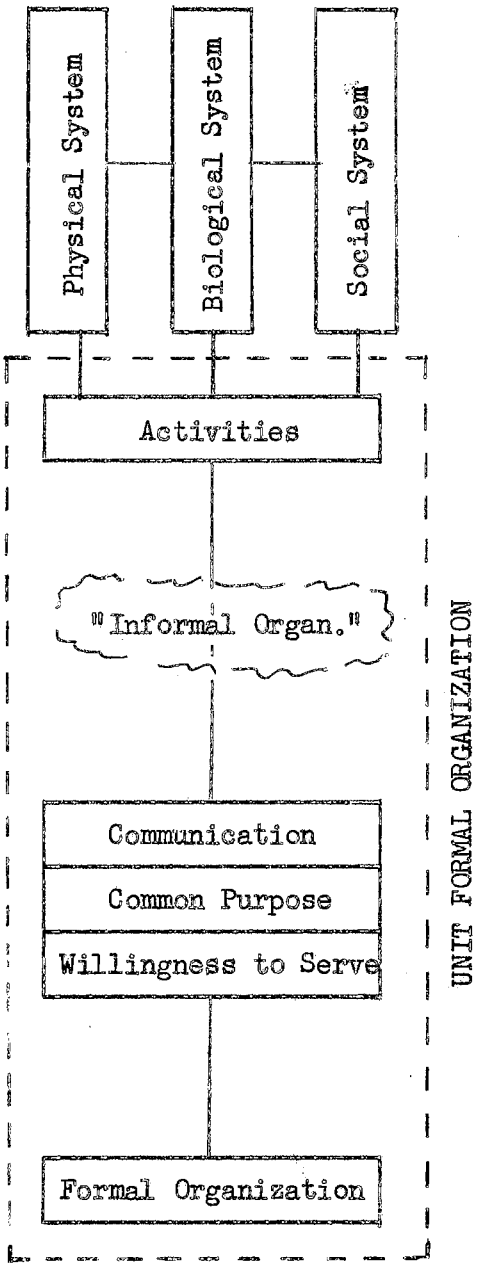

Figure 5. Unit Formal Organization

Cooperative Systems

We have seen how formal organization results from a split-off of the acts of human beings and we now know that it is the fourth partial system of a more superior complex. That more superior complex is a "cooperative system."

Physical, biological and social elements are bound together by formal organization in such a manner as to permit Barnard to define a cooperative system as "a complex of physical, biological, personal, and social components which are in a specific systematic relationship by reason of the cooperation of two or more persons for at least one definite end."[8]

Because of (a) constant changes in the physical environment, which (b) demand internal adjustments, that tend to lead to (c) alteration of the purposes of action, the existence of a cooperative system is an abnormal rather than a normal condition. The system is incessantly dynamic and depends first and foremost on a double coordination of time and place. A correct time order of cooperative acts must be discovered or invented, and their proper placing devised.

All of the factors which apply to systems in general, apply to cooperative systems in particular. The physical, biological, social, and organizational systems are interrelated and interdependent. They interact with the cooperative system so that both the character of the complex and the character of the partial systems are mutually determined. Changes in one of the partial systems which are greater than the limits set by the

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[8]Ibid., p. 65. Barnard makes a division of the biological system at this point in his exposition which is not pertinent to our summary.

cooperative system will produce a change in the system-as-a-whole. System equilibrium is the fundamental consideration.

When the cooperative system achieves an end it is said to be effective. When it creates a surplus of personal satisfaction for the contributors, it is efficient. If the surplus is great enough, activities may still flow to the system even though the agreed-upon end is not achieved. Because of this, the best measure of system equilibrium is its efficiency.

Returning to our flow diagram once again, we find that our cooperative system is composed of two or more specialized unit formal organizations in relationship with the physical, biological and social systems. This is true because there is always an "executive" unit along with the basic "working" unit organization. The interrelation-interdependence of the components is now more apparent.

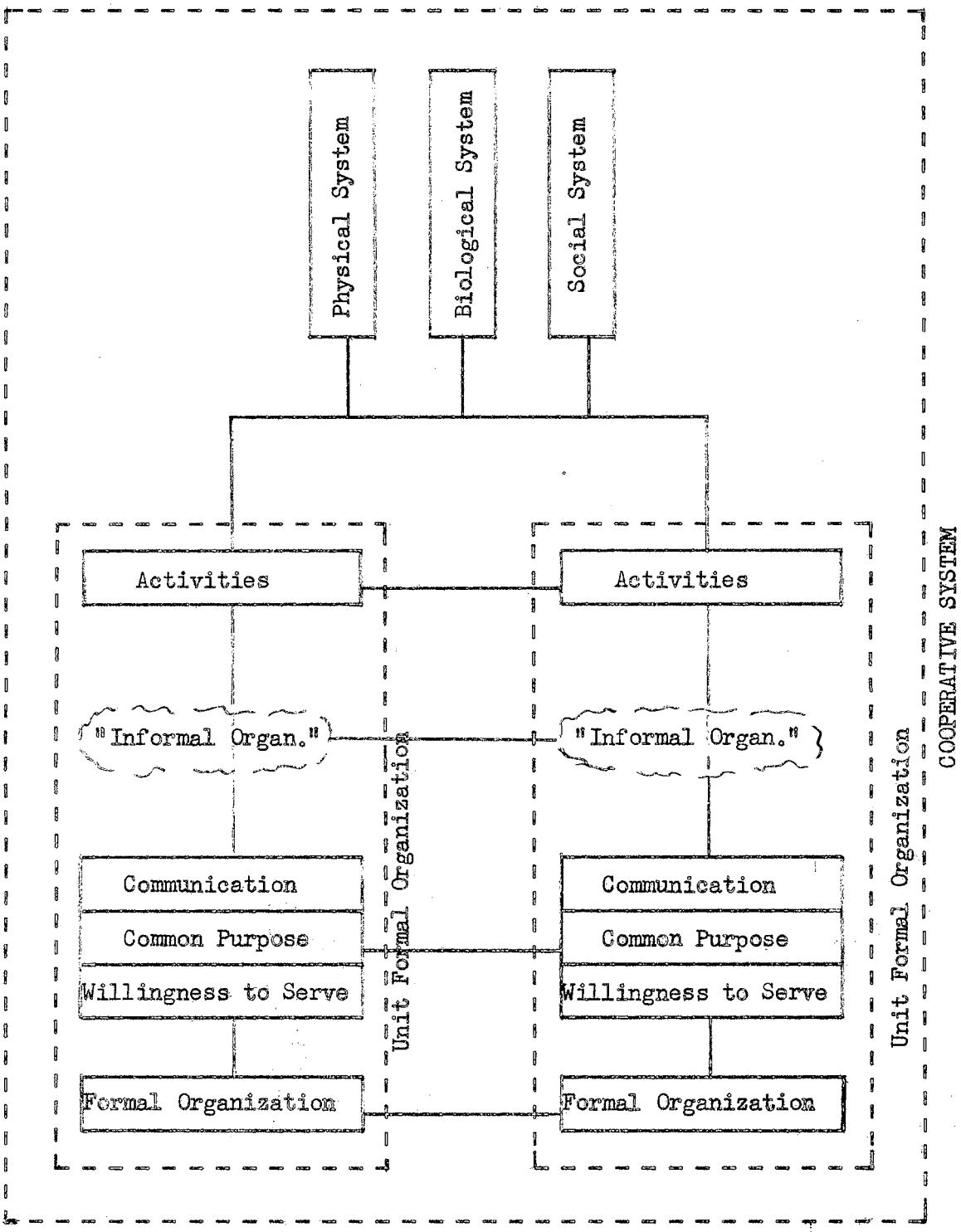

Figure 6. Basic Cooperative System

Comprehensive Cooperative Systems

At this point, Barnard speaks of many different levels of complexity and interrelationship. Since this gives rise to some difficulty in understanding, a more extended effort will be made to describe the factors involved.

Outside of the specific cooperative system which we discussed in Section 6 lies an all inclusive social environment containing other cooperative systems. These systems range from the most basic, at the level of our specific cooperative system, to the most comprehensive at the level of the church and state. Each of these systems interacts with all of the other systems and with our specific cooperative system, but the degree of interaction is dependent upon the directness of the relationship.

To get a closer picture of this, let us review what we have said about abstract systems. You will recall that a system has a propensity to expand until equilibrium can no longer be maintained. If it is to continue to exist, it must then divide into a number of partial systems or create additional units. These partial systems build on the same level and then, level by level, until a complex is operating.

Now, exactly the same thing happens to the specific cooperative system. When equilibrium can no longer be maintained, the system must either cease to exist, split, or create additional units on the same level. Distances are shortest on this partial or unit system level and the relationships most direct.

Demands for coordination become greater and greater as the number of partial systems on this level increases. Such coordination pressure causes the creation of a "super-leader" unit which must function from

the level immediately above the partial systems. The super-leader unit is then a superior cooperative system and the degree of interaction between it and the partial systems is less than the degree of interaction among the partial systems themselves.

This building process continues, level by level, as long as equilibrium is present. The degree of direct interaction between the partial systems on the basic level and the most superior level lessens proportionately as the distance between levels increases. Because the systems at each and every level are mutually dependent, they are mutually limited in their purpose and ways of operation, as well as in the number, character and status of the contributors.

As we progress up the ladder of complexity, it becomes evident that the systems at each level are superior to those immediately below them and are at the same time incomplete, subordinate to, and dependent on the systems on the levels above them.

While this internal complexing of the specific cooperative system is taking place, other cooperative systems in the social environment outside are, at every level, in mutual relationship with it. The influence and the effects which they have on the cooperative complex are a function of the distance between them. For instance, if both the specific cooperative system and the external cooperative system are local industrial plants employing the same type of skilled personnel, the wage scale paid by one of the plants has an immediate effect on the availability of contributors - craftsmen - to both of the plants. Contrast this example with the case of the one-owner grocery and the chain supermarket. Changes in the pricing policy of the chain store have only a remote effect on the grocery, since the purposes, the

services, and the levels on which they operate are so far apart.

Complex Formal Organizations

In the last two sections we spoke exclusively about simple and comprehensive cooperative systems which are composed of physical, biological, social, and organizational components and ignored the device of organization which had been so carefully constructed in the earlier sections. This was done to lay the groundwork for the material which follows.

We know from this discussion that the specific cooperative system develops on the basic level and from there expands level by level until a complex is operating. We know also that this complex interacts with an all inclusive social environment containing other cooperative systems of varying levels of comprehensiveness. We have found that the cooperative system can not be dealt with directly because of the large number of poorly understood variables. Too, we know that unit formal organization is one of the four partial systems which go to make up the simple cooperative system. And finally, Barnard tells us that the organizational construct was devised for analysis because the variable - consciously coordinated human activities - could be objectively manipulated.

With these facts in hand it is now possible to cope with complex formal organization. The first step will be to say that the organizational complex builds at the same time and in the same manner as the comprehensive cooperative system. This is true because formal organization is one of the four partial systems which go to make up the cooperative.

Using this basic premise and working from the bottom up by considering the unit organization, we can state that every unit organization in what will be the complex is a specialization as a result of the division of a general purpose into detailed parts. These specializations come about when the following considerations are determined: (1) the place where the activities are to occur; (2) the timing involved; (3) the people who will interact; (4) the objective; and (5) the methods or processes to be used. Working units are thus formed at the basic level.

The critical or strategic factor here is the necessity for communication. The construction of the complex at this level must be designed to compensate for such a factor if equilibrium is to be maintained. Executive or super-leader units are one of the solutions to the problem. So, lateral growth takes place through the combination and creation of working and executive unit organizations.

When lateral growth has reached its limit of equilibrium, the vertical building process begins and continues until a structure has been completed which is both effective and efficient from the view point of general organizational purpose.

The resulting complex formal organization is made an organic whole by the contribution of a single activity to two or more unit organizations at the same time. This is possible, for instance, when a person contributes to both a working organization and an executive organization by communicating certain orders or directives.

Because the organizational complex is a whole, changes in any of its parts outside significant limits cause change not only in the parts interacting with it but also in the structure of the organization-as-a-whole.

Through the process of separating all of Barnard's ideas on organization from those basically involved with management, it has been possible to show the elements which form the construct "organization" and to demonstrate the way in which they are related. Starting with a knowledge of abstract systems, we have found that:

1. Physical, biological and social factors are inherent in any type of cooperative venture and that they can not be directly handled because of the many unknowns and intangibles which they encompass
2. One thing which is common to the physical, biological and social systems, and to cooperation, is organization.
3. "Organization is a field of personal 'forces'" with the activities of human beings as the evidences and the sources of the forces of the field [9]
4. The activities are loosely grouped together in "informal organization" until conditions of communication, common purpose, and willingness to serve bring them together so that they may become formal organizational forces.
5. The formal organizational forces can be objectively manipulated as a system which builds from the unit level into multileveled complexes.

and, 6. Cooperative systems made up of physical, biological, and social factors may be understood through the use of this force-field theory

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[9] Ibid.

CHAPTER III

THE DYNAMIC EVENT-STRUCTURE THEORY OF F. H. ALLPORT[1, 2]

Psychologist, today, are confronted with a bewildering array of theories or "hypothetical constructs" which have been developed since the beginning of scientific study in the field. The situation, in part, has been created by the fact that for every theory rejected, there have been several new ones postulated to answer the same theoretical or experimental question. In addition, basic facets of the rejected hypotheses "pop-up" with regularity in some of the more modern efforts.

Yet, this morass of theoretical offerings stems from a single common purpose. If the data - which brilliant, creative research has generated - is to be useful, it must be meaningful to the user. It can only be meaningful to the user if he is able to mentally organize it into some type of ordered pattern or concept.

F. H. Alport's theory of event-structure is an attempt to provide a method for meaningfully arranging not only the data of his special field of social psychology, but the data of science in general. How well he

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[1]Floyd H. Allport, "The Structuring of Events: Outline of a General Theory with Applications to Psychology," The Psychological Review, 61 (1954), 281-303.

[2]_____, Theories of Perception and the Concept of Structure (New York, 1955).

The material which follows in this chapter is a condensation of these two works and Allport's vocabulary is carried over.

has accomplished his purpose will be determined by efforts to apply the theory in many different fields.

For our undertaking of giving management a postulate of dynamic structure as a perceptual aid, Allport's concept has been reduced to those significant essentials which the manager needs for understanding, and application to his problems. The first section is concerned with preliminary discussion and definition of structural elements. The fundamentals of the theory of event-structure and its model are covered in step-by-step fashion in the second section. Operation of the model, the third section, shows the place of quantitative factors in the non-quantitative structure.

Preliminary Discussion and Definition of Structural Elements

How does an aggregate, as an arrangement of events, come to be? By what process does the selection, ordering, and organization of quantitative laws take place? Are the quantitative laws themselves responsible? From the "building-block" theory of Mills, the field theory of the Gestaltists, the probabilistic and transactional functionalism of Brunswik and Ames, and many others have come the answers to the above questions. However, when they are put to the test, their shortcomings in explaining the process by which events are patterned become apparent. The most common weaknesses lie in the beliefs that: (a) quantitative order is the only order in nature; and (b) the true criterion of objectivity is measurement, quantity, or number.

According to Allport, quantity is not the true basic criterion of objective theory. An "identifying encounter of denotation" is.[3] This

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[3] Ibid, p. 619.

encounter can be either direct, through physical contact, or indirect through the use of measuring instruments on the object itself. Since it is an all or none, yes-or-no experience or event which simply occurs, it can have no degrees of existence and can not be quantified. Therefore, a structural format created through the patterning of events must be non-quantitative, too.

If this be true, variable quantities and their functional relationships do not answer the need for an aggregating or integrating principle and the order that structuring gives rise to must be different from mathematical or numerical order. It would be logical to suppose, then, that there are two laws or two aspects of the same law of nature. They are: (1) quantitative law; and (2) non-quantitative or structural law.

Such a premise requires the formulation of two quite different kinds of statements and the development of all the lawful relationships between them. At the same time care must be taken not to confuse or substitute one for the other, for this would mean the mixing of quantitative, continuous factors with the non-quantitative, dichotomous elements of structure.

For clarification at this point it should be specifically stated that the laws of mechanics can be applied to the event or event pattern, and quantities associated with it. But the laws cannot describe the event itself, for it is the condition upon which they are based. In fact, the event must occur first to produce the evidence required for the quantitative hypothesis or law. Secondly, a quantity of an abstracted, continuous variable can not be used to describe a discontinuous, non-variable event.

Further support for the point of view that there are separate

quantitative and structural laws comes from the following considerations:

1. Mechanical laws do not hold for the actions of minute particles covered by the physical "principle of uncertainty."
2. Prediction of patterns in which the event-points in time and space vary is not possible quantitatively.

and, 3. The fact of occurrence or non-occurrence of an aggregate is determined in an all or none, non-dimensional way.

The answer to these and other failings of the quantitative approach to order in nature must then be tied up in some kind of geometric conception which, together with dimensions and quantities, would be all-inclusive. Now, as soon as the question of a geometric approach is brought into the problem, the natural reaction is to think in terms of fixed and static form and to lay aside dynamic components as inapplicable. This predeterminationist pitfall must be bridged by proposing a dynamic, rather than a static structure.

Allport's theory of event-structure takes such an approach by postulating a general law of "structuring" based on self-delimited and cyclical patterns of ongoings and events. What is meant by this statement and how are the terms, self-delimited, cyclical, ongoings, and events defined? For the present, an attempt will be made to define terms, but an understanding of the various implications involved in the statement will have to wait until the specifics of the theory have been presented.

It is a generally accepted feature of all theories of aggregation that the parts or elements which make up an aggregate or structure are interrelated and interdependent. Because of this, the existence and

actions of the elements affect one another. Such a condition can only prevail completely in a closed arrangement in which every element is connected with parts on either side both spatially and in time. The result is a "geometry of dynamic self-closedness" and the aggregate is definitely defined and limited in its space-and-time scope.[4] Or to use a "shorthand" term we might say that the pattern or structure is self-delimited. Flowers, rocks, desks, and automobiles are examples.

With both space and time closure comes the theory of circularity or negative feed-back by which movement travels through the system and eventually returns to its initial position. When this occurs the process is said to be cyclical.

An ongoing is a movement - that is, some form of motion - which travels through space and during time in a continuous manner. What actually goes on or moves is incidental to our construct. It can be the minutest element or particle or a compounding of them such as a man. Our primary interest is not in the element, or man, but in its movement and in the contacts, collisions, or encounters which it makes as it travels along its space-time pathway.

The points in time and space at which ongoing pathways touch, or elements in movement collide, encounter, or contact each other or one another, are events or event-points. These indivisible, all or none happenings are the junction points of the format or structure. They are the dividing points in time and space which separate: (a) what went before from what comes after; and (b) ongoings on one side from ongoings on the other. Because they are mere points, they can not be fractionated,

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[4]Ibid., p. 613

quantified, or measured. Events can not partially occur, and are, therefore, non-continuous. And above all, they are not the "acts" of agents but merely the points of connection between ongoings.

If the reader were to go back and restudy the preceding statement on "structuring" and fix the definitions above firmly in mind, it would now become apparent that our self-delimited and cyclical pattern of ongoings and events possesses a "structural format" as illustrated below. For the sake of simplicity in drawing, the unit structure is shown as truly circular. That this may or may not be correct in all situations should be definitely noted. The actual closed shape of the pattern is dependent on the length of time and the distance between event-points, plus a series of factors and conditions which will be discussed in the following sections.

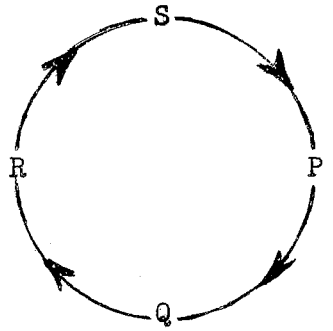

Figure 7. Fundamental Structural Pattern

Our figure shows event-points, P, Q, R, and S connected by curving, continuous ongoings. The arrows indicate the direction in structural time and motion. Both the events-points and the ongoings are physically connected. The design of the pattern is such that starting from any event-point and passing through each succeeding one will cause ultimate return to the initial point of disturbance. That this is not

a linear, cause-and-effect process will be more readily understood as the result of further explanation of the model.

It is possible to change both the dimensional time and distance factors without destroying the circular, cyclical pattern of the structural format. The number of included events and ongoings can be varied from one continuous ongoing and no event, as in the case of the vibration of a single subatomic particle, to an almost infinite number of structural elements. One can readily see that this structural unit has a place for and is related to quantitative law but that quantitative law, in itself, is not enough to describe it. Structural law or the structural aspect of natural law must be invoked to explain an event or the pattern of events shown above. Perhaps this quantitative, non-quantitative problem can best be resolved by saying that dimensionality and all the other aspects of quantitative law are the amount or degree in which the structure operates. That is, they are the energies contained within the structure.

At the same time there is another principle - an aspect of structure - functioning. It is the <u>probability</u> of the structure's occurrence. It is composed of both the individual and combined probabilities of the whole pattern of events occurring, all within certain interdependent relationships as to position, sequence, and ongoing of the elements involved. So, every aggregate occurs through probability in some amount; and probability, quantitative, and covariation laws are all in operation together. Without the proper combination there would be no use for the quantitative "tools" because there would be no structure to which to apply them.

Is the pattern of the aggregate the result of pure probability,

randomness or chance, or are there structural laws which "bias" various elements in favor of the structure's occurrence? The author, Allport, believes that structure is neither random nor endlessly varied and that there are specific geometric or "kinematic" features which go to make up a structural, kinematic geometry. They are: relatedness, self-closing or circularity, space and time assembly, flexibility and constant relationships. Just what these terms mean and how they are related to patterned aggregates or structures will be the subject matter of the next section.

The Fundamentals of the Theory of Event-Structure and Its Model

The first section has now equipped us with a statement that there is a general law of "structuring" based on self-delimited and cyclical patterns of ongoings and events; definitions of the terms of the statement; and a figure showing the unit structure to which the first two belong. Preliminary discussion has established the justification for such an approach to the problem of aggregation. It is the purpose of this section to build, step-by-step, the theory of event-structure and through the use of a model to clearly explain the kinematics and dynamics of structuring.

The unit structure, (Figure 8) reproduced here for reference, is composed of continuous ongoings and dichotomous events physically connected in a circular, cyclical pattern. Its pattern is the result of the adoption of the principle of circularity which permits a series to come back on itself and complete a cycle, or to repeat itself indefinitely. No elements are "left hanging," as in linear systems, and true interrelation-interdependence of parts is possible. There <u>is</u> an

intended similarity between this and the feed-back circuits of the Cybernetists.

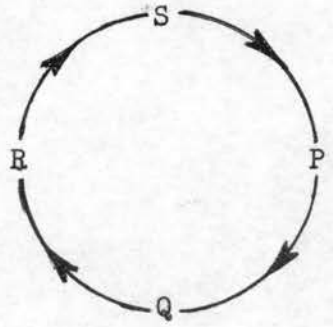

Figure 8. Unit Structure

To more readily visualize the situation, the dynamic, circular pattern can be thought of as a "thin wire hoop" deformable into any shape which permits it to remain intact and continuous. At intervals around the hoop, points, event-points, are marked off and the segments between them represent ongoing processes or movements. [The reader should be reminded at this time that the structure or pattern is dynamic because some of its elements - ongoings - are movements or motions which occur over some time interval.] This is step #1 of the theory, the conceptualization of a complete and potentially repetitive cycle of ongoings and events. It is the elementary form of the unit pattern and is called the circuital-circular or "c" lay of structure. It applies to every order of structure except the smallest which might be conceived. [The smallest, in this case, is taken to be the vibratory motion cycle of a subatomic particle composed merely of ongoing.]

From this point upward in order, all cycles are combinations of smaller, self-closed cycles which incorporate "c" lay. For example, the curving, linear segments between events P and Q, Q and R, and so on, which we have taken to represent the ongoings connecting the various

events of the pattern, are actually smaller circular, self-closed cycles. This fact must be held firmly in mind at all times. For the sake of presentation clarity the hoop segments will be shown as above and it will be necessary for the reader to mentally substitute a cyclical pattern for every linear segment.

Step #2 is pictured when two segmented hoops - two basic patterns - are fitted together so that their circumferences are touching at two points as shown. These two points of contact or encounter are event-points and the arrangement which results from such double "tangency" is called an "event-system."

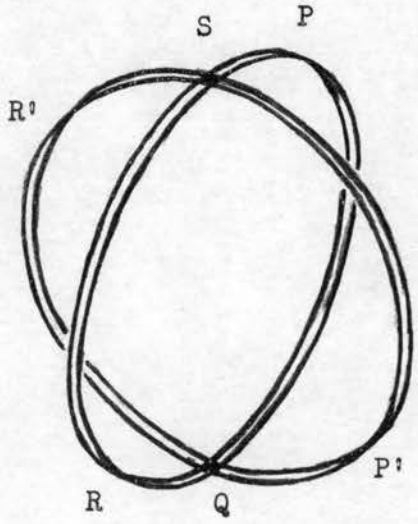

Figure 9. An Event-System

Now, remembering that the hoops are flexible, they may, by bending them into irregular forms, be made to touch at more than two points or to run parallel for part of their ongoing-event series. This is a condition which Allport calls "'tangencies' of cycles."[5] It provides a means through which: (a) events may be contributed by one cycle to another -

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[5]Ibid., p. 636

"positive interstructurance;" or (b) one cycle may prevent or inhibit events in the other - "negative interstructurance." Because of the flexibility feature, it is possible to have both effects in one double-tangency system. Or, both aspects may come from not two but many tangent cycles in a more complex event-system arranged in the same manner. By this device of construction facilitating and inhibiting relationships are built into the self-closed model. It is also possible for these same relationships to occur when hoops are tangent at only one point. This arrangement of "'out-structural' tangency" would not be a true system, however. The problem of larger, compounded structures is dealt with in Step #3.

Our original unit structure or event-cycle furnishes the properties necessary for this extension of structuring to higher orders. With the faculty of being neither linear, open-ended nor indefinitely extended, the closed, segmented hoop of ongoings and events can be combined into a larger circle of hoops. The following diagram of the model demonstrates this and lends understanding to the mechanics involved.

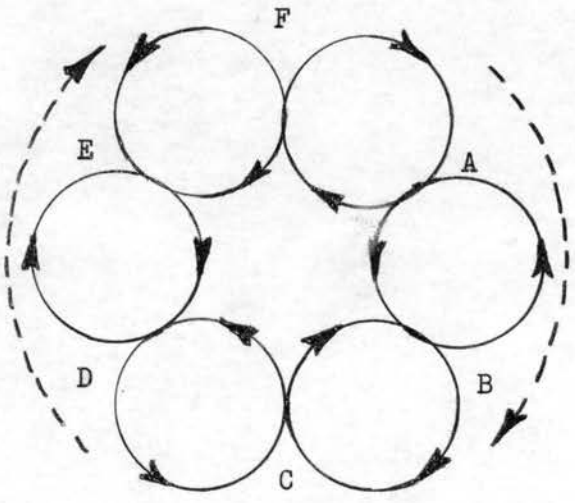

Figure 10. A Higher Order Level

The ongoing elements of each of the cycles converge at common event-points to create the larger self-closed structure. Succession in time is represented as the ongoings come to event-point first with the cycle on one side and then on the other. The over-all "including" structure is thus composed of a number of "included" event-cycles, and single ongoings contribute to two different orders of structure at the same time. This is a basic aspect of the property of "order" and it applies equally as well to event-systems. In addition, the cycle of cycles has its own "c" lay and it is the self-closing of the parts which makes this self-closing of the whole possible.

The reader should not be mislead by the arrows of the diagram into believing that the event at A, for example, trips off or triggers the ongoing cycle which results in event B. To do this would be to introduce event A as a linear "cause" agent or act and the following ongoing as the "effect." Such linear cause and effect thinking can not be satisfactorily built into a truly circular structure. It is best to remember that the ongoing cycles concerned are continuous processes already in operation, which have become connected at common points, event-points. Patterns or structures come from cycles, patterns, or structures already existing. With this much foundation it is now possible to add another feature to the model. This will be done in Step #4.

So far in our discussion of structuring we have mentioned such dimensional or quantitative features as time-distance variations of the ongoings, the possibility of incorporating differing numbers of ongoings and events in one cycle, and the complexing of cycles into event systems and cycles of cycles. Now if we look a little more closely at our

model of the unit cycle - the segmented hoop - some interesting details will become visible. Instead of a single ongoing in each segment, there are a number of ongoing elements moving in "parallel" much like the flow of water molecules through a pipe. So we really have an "ongoing-role" in place of a single ongoing. And, as a result, our event-point becomes an "event-region," a volume of space through time within which events occur. An example of this would be voice communication in which a broad band of sound waves, an ongoing role, travels to the event-region, an ear.

Returning to our hoop model we see these features added to create a hoop-format and to give another "lay" to the kinematics of the structure. It is the number or "n" lay. With this addition to the model, an important change takes place in the functioning of ongoings and events.

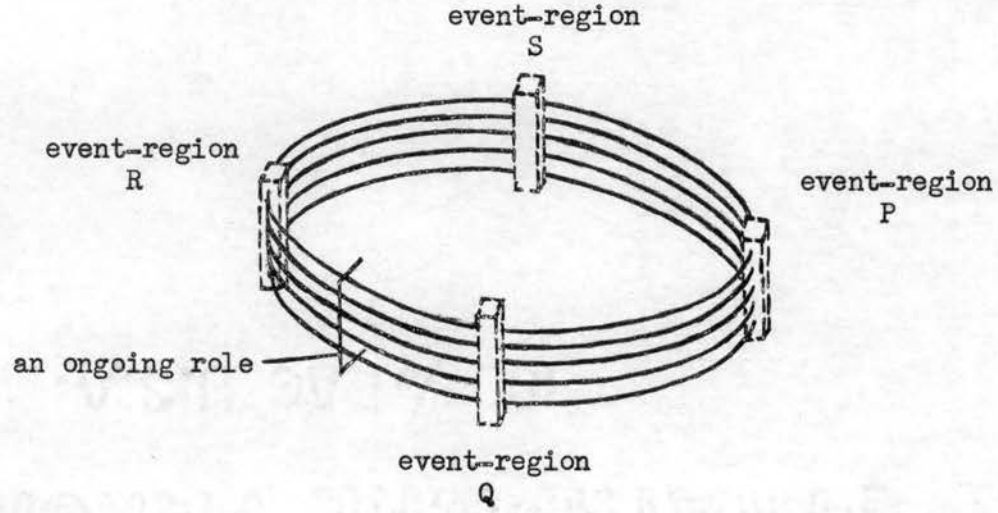

Figure 11. Event-Regions and Ongoing Roles

Each of the ongoings in a segment bundle - ongoing role - passes through event-regions but there is no absolute assurance that it will come to event point with an ongoing in the succeeding role. Or, no assurance

that every sound wave in the band will be heard. There is, however, a weighted probability that some events will occur in each of the event-regions. Just how many there will be is dependent on: (a) the probabilities of encounter of single ongoings from each of the adjacent ongoing roles within the space and time limits of the event-region; and (b) the number of ongoings which enter the region. /There is an intimate relation of (b) to (a) which will be shown below./ The number of on-going elements present in the "n" lay of the structure in the vicinity of the region determines the spatial aspect of these factors while the time aspect is covered by the "lay" of structure discussed in Step #5, which follows.

Recalling that the ongoing cycles are circuital as well as circular, it is possible for them to repeat themselves in specific periods of time. This repetitive characteristic is the "r" lay of structure and is a universal structural property along with "c" lay and "n" lay. Since it operates through time its cycle frequency can be changed and the number of ongoing elements entering an event-region raised or lowered. Thus with "r" lay we have a time aspect to add to the spatial aspect which "n" lay provides.

These two, "n" lay and "r" lay, determine the number of ongoings within the space and time limits of the event-region. The probable number of collisions - the probable density of events - which occur when ongoings encounter each other increases approximately as the square of the number of ongoing elements in the region. Because of this expansion relationship, there is a point of rapid rise, the threshold, at which the density of encounters becomes suddenly apparent and we say that "the event" happened. Since a probability of encounter of

1.0 would indicate that the space and time volume of the region is completely filled by ongoing elements, there is both a threshold value and an upper limit value for density of events in the region.

We have now reached a point where we can say that "probability [probable density of events] in a region represents the summation of events in the region in both space and time."[6] We know, too, that the structure's occurrence can be predicted "as the combined probability for all the event-regions of the structure."[7]

Probability considerations have been much in evidence throughout the preceding material. We have seen that the principle of probability is intimately tied up in the kinematic geometry of structure and that no patterned aggregate of ongoings and events can occur without it. The statement has also been made that the probabilities operating are not ones of pure randomness or chance, but are probabilities biased by the effects which structural laws have on the various elements involved. In other words, there is a general interrelation-interdependence of the two such that any randomness is partial and controlled and exists within a condition of ongoing which follows a definite structural law. It is a structural law founded in the universal tendency of ongoings toward self-closing, a tendency which relativity theory exploits and explains in great detail.

Is this general structural biasing of probabilities enough to explain how a self-closed structure of events builds up to threshold level and how it operates, or are there other factors which must also

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[6]Ibid., p. 641

[7]Ibid., p. 642

be considered? A closer look at the environmental manifold might help to answer this question. As a result of such an appraisal, it becomes immediately apparent that the external manifold implicity contains concentrations of certain types of structures or structural elements and a complete or partial lack of others. The same situation holds for ongoings of existing tangent internal structural manifolds. This concentration or lack is, in itself, a "bounding or biasing" condition which increases the structural probabilities. This is true because: (a) the existing structures reduce the space-time freedom of adjacent ongoings; (b) the existing structures contain event or energic densities which might be utilized; and (c) structures can only come from cycles, patterns, or structures already existing.

The structure most likely to occur in any situation will be one which makes use of the units with the greatest densities and which has had its event-regions restricted in space and time to increase the probable density of events. Allport cites the example of an eating structure as being most likely to occur when an apple is available and an individual is hungry.[8] This might not be the case if either or both structural conditions were absent.

So, the probabilities working in the structuring process are biased in a general way by structural law and in a specific way by bounding conditions. Our concern in predicting the occurrence of a structure, or what that structure will be, must therefore be with the probable densities at the event-regions, the more-or-less "end results" of the biasing or bounding effects.

Once the probability factors have functioned and the structure

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[8] Ibid., p 650

appears, there are two places in the format for quantitative and covariation laws. First, each event-region has three spatial dimensions and a time dimension and "there can be temporal as well as spatial summation to attain the threshold density."[9] And, second, quantitative increases in density beyond threshold and below the upper limit would be the amounts or degrees in which the structure operates. All this is true as a result of the "n" lay and "r" lay properties of the structure which might be any quantitative values from one upward. These two properties along with the non-quantitative "c" or cyclical lay are the cornerstone features of a structural, kinematic geometry.

Before we pass beyond the basic model and discuss the way in which the model operates, there are five more-or-less secondary features of the fundamental pattern which should be noted for better, more complete understanding. They are:

1. The purely kinematic or geometric aspects of the model can be described without concern for the size, direction or temporal limits of the structure. Just so long as the self-closed, cyclical characteristic is preserved, the dimensional variations can reach any value. This is the relationship of the constant and kinematic to the flexible and quantitative
2. Events or encounters have a dual part to play: (a) a geometric one as format-connectors; and (b) a quantitative one as units of energy occurring in the formats which the on-going cycles provide. In this manner, "structural-

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[9] Ibid., p. 642

dynamics" are interlaid within the "structural-kinematic" framework

3. While the cycle is a self-closing structure, it is an open-system with tangent input and output event connections to outside environmental structures. Event energies [capacity for event-points] from these tangent structures either add to or reduce the structure's "proper" or mean energy level. A "steady-state" is maintained when energies are fed into and out of the structure. And the structure, in itself, reaches equilibrium by the distribution of energy within the pattern. The relationship with other structures Allport calls "'out-structural' tangencies"[10]
4. Because of the time independence of self-repeating cycles they can be arranged in the proper order of succession in the format. They can also be used as storage cycles for later introduction into the pattern
5. Every structure of ongoings and events occurs through the principle of structural probabilities and the "energies" of the structure are the probable densities within the event-regions.

With these and the preceding considerations in mind, the way in which the model operates and the development of a working equation will be discussed in the third section.

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[10] Ibid., p. 636

Operation of the Model

Making the assumption that our pattern has come into being as the result of the biased and bounded probabilities previously mentioned, we are now in the position of being able to see how structural-dynamics operate within the structural-kinematic framework.

The pattern is capable of maintaining itself over time in a "static" or equilibrium state since the ongoing cycles, by the self-closing and repetitive character of their elements, possess a continual availability for events. At this "autonomous or proper" energy level - probability density - the ongoings continuously cycle through event-regions and a "virtual simultaneity of events" results throughout the kinematically self-closing format.[11]

If tangent input and output structures are added to our ongoing-event cycle, (See Figure 12) and energies /capacity for event-points/ of the cycle are increased through tangency on the input side, equilibrium is disturbed. From the region - "primary event region" - where the change first occurs there is a displacement of energy to all other event-regions of the structure. This displacement tends to raise the structure's total energy level. Starting with this base condition, a number of cases can be developed depending upon the way in which the kinematic and dynamic factors combine.

Cyclical kinematic completion of our pattern of ongoings and events results when the cycle returns to the primary event-region. It may terminate at this point and be non-repetitive. Negative "kinematic closure" is said to be present in this case. An illustra-

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[11]Allport, The Psychological Review, 61, 298.

tion of this type of structure is the cycle through which a person goes when he touches a hot stove and then pulls his hand away. If the cycle does not terminate but repeats itself, positive kinematic closure has taken place. For instance, the swallowing cycle of a thirsty person will continue in this manner. In either case, at kinematic closure the pattern becomes delimited and its characteristic arrangement of ongoings and events can be distinguished from all others.

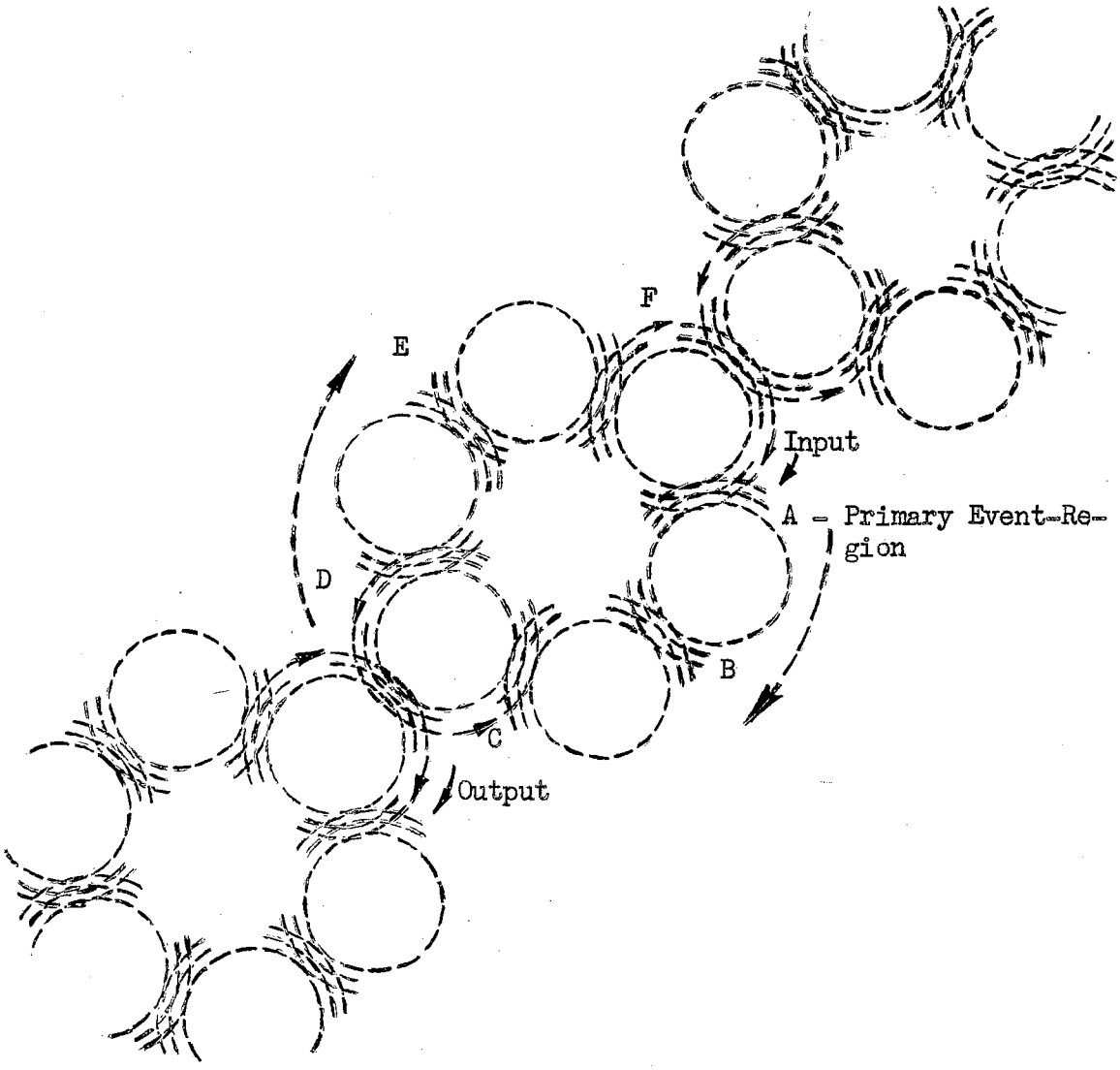

Figure 12. The Operating Model

From the dynamic or energic point-of-view, when the structure reaches an equilibrium state in which there is no concentration of energies at any one of the several event-regions, a situation of "energic closure" is represented. [This is the maximum entropy level of the structure.] A memory of a horrifying event without recall of any specific details is an example. Energic closure also results when a structural manifold, of the type shown in our diagram, achieves a "steady state." A business is sustained in this manner. Since steady state achievement is the vital consideration of management it will be enlarged upon in the succeeding material.

Now, with all of these variables in mind, let us return to our problem to see just what combinations are possible when the structure's total energy level raises above the autonomous or basic equilibrium value.

1. The structure can reach negative kinematic closure: (a) virtually simultaneously; or (b) through an apparent succession of events around the circle. This is true because of the variability which the "r" lay of structure permits.

   At kinematic closure there may either be: (c) continued input of energy with a resultant continuing rise in the total energy level; or (d) energic closure with the stimulus energy cut off and with the structure reaching equilibrium either at the autonomous level or above

2. The structure can reach positive kinematic closure through continued repetition of the cycle of events.

   At kinematic closure there may either be: (a) con-

tinued input of energy and a steady state condition of energic closure; or (b) a cut-off of stimulus energy and a return to equilibrium and negative kinematic closure at the autonomous level.

Before proceeding farther into the structural dynamic phases of the theory, it will be profitable to enlarge on Allport's usage of the thermodynamic postulate of steady state. An understanding is necessary if the event-structure approach is to be applied to the most common of the manager's problems, sustaining or continuing structures.

Suppose that we start by considering our basic arrangement of an ongoing-event cycle with tangent input and output structures; by definition, an open-system. We know that when energies are introduced into the cycle by the input structure, the cycle's equilibrium is disturbed and there is a movement away from its autonomous or proper energy level. Since the cycle of ongoings and events is kinematically self-closing it has a tendency, according to thermodynamic law, to come to equilibrium within itself at a new level. It reaches such a condition when each ongoing cycle in the total repeating pattern is transferring exactly the same amount of energies as it receives. The kinematic ongoing-event cycle operates despite the energy equilibrium state because of its separate structural characteristics of repetition, "r" lay.

The thermodynamic law of entropy, when applied to our open-system, says that there will be a continual tendency for all three of the structures to come to a common equilibrium. Or, put another way, the energies of the system would tend to become equally distributed among the three structures. However, we have already said that the ongoing-event cycle tends to always maintain itself at <u>its</u> own equilibrium level. If

it does this, it would resist the system tendency toward equilibrium at a system level. [This is the same as saying that our kinematic cycle represents an amount of "negative entropy" in the system.] As a result of this resistance, the system always tends toward equilibrium but does not achieve it. Under these circumstances a "steady state" condition exists and will be maintained above the autonomous energy level as long as the energic density is greatest on the input side.

In the preceding explanation we dealt only with the case where facilitating energies are contributed to the ongoing-event cycle by a tangent structure. Or to use terminology which was adopted in Step #2 of the theory, the case was one of "positive interstructurance" between the tangent cycles. We saw that energy increments add to the autonomous or proper energy of the main cycle in this situation. It is now necessary to look briefly at the case which Allport calls "negative interstructurance" in order to make the presentation complete.

A different energy process operates in "negative interstructurance." The tangent structure detracts from, rather than adds to, the energy level of the ongoing-event cycle and thus prevents or inhibits events by reducing their probability. In this way it is quite possible to have a kinematic arrangement of tangent structures such that when the tangent structure's energies are being increased through <u>its</u> own primary event-region there will, at the same time, be an accompanying decrease in the energies of the main cycle.

This interstructural exchange of energies proceeds by "constant, kinematically determined ratios" which operate not only in this case of negative interstructurance but for positive interstructurance as well. "Indices of interstructurance" is the name given to these ratios which

represent the quantitative energy change in the main cycle divided by the change in the tangent structure.[12] There is an interstructurance index for each pair of structures, an index which can be either positive or negative with a value of 1.0 or less.

Through the use of such indices it will be feasible to determine the amount of energy which the main structure has available for self-maintenance and for transfer to other structures. The mechanics of this determination are founded in all of the preceding structural-kinematic and structural-dynamic considerations and have no meaning from a purely quantitative point of view.

The first step in the determination of the available structural energies is to state that the total amount of energies of a structure, at any given time, is a function of (a) its proper or "structurance" energies and (b) the sum of the interstructurance increments or decrements being received from the other structures of the manifold.

The second step is to state this as a generalized structural-dynamic equation:

$$E_1 \sim S_1 + S_2 I_{21} + S_3 I_{31} \ldots + S_n I_{n1}$$

where: E_1 = total energy of the structure being measured or determined

$\sim$ means "varies directly with"

S_1 = proper or structurance energy of structure 1

$S_2 \ldots S_n$ = proper or structurance energy of all tangent structures

$I_{21} \ldots I_{n1}$ = indices of interstructurance of the tangent structures with structure 1

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[12] Allport, Theories of Perception and the Concept of Structure, p. 658.

The summation is algebraic since the interstructurance index may be either negative or positive. All of the energy increments to the right of S_1 may be summed to determine the "manifold energy" accruing to the main structure. Tangent structures considered low in either S or I may be omitted as not significant to the determination of E_1. A negative value for E_1 would indicate that energies were being expended in a structure negatively interstructurant to it.

With this writing of a generalized structural-dynamic equation, the task of condensing the dynamic event-structure theory of Floyd H. Allport is complete. Our path has lead us from the preliminary discussion and definition of structural elements, through the fundamentals of the theory and a description of its model, to an explanation of the model's operation and a presentation of a working equation with potential application to a wide variety of management problems.

We now recognize that:

1. There are two aspects of natural law, the quantitative and the structural
2. The general law of "structuring" is based on self-delimited and cyclical patterns of ongoings and events
3. The patterns occur as the result of both the individual and combined probabilities of the whole chain of events happening in proper space and time sequence
4. The structural probabilities are biased and bounded by implicit conditions of the environmental manifold and by the universal tendency of ongoings toward self-closing
5. The properties of the basic ongoing-event cycle, "c", "n", and "r" lay, are such that structuring can be extended

to higher and more complex orders

6. There is a definite place for quantitative and covariation law within the structural format

7. Both simultaneous and sustained aggregates can be understood through application of event-structure theory

8. The "energies" of the structure are the probable-densities within the event-regions

9. There is a general energy equation based on the relationship between structures

and, 10. Through the use of this structural-dynamic equation it will be possible to determine not only what structures will occur, but also the effects which the existence and operation of tangent structures will produce in the structure under study.

CHAPTER IV

THE TWO THEORIES RELATED

By this time the reader must thoroughly realize that there are differences and similarities between the organization theory of Barnard and Allport's theory of event-structure. The most apparent general distinctions are:

1. Different levels of abstraction or generalization are represented. Barnard has taken the relatively broad and adaptable field theory of the Gestalt Psychology "School" and reduced the abstraction level by applying and fitting it to the more specific problems with which he has been confronted as a business manager.

   Allport, on the other hand, has made a determined effort to produce a theory which would have application to problems, data, and experiences in a very wide variety of fields. In fact, he believes that event-structure theory deals with an aspect of natural law which is common to all things at all levels of complexity

2. Almost completely different vocabularies are involved. Both theorists have devised and adapted word forms to fit their unique mental concepts and to prevent the distortion of common meaning and usage from creeping into the under-

standing of the person who might choose to apply the ideas.

Because of these distinctions, the present writer will attempt to aid the reader by generally correlating the two theories as to: Purpose; Basic Approach; Fundamental Working Unit; Origin; Operation; and Expansion of a System.

Purpose

If the numbers 1, 3, 5, 7, 9, 11 were to be written on a classroom blackboard, the members of the class might well ask how these specific figures came to be written down and why they were arranged in such a sequence. One answer would be that they represent a numerical series, any term of which is equal to two times the number of the term minus one, or $(2n - 1)$. If letters of the alphabet were ordered in the following manner, "Taylor is the father of scientific management," similar questions on the arrangement of these particular letters could be raised and the laws of spelling and grammar invoked in explanation. The same question procedure may well apply to the ordering or sequencing of all things from the particles of the atom to the complex customs and cultures of modern civilization; for they are all peculiar kinds of assemblies of matter and energy.

Both Barnard and Allport have been confronted with this problem of assembly or aggregation and have tried to devise objectives procedures for the explanation and understanding of the phenomenon. The theories of "organization" and event-structure are the results of these efforts. They provide systematic and logical methods to aid in comprehending the ways in which certain variables or elements from a general pool or

universe come together to form an aggregate or system.

The ultimate end-purpose of both of these theoretical approaches is to furnish the practitioner with a "tool" which he might apply to systems or structures, in his fields of interest, to give him a firmer grasp of the assembly process and the operation of the combined elements. With this firmer grasp, accurate prediction of the future is possible and decision-making, in the present, is greatly facilitated.

Basic Approach to Theory Development

Because Barnard and Allport are both dealing with the same type of relatively "non-objective" material, they have gone to elaborate means to make their methods as objective as ingenuity will permit. For development purposes, Barnard creates a construct-"organization"- by setting aside from the physical, biological and social systems the logical acts or activities of people. "Organization" is thus made an aspect which is common to all systems and an aspect, with an objective base, which can be readily used and applied. Allport's efforts have been directed, by the same pressing need for objectivity, toward dividing natural law into: (1) quantitative law; and (2) structural law. They have also been directed toward the postulation of a non-quantitative structuring process based on the objective or denotable elements of ongoings and events.

Once these objective foundations have been established, the two authors proceed with the assumption that systems and manifolds must be treated as a whole and that nothing productive can be achieved by first studying the parts and then attempting to put them together. Barnard justifies this by adopting the Gestalt view that the whole differs from

anything which may result from the summation of the parts. On the other hand, Allport's thinking results from the widely divergent supposition that the whole is something new which includes and is dependent on factors inherent in the parts. Where Barnard generally feels that the term "summation" has no real meaning when applied in this sense, Allport specifically states that the whole is not to be considered as a summation of the parts but is rather the product of kinematic or structural composition.

It is agreed that each element of the system - organization or structure - functions with every other element in a significant way. That is, they are interrelated and interdependent, and a component's existence and activity creates a definite effect or result in every other part of the system. In order for this to be true some means of connection must be involved. What this linking factor is will be discussed later.

The interrelation and interdependence of the constituents, and the process of aggregation itself, are influenced by the various factors which go to make up the external environments or structural manifolds. These universes furnish the materials to be aggregated or ordered into the system. Because of this fact, the aggregate is limited or bounded in scope and in action. Some balance must be constantly maintained between the system or structure and all of these outside considerations.

Barnard is convinced that a system results from the conscious coordination of the timing, the form, and the placement of a variety of parts. Since "willingness to serve" and "cooperation" are inherent in conscious coordination, his efforts toward a thoroughly objective base theory are considerably diluted by the necessary inclusion of these

non-objective concepts.

While Allport's use of the theory of bounding and biasing might be stretched into coincidence with Barnard's basic line of reasoning, it is equally true from his point of view that probability of occurrence is always fundamental to the aggregation process. Where conscious coordination implies automatic completion, probability of occurrence puts a realistic emphasis where it actually applies.

It is immediately apparent that probability statistics are many levels higher on the objectivity scale than the abstractions of willingness to serve and cooperation. The truism, "You can lead a horse to water, but you can't make him drink," can be more objectively analyzed through probabilities than through the ideas which Barnard has adopted. Judgment as to whether probability application leads to a sharper "tool" for the practitioner must be reserved until it has been applied to management theory.

Fundamental Working Units

A rather interesting situation develops at this point. Barnard defines an organization as "a system of consciously coordinated personal activities or forces," and proceeds to work with it as a purely linear entity.[1] Later in a footnote it is mentioned that "organizations are best regarded as circular or spherical, with the chief executive position in the center."[2] Barnard then explains his continued use of the linear approach by saying that it is conventional and that no

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[1]Barnard, p. 72.

[2]Ibid., p. 112

practical means are available by which diagraming of the system will lead to anything other than a two-dimensional pyramidal form. He goes on to make the following statement:

> Probably all spatial figures for organization are seriously misleading; but if they are used to cover the functioning of organizations as distinguished from its structural aspects, either the center of a circle or of a sphere better suggests the relationships.[3]

The theorist, Barnard, is actually caught up in this paradox because of his adoption of "field theory" - a basically linear theory - and by his belief that geometric diagraming will always be interpreted as being static by its very nature.

Allport carefully avoids this pitfall by defining his fundamental unit as a "self-delimited and cyclical pattern of ongoings and events."[4] Thus, at one stroke, he establishes an objective, geometric structure which is, at the same time, definitely dynamic. It possesses a circular-circuital pattern which insures that it will always be self-closing and therefore self-complete.

Further differences in the two theories result from the linear vs. circular argument. We have seen that agreement exists, on a purely hypothetical level, as to the interrelation-interdependence postulate. However, an investigation in finer detail shows a certain lack of agreement between the working models. Where a linear arrangement is constructed there is always difficulty in explaining how the elements at the so-called "starting" end are in interrelation-interdependence with the elements at the "finish" end; or how the top and the bottom

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[3] Ibid.

[4] Allport, Theories of Perception and the Concept of Structure, 627.

affect each other. This difficulty can not be resolved as long as the ends are left hanging and not directly connected. To say that there is flow "up and down the line" is to admit that the linear configuration is inadequate and to talk, by indirection, about a circular pattern. Barnard does this, in essence, by stating only that connection takes place through the contribution of a single activity to two or more organizations at the same time.

Such a problem does not exist in event-structure. The working unit is composed of elements physically connected one by the other into a self-closing cycle of ongoings and events. Even though the cycle may function sequentially in time and in space there is always a positive connection at the initial event-region.

Origin of a System

A new organization appears, according to Barnard, when there is a combination of the elements of communication, willingness to serve, and common purpose which fits with the external conditions of the moment. This combination can: (a) come about spontaneously; (b) be planned from the beginning by one or more persons; (c) be consciously set out from some existing organization; or (d) be split away from an existing organization by some external or internal force. It may come into being directly; or through "informal organization" in an indirect manner. In any case its beginning must be small.

Several of these premises require a closer look. Extreme care must, of necessity, be taken to insure that no misinterpretation results from the use of the word "new." Creation of "new" organizations must not be confused with the creation of "new" complexes or groupings of

existing organizations. There must be an appreciation of the fact that communication, willingness to serve, and common purpose have many subjective facets which are not available to objective analysis. And, finally, since it is difficult to bring spontaneous organization under the general category of conscious coordination, the actual organizational starting point is that point at which people begin to cooperate with a common end in mind.

Apparently Barnard has been forced, by his selection of a theory base, to "walk" some rather narrow pathways in order to fit his actual experiences into the framework which the theory provides. The question of what characterizes new organization is pressed upon him by the construction and operation of the "wholeness" theory. In addition, spontaneous organization can only be included, and accounted for, by expending great effort to stretch the otherwise confining and excluding boundaries in order to accomodate it.

Event-structure theory causes no such difficulties. Patterns or structures composed of objective ongoings and events which occur within certain interdependent relationships as to position and sequence, come from cycles, patterns, or structures already existing in the manifolds or environments. And, "... a particular self-closed structure of events gets built up [through the functioning of probabilities] to the 'performance level' of density ... whenever the proper stimulus manifold or other characteristic conditions, external and internal, are presented."[5] The employment of biased and bounded probabilities at each of the event-regions and on a structure level produces a theoret-

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[5]Ibid., p. 649.

ical framework broad enough to include patterns which occur virtually spontaneously, or sequentially. At the same time, it does not exclude conscious operation on the structure. By varying the biasing and bounding conditions, the probabilities of a structure's occurrence can be manipulated over a broad range.

Operation of a System

The contrast here is generally not too pronounced and the largest part of any difference results from:

1. Barnard's use of "wholeness" theory which decrees that limits of variation be set by the system-as-a-whole

and, 2. The employment of two distinct levels of abstraction. At this point, Allport is much more specific and, therefore, less abstract in his description of how the system or structure operates. In fact, the construction of his model is designed to provide a more-than-adequate coverage for the objective explanation of system operation.

Thermodynamic theories supply both authors with the mechanisms necessary for the understanding of the interaction effects which are produced by variations in the component parts. Barnard subscribes to the law of equilibrium exclusively, since it is based on the linear "disturbance and restoration" principle.

When internal or external forces cause changes in the elements of the system which disturb its initial equilibrium state, there will be a rebalancing of the elements in an attempt to return to the original condition. If the disturbance is not too great this return to the initial equilibrium state will take place. If the disturbance is be-

yond the limits, either of two effects will appear: (a) equilibrium will be established at a new level, this representing a change of state of the system; or (b) a new system will be created. This equilibrium process is "basically an equilibrium between the system and the total situation external to it," although fundamentally it takes place through the proportioning and reproportioning of the elements.[6]

Throughout this discussion Barnard does two things. First, he keeps the abstraction level high by using, as secondary system elements, the concepts of communication, willingness to serve and common purpose; and by talking about effectiveness and efficiency, the aspects of external equilibrium. Second, he leaves unanswered the question of the continuity or discontinuity of organizational operation and regards organization as continuous but with "dormant" periods. [No attempt will be made to pursue this second point other than to say that the theory base can not accommodate the problem of intermittent operation adequately and, therefore, has no real answer to the question.]

As we have seen in much detail, Allport's model has been painstakingly designed from the first to permit it to fit a wide variety of operating cases. The limits of the structure are determined, not by the structure-as-a-whole but, by the probability limits at each of the event-regions which work in conjunction with the combined probability for the whole structure.

With events acting both as geometric connectors and as units of energy, the kinematic and the energic aspects of structure are spelled out in objective detail at the minimum abstraction level. The thermo-

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[6]Barnard, p. 83.

dynamic steady-state postulate which Allport uses is best adapted to the circular type of structural pattern, and to the conditions of aggregate operation as pictured. This is so because its emphasis is on the maintenance of the existing state rather than restoration after disturbance.

From this point in the theory it is possible to demonstrate the energy interchange within the particular structure, and between it and all kinds of cycles interstructurant with it. The net resultant of this phase of model development is a generalized structural-dynamic equation which can be considered, along with the geometric or kinematic diagrams, as Allport's "tool" for understanding the aggregation process and the operation of the structure or system.

The question of continuity or discontinuity of the structure or organization's operation is easily handled as the change of energic density at each or all of the event-regions. When the probability or energic density is above threshold, the structure is visually apparent. Any time the energy input to the structure is reduced, the energic density will drop below threshold to a maintenance equilibrium level. It will persist at this level over time until energy input is restored. The structural model is so arranged as to permit this cycling to continue indefinitely.

Expansion of a System

The process of expansion of a system gives rise to the problem of explaining why and how an existing system divides and multiplies, first on the same level and then level by level until comprehensive systems are operating. There is also the problem of how the systems are connected on each level and level to level.

Barnard's answers to these problems appear to be direct and straightforward. He feels that each system has an inherent propensity to expand which results from the continual effort to maintain equilibrium. This expansion effect finally reaches a point where it is impossible for stability to continue. The system will then either cease to exist, will divide into a number of partial systems, or create additional units. This division and creation works first on one level and then level by level to build a multilevel complex. The element which acts as the connector to make the complex an organic whole is the single activity which has been contributed to two or more units at the same time.

Behind this apparently straightforward approach lies the question of what has happened to the "wholeness" base theory which, to this point, has furnished the descriptive framework. It can be recalled that the system-as-a-whole sets the limits within which the parts may vary without causing a change to or a reaction from the system. Now, when Barnard puts together two partial systems the entire situation changes. Before combination, each of the partial systems, when viewed in isolation, determines the limits within which its elements may fluctuate. After combination, although they are still the same partial systems, they must lose this ability to the new, more complex system-as-a-whole. To account for this loss phenomenon some additional mechanism must be postulated or, if this is not possible, it must be conceded that the problem of system expansion can not be adequately explained by "wholeness" theory application. No such mechanism has been presented, to date, which does not destroy the fundamental foundations of the "field or wholeness" theory. Therefore, Barnard has no satisfactory ground upon which to build an understanding of system expansion.

The answer to this part vs. whole problem is basic to the design of Allport's model. Through the structural property of "order," cycles or systems of cycles of ongoings and events may be joined, by tangency, into larger structures or systems. "The 'higher' order consists merely of the structuring of structures of the 'lower' order into a more inclusive structure."[7] The structural features of c, n, and r lay and the various factors of structural-dynamics are repeated by the more inclusive structure "at its own order." [See Figure 12]

How does this ordering occur? The answer to this question is resolved through the operation of probabilities. "Whenever event-density in all the tangency-regions between the lower-order cycles become sufficiently great the higher or more 'macroscopic' structure becomes suddenly 'probable'."[8] The probability limits which restricted variations in the lower-order units now combine with the added probabilities at higher order to jointly determine the existence of the new, enlarged pattern.

Connection between cycles of the same order and from order to order are physical, the cycles of ongoings tied to the cycles of events and vice versa.

The reader may now see a little more clearly the relation between the organization theory of Barnard and Allport's theory of event-structure. The points of agreement and disagreement have been generally correlated and the broader nature of the circular model illustrated. In Chapter V an attempt will be made to separate some of the major areas of Barnard's management theories from their present organizational base and to reattach them to the broader base of event-structure theory.

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[7]Allport, Theories of Perception and the Concept of Structure, p. 661.

[8]Ibid.

CHAPTER V

APPLICATION OF ALLPORT'S THEORY OF EVENT-STRUCTURE TO THREE PHASES OF BARNARD'S MANAGEMENT THEORY

Rather than to continue farther into the purely scientific aspects of Allport's theory and by so doing to stray from the scope of our thesis, suppose we stop at this point to see whether his "blueprints" and laws are of value to the working manager. By applying his concepts to some of the management problems which Barnard has dredged to the surface, we should be able to determine just how sharp these tools of analysis really are. At the same time we will be answering the always present question: "Are these techniques simple enough and concise enough for the manager to use under the everyday, pressure demands of his position?" It will also make it possible for the reader to better understand the place of quantities within a non-quantitative structure or model.

The approach to be taken in the material which follows will be a rather crude, molar one and will talk in abstract terms such as man, worker, manager, incentives, control, groups, and cooperative systems. These broad generalizations will be used "as signposts" to draw us down the converging avenues to the structures of ongoings and events which we know to be the acts or patterns of acts of human beings functioning individually and with others. The analyses will be just thorough enough to show that Allport's methods can be of value in the

normal affairs of the manager, but not so thorough as to answer each and every one of the questions which might be raised. To do otherwise would be to bury the reader in almost endless detail and to divert him into fields of interest not his own.

While this procedure may be dismissed by some as rather unscientific, functionalistic, or "glossy and shallow," it is hoped that enough positive results can be achieved to intrigue the reader into trying event-structure concepts for himself. He will find that Allport has been quite successful in his efforts to create a tool which might be objectively applied to an extremely broad range of phenomenon. Within this range lie the problems the manager has to satisfactorily solve to discharge his responsibility of maintaining the equilibrium of the cooperative system.

Three separate management problems will be reviewed. They will be arranged in order of complexity of presentation rather than in order of inherent problem complexity. By following this scheme it is hoped that the reader will be led gradually into application of the theory. The first section will analyze "resistance-to-change," a basic facet of cooperation and willingness to serve or to contribute. The way in which a "man" functions as a member of both "formal" and "informal" organization will be studied in the second section. And, finally, in the last section an attempt will be made to connect event-structure theory with communication and authority.

"Resistance - to - Change"

Perhaps one of the most commonly discussed topics of so-called "scientific management" is man's resistance-to-change. Taylor felt

that it was responsible for his having been "bucked" at every turn and, as a result, he followed a go-slow and plan policy. His standard procedure was to select a qualified worker [one who also happened to be the opinion leader of the group] and to compensate him well for learning new methods. Barnard points up the same thinking when he considers the individual as the basic "strategic factor" of all cooperative systems. Then, too, present-day management literature is filled constantly with all kinds and types of techniques designed to deal with and to overcome this resistance to the introduction of anything new.

Can Allport's event-structure theory be used to objectively analyze the problem? The best answer to this question is to actually try to visualize the individual and his various organizational connections by using the tools which Allport has laid out for us. These tools are:

1. Ongoings or movements in multiple roles - "n" lay
2. Events and four dimensional event-regions
3. Circular patterns which close themselves - "c" lay; and which are capable of repetition - "r" lay
4. Probability densities at the event-regions which in combination determine the structure's occurrence

and, 5. Energy considerations and interstructurance indices through which a variety of units may be converted to common energy values and applied to an energy equation.

Now, if we were to look microscopically at a person we would find a large number of closed circular patterns or structures such as the circulatory, nervous, and muscle systems. All of these patterns may be considered as made up of ongoings and events. The ongoings of the blood corpuscles and the event-regions of the heart, lungs, and body cells are familiar examples of a repeating cycle possessing "c" lay, "n" lay,

and "r" lay and existing as the result of the combined probabilities of above-threshold densities at all of the event-regions in the pattern.

At a higher "order," the individual is said to have a personality, to possess the capacity for learning and experience, and the ability to remember. All of these factors may be pictured as personality meaning-structures; cycles of ongoings and events patterned with the three lays of structure through biased and bounded probabilities at the event-regions.

By following this procedure of considering all of the elements which go to make up the complex higher order structure which we call "man," it would be apparent that we are dealing with a "matrix-system" and that it might be visualized as a hollow sphere with a series of interwoven hoops stretched over it. Each of the hoops objectively represents one of the circular-circuital patterns of events connected by ongoings; patterns which we would otherwise call personality factors, physiological factors, or, perhaps, "memory."

Once the process of converting from subjective, non-denotable terminology to the objective, geometric event-structure way of visualizing the various factors which are "man" has been completed, we find that we are dealing with common terms, structures, and units. The terms are denotable ongoings and events; the structures are kinematically self-closing patterns; and the units are units of energy.

We are now ready to discuss an individual's resistance-to-change. For simplicity of diagraming, the matrix event-system of man which we have developed will be shown as a single hoop. The system of the manager attempting to install something new, and the system of the resisting worker will be treated in this manner. The two hoops are

interstructurant one with the other as illustrated below.

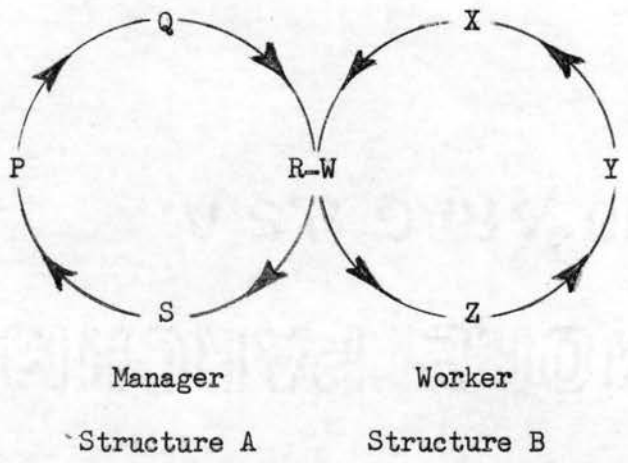

Figure 13. The Manager and a Resisting Worker

Assume the case where the manager, Structure A, has been "motivated" by some need or goal [needs may be considered as physiological cycles, and goals as meaning cycles in the manager's matrix-system] to install a new program. He contacts the worker, Structure B, to present his proposal and is met with immediate resistance.

Using event-structure analysis, here is what has happened. Structure A has had its energy level increased and, because it is interstructurant with B, the two systems immediately tend toward equilibrium at some new common energy level. However, since Structure B is a kinematically closed matrix-system it tends to maintain itself at its original level. This tendency of B's is the direct equivalent of "resistance-to-change" and may be objectively manipulated as a thermodynamic energy problem.

We know, from the summary of Allport's concepts in Chapter III, that Structure B's tendency toward, and its achievement of its own equilibrium act as negative entropy to the system shown. This negative entropy is an element of life to the structure just as the intake of

food is to the human body. It provides order and thus prevents the total system from reaching its own equilibrium, a condition of maximum entropy which leads to pure randomness or death. With this behavior on B's part, a stable system exists with which the manager may consistently deal, for it is a stability that lends itself to accurate prediction.

The worker's actual resistance-to-change may be determined by first evaluating the proper energy level of his structure and that of the significant cycles interstructurant with it. Once such an evaluation has been made, the structural-dynamic equation can be brought to bear on the problem. The algebraic summation of proper energy and weighted manifold energy would be equal to the total energy which the worker might be expected to expend in resisting the manager's plans.

Perhaps the reader might like to convert this extremely simplified analysis into a more detailed one. This could be done by considering what happens to the "steady-state" of the above two-structure system when the manager attempts to overcome the worker's resistance-to-change. Can the normally resulting erratic behavior of the system be related to the destruction of the steady-state condition? Knowing the arrangement of the system, what recourse does the manager have when change becomes necessary?

Without expanding our consideration of the problem any further, it is apparent that Allport's event-structure theory is broad enough and objective enough to permit the manager to readily visualize the subjective "resistance-to-change" and to deal with it in an objective manner with an assurance of positive solution.

Membership in Both "Formal" and "Informal" Organization

One of the points of difficulty in understanding Barnard's theory is the question of how an individual can contribute acts or activities to several organizations at the same time. This understanding becomes even more difficult when it is related to "formal" and "informal" organization. As we saw in Chapter II, the dividing line between informal grouping and formal organization is a rather fine one, the only difference between the two, according to Barnard, being "common purpose." This common purpose acts as the coordinating element which draws the other factors together in a combination appropriate to the external conditions of the moment.

Looking at this situation from the event-structure point of view, we first must recall that an individual's behavior can be plotted as a cycle of ongoings and events such as shown below.

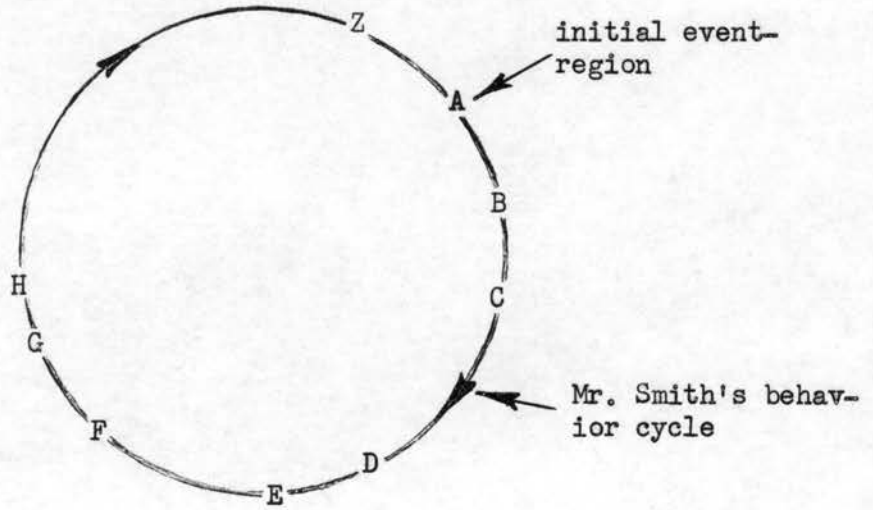

Figure 14. The Behavior Cycle of Mr. Smith, The Manager

The event at A is the manager, Mr. Smith's contact with his gray flannel suit; B, his getting into the family car, driven by his wife, for the

daily trip to the train station; C, his entry into the club car; D, the start of a day's work; E, a conference meeting; F, a luncheon meeting with a customer; G, personal time; H, dictation of company correspondence; and so on, until at Z he returns home in the evening and removes his business clothes.

One quick glance at this listing and the reader can immediately see that events at A, C, and Z belong to one group of events. Those at D, E, F, and H are part of another. And that B and G are elements of two other separate categories.

By going back to our kit of tools of analysis we can draw out the fact that the designations A, B, C, D, ... and Z are regions in space and time within which ongoings come to event-point. At the order of structuring involved in this particular case, ongoings from more than one cycle or system give rise to the events which we have listed.

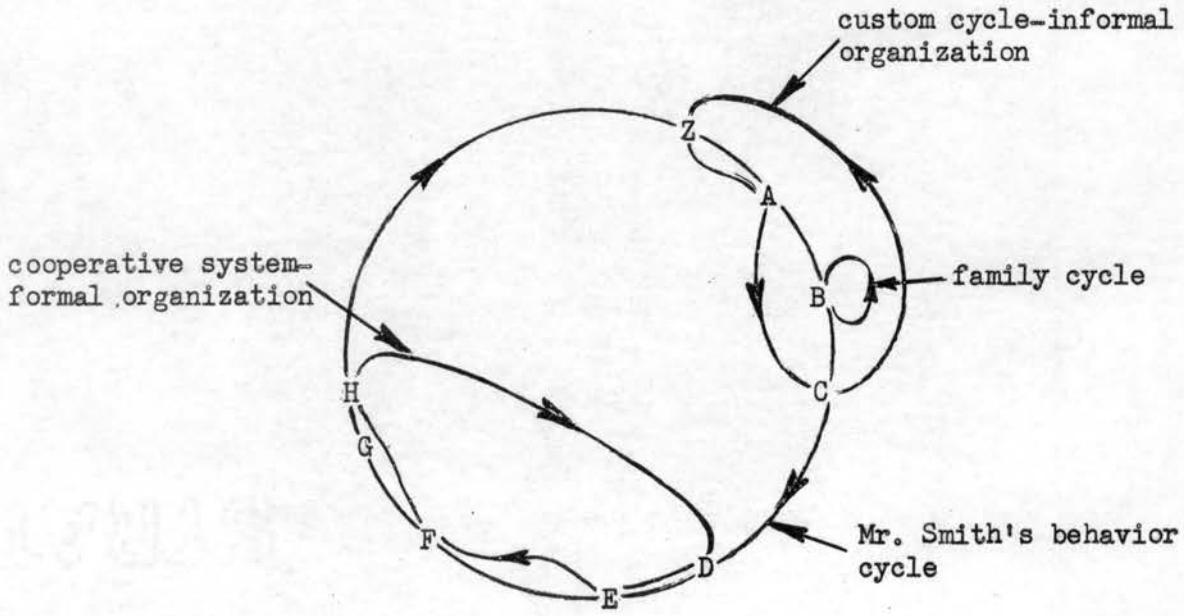

Figure 15. Behavior Cycle in "Formal" and "Informal" Organization

The events at A, C, and Z connect not only the ongoings of Mr. Smith's behavior cycle but also the ongoings from the cycle or system which we

normally call "custom." This custom cycle is one of the many cycles that Barnard lumps together under the term "informal organization." The event at B is one of the connectors of the "family" structure. D, E, F, and H might meet Barnard's classification of elements of "formal" organization; while G is the relatively unstructured event which Mr. Smith feels belongs to him exclusively. It should be noted that the events which are a part of the "formal" organization might very well act as connectors in the "informal" structure, too.

It is evident from the above explanation that event-structure analysis can be easily used to picture a person's behavior cycles or systems and to show diagrammatically how an individual can contribute to several "organizations" at the same time. But we have yet to see if it can handle the question of "common purpose."

With the knowledge of the first section for background we know that man is a matrix-system composed of many cycles, several of which were spotlighted by the demands of the case of resistance-to-change. Perhaps by bringing the matrix-system into sharper focus we might be able to find something to satisfy our present search. Could the previous mention of the manager's being "motivated" by a goal give us a clue to direct our attention? The answer is "yes." The manager's goal is his "end-purpose" and, in our new terminology, is his end-purpose cycle. This cycle is a "meaning-cycle," interstructurant with the behavioral or "means-purpose" cycle.

From this point it would require very little additional visualization effort to picture an end-purpose system composed of the tangent meaning cycles of a number of persons contributing to a mutual cooperative system. The reader by recalling in specific detail almost any one

of the formal groups in which he participates might extend the above generalized analysis down to more familiar ground. If this were done there would be an immediate realization that a "tool" exists for understanding the non-objective concept of "common purpose."

Are Allport's ideas of structure valid to the problem of membership in both "formal" and "informal" organization? Is there a place for the very abstract "common purpose"? After considering the preceding analysis and applying it to familiar cases, the reader can only answer in the affirmative.

Communication and Authority

According to Barnard, "Authority is the character of a communication [order] in a formal organization by virtue of which it is accepted by a contributor to or 'member' of the organization as governing the action he contributes ... ."[1] Two aspects are involved: (1) subjective, personal acceptance; and (2) the objective character of the communication which leads to its acceptance.[2] For study it is desirable to break down the objective aspect into: (a) authority of position; and (b) authority of leadership.[3] The first, authority of position is an essentially impersonal consideration, while the second, authority of leadership depends on the ability of the individual concerned. If the two are successfully combined in the system of authority or communication, maximum organizational effectiveness and efficiency result.

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[1]Barnard, p. 163.

[2]Ibid.

[3]Ibid., p. 173.

Almost everyone has, at some time, seen a normal organization chart which shows each position and its relation to all the others. A glance will tell the level on which a specific job falls and those parallel to, above, and below it. Transposing Barnard's theories to the chart presentation, the position pyramid may be said to show the lines of objective authority or the system of formal communication of the organization.

While the organization must be so "designed" as to furnish a firm base for operation, it is a complex task, using standard organization charts, to concretely visualize the overall structure and the manner in which authority and communication work within it. The chart is able to provide the answers to the static problems involved but the user himself must transpose the dynamics into the static framework, an almost impossible job.

With all of the above thinking in mind, this section will represent an attempt to demonstrate how event-structure theory might be applied to the subject. As a descriptive vehicle we will use the case of the manager and his five-man executive group.

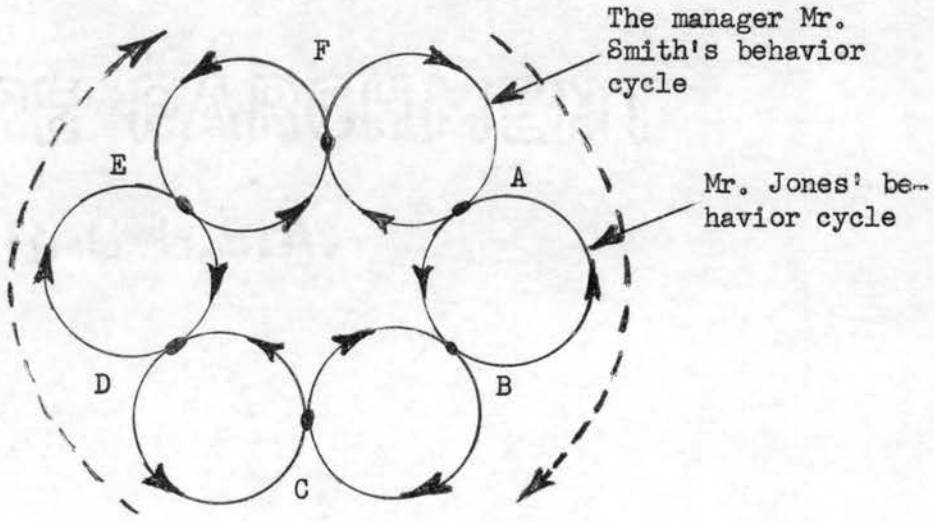

Figure 16. The Behavior Pattern of An Executive Group

First, let us plot the group as a simplified cycle of cycles, the large cycle representing the behavior pattern of the group and each of the interstructurant lower order cycles the individual members' behavior structures. On the basis of our acquaintance with Allport's theory we might say that the larger cycle is made up of the events of executive operation connected by the ongoings of its members. The cycle diagram thus takes the place of the standard organization chart and gives us a dynamic format with which to work. The positions of individuals' cycles demonstrate the men's positions in this "organizational" arrangement.

Now, what do we mean by the system of formal communication of the organization? We may start with the generally accepted definition of communication as the process of transferring information from one person to another. Information when used in this sense means data, facts, and knowledge of different kinds and types. Therefore, the organizational communication system must be the "mechanism" through which facts flow; or since facts flow from person to person, it must be the arrangement of people in organizational positions.

Translating this into Allport's language we can first say that information is energy and that data or facts are units of energy or unit-events. When the manager's cycle energy is raised by contact with some tangent structure like a customer, or through some need cycle of his own such as the desire for a bonus, this energy is normally transferred to the group in the form of an order. The order, as patterned units of energy, raises the probable density of events or energic density at the point of tangency, A, between the interstructurant cycles. The number of unit-events is thus increased and the increase distributed around the executive cycle until, at kinematic closure, the flow ceases

or is repeated as follow-up orders. So, the system of formal communication may be traced by starting with energic disturbance in the cycle of the manager and following it around the executive pattern as directed by the arrows.

This gives us a general picture of how the events of tangency and their energies take the place of "information" and its transmission through a communication system. As yet no attempt has been made to bring the problem of authority into the event-structure spotlight. Therefore, we must ask the question, "How can 'authority' be objectively dealt with and reduced to a more useful level of abstraction?"

Going back to our tools of analysis we know that when two cycles or systems are interstructurant, they may act either to reinforce or to inhibit each other. This they do by increasing or decreasing the probable density of events at the event-regions. Or, they add to or subtract from the energy densities of the structures. These changes of energy "proceed by a constant [kinematically determined] ratio" which has been called the index of interstructurance.[4] The index is the "mechanism" through which the patterned energies of information are transmitted and by our definition is "communication," the process of transferring information. We shall see later that there is a direct, objective relation between the index of interstructurance and the question of authority of communication.

To get into the problem itself, let us take the case described above and look at it a little more closely. When the manager's cycle energy is raised by contact with a tangent structure, the number of ongoings in the behavior cycle increases through changes in "n" lay and

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[4]Allport, The Psychological Review, 61, p. 301.

"r" lay. This means that there will be a larger number of ongoings entering the event-region at A from Mr. Smith's cycle. A rise in the probable density of events or energic density in region A results. This is exactly the same behavior pattern as Mr. Smith transmitting an order - "coded" or patterned units of energy - to Mr. Jones.

While this process is taking place, Mr. Jones' behavior cycle is also active. It comes to event-region A as an ongoing role which includes a number of subcycles of "meaning." These may be both subjective and personal, and objective and impersonal. They help to determine the actual quality and quantity of ongoings per unit time which enter the event-region as Mr. Jones' behavior cycle. By doing this, they also determine the receptiveness and the capacity of the cycle for the units of energy which Mr. Smith's cycle brings to the event-region. This is exactly the same behavior as Mr. Jones receiving an order from Mr. Smith.

Depending upon the number, type, and timing of the ongoings entering the event-region from both Mr. Smith's and Mr. Jones' cycles there will either be an increase or a decrease in the energy level of Mr. Jones' cycle when Mr. Smith's cycle energy is raised. The indicator of this reaction is the index of interstructurance which may be either positive or negative with a range from 0 to 1.

When the index is positive there is an increase in the energy of both behavior cycles; when the index is negative there is a decrease in Mr. Jones' cycle energy. In the former case, the energy transmission would be from the manager's cycle through Mr. Jones' cycle, and then to the next ongoing cycle in the group. The latter proposition would mean that the transfer of energy is reversed and flows from Mr. Jones' cycle to the manager's behavior cycle.

Converting this explanation back into Barnard's terminology, we can say that an order or communication has authority when the index of inter-structurance is positive and that it lacks authority for the recipent when the index is negative. Satisfactory communication of information is possible in the positive case, but not in the negative. In addition, the meaning cycles of the receiver, such as those dealing with his knowledge of the position and leadership ability of the sender, help to determine the sign of the index.

This completes the attempt to fit event-structure theory to the problem of communication and authority. Although the analysis has been brief and has considered only very basic elements, we find that the design of the theory is adequate for the task and is in no way restricted or limited when applied to this portion of management theory.

By reviewing three of management theory's problems and applying the concepts or "tools" of event-structure to them, we have found that they are sharp enough to deal objectively with otherwise subjective considerations. The techniques of visualization are simple enough for the manager, with a good foundation of understanding and a small amount of practice, to use in his everyday operations. If they are so used, the work of correlating quantities with non-quantitative factors is greatly facilitated.

CHAPTER VI

SUMMARY AND CONCLUSIONS

The manager today is confronted with an almost overwhelming variety of techniques intended to aid him in understanding and manipulating the strategic factors of the environment. Recent efforts in the field of management have been directed toward the construction of mathematical models which, according to some of their proponents, make the decisions for the manager any time the proper quantitative values are "plugged-in."

The most major difficulty with this approach is that many elements with which the manager works can not be quantified and, therefore, can not be included in the mathematical operations. They must be first stripped away from the quantities and then reattached after the calculations have been completed. This fact is not generally understood by those relying on the mathematical model technique. As a result, the process of reattachment, which requires a vast amount of management "know-how," becomes by default the province of relatively inexperienced technicians.

Behind all this is the basic problem, a problem of ordering or organization of highly varied data dealing mostly with the behavior of people. This data must be converted into some kind of pattern meaningful to the manager.

Since C. I. Barnard's theory of organization was constructed to "usefully explain" the "whys" and "hows" of people's behavior in "formal" and "informal" organization, it has been condensed and interpreted for purposes of comparison with the event-structure theory of F. H. Allport. Allport's theory has likewise been condensed and the two theories have been compared in order to determine their relative strengths and weaknesses.

It is apparent from this evaluation that Allport's concept is, by far, the stronger of the two from a purely theoretical point of view. It is also quite evident that the method provides, through the use of a dynamic non-quantitative model, a way of clearly and objectively visualizing the patterning or structuring of not only human behavior but of behavior in general.

The place of quantities within the non-quantitative structure of the model is thoroughly developed and a structural dynamic energy equation devised.

To test its ease of application, three phases of management theory, "resistance-to-change," membership in "formal" and "informal" organization, and communication and authority, have been briefly analyzed using event-structure postulates.

The theory has met this test very satisfactorily and it is believed that Allport's concept of event-structure provides the manager with a basic blueprint, map, or tool of analysis which will aid him in perceiving and understanding the ordering, organization, or structuring of behavior. By doing this, it will also enable him to place, in proper perspective, the various techniques of modern management.

For the future there appears to exist an excellent possibility that

the event-structure model and its energy equation may be set up in an analogue computer and major policies and orders tested for reaction before they are actually presented. The same approach might be followed as a check on the effectiveness of proposed incentive plans. From this point on, the application for the theory in the management field appears to be virtually unlimited.

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VITA

Justus Theodore Schreiber

Candidate for the Degree of

Master of Science

Thesis: MANAGEMENT PERCEPTION: PHASE I - The Concept of Event-Structure As a Perceptual Aid to the Manager

Major Field: Industrial Engineering and Management

Biographical:

Personal data: Born in Philadelphia, Pennsylvania, October 1, 1924, the son of Dr. William L. and Josephine Datz Schreiber.

Education: Attended grade school in Philadelphia, Pennsylvania; graduated from Northeast Catholic High School, Philadelphia, in 1941; attended the University of Pennsylvania from 1947 to 1949; received the Bachelor of Science degree in Industrial Engineering from the Oklahoma Agricultural and Mechanical College in May, 1953.

Professional experience: Employed by E. I. duPont de Nemours & Company, Belle, West Virginia, as a Project Engineer from 1953 to 1955, after miscellaneous experience with that company as a detailer-tracer, 1941 to 1943; machine shop planning and scheduling, 1951; and maintenance engineering, 1952. The period of time from 1943 to 1947 was spent as a tank and armored car driver with combat service in the Europeon Theater of Operation.

Professional societies: American Institute of Industrial Engineers and Alpha Pi Mu, honorary Industrial Engineering Society.

Date of Final Examination: June 21, 1956