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DOCTOR OF PHILOSOPHY

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Title

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Margaret Ann Ramsey

1971

EDUCATION AND SPACE IN THE MUSEUM:
A STRUCTURAL MODEL

BY
MARGARET ANN RAMSEY
B.A., The University of New Mexico, 1968

DISSERTATION

Submitted in Partial Fulfillment of the
Requirements for the Degree of
Doctor of Philosophy in Education
in the Graduate School of
The University of New Mexico
Albuquerque, New Mexico
August, 1971

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"They became what they beheld"

-----Edmund Carpenter

For Osiris, and all the Children
with all my love.

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EDUCATION AND SPACE IN THE MUSEUM:
A STRUCTURAL MODEL

BY
Margaret Ann Ramsey

ABSTRACT OF DISSERTATION

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EDUCATION AND SPACE IN THE MUSEUM:
A STRUCTURAL MODEL

Margaret Ann Ramsey, Ph.D.
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The University of New Mexico, 1971

Statement of Purpose. The purpose of this investigation is to identify which elements are operating in a museum in order to determine the underlying structure of space and thereby build a model. A secondary purpose is to synthesize various fields, including the social sciences, in order to understand better how space operates in a museum. The study treats the use of space as an educational problem.

Procedure. The method of structuralism is applied to identify which elements operate in a museum in order to find the underlying structure of space. After these elements are identified, they are used in constructing a model.

Three classifications of the source literature are used in understanding the museum as an environment and microworld. The writers from the sources used in the study are classified as environmentalists, perceptualists, and interactionists. The literature is composed of sources from a wide range of fields, including the social sciences, the humanities, general systems theory, and mathematics.

Included in the study are (1) a general review of the state of the museums in America and a discussion of museum history and philosophy, pointing out the deficiencies and suggesting possible corrections; (2) a structural examination of the processes of perception, interaction, and

environment in the museum; (3) an examination, through the method of balance theory, of these processes and their composite elements; (4) the construction of a model leading to a better understanding of education.

Data. Data for this study was obtained from three years of participant observation at the Maxwell Museum of Anthropology of the University of New Mexico, where the writer served as Chief Docent and head of the Education Division at this museum.

Conclusions. The following conclusions were reached:

1. The spatial structure in the museum is composed of three elements. These elements are defined as the space of and around bodies, the space of and around objects, and the space in between these two categories. These three elements are also examined in a total systems framework.

2. Space (as it has been defined) is the underlying structure in the museum.

3. The spatial structure of the museum has more effect on education than any verbal efforts in that institution.

4. In the museum, space operates as time.

5. Perception is gestalt, but the method of structuralism allows for separate analysis of perceptual elements.

6. By examining the elements using the method of balance theory, cycles are found to be operating in the museum. These cycles are the interaction of at least two, but usually three or more elements. The balance, either positive or negative, of these cycles was determined. It

was found that some cycles could be negative and still contribute to an overall positive balance in the museum.

7. A model was constructed that contained all the cycles in the museum.

Implications for Practice. Based on these conclusions, space is the most important element in the museum and other institutions. This concept should be an integral part of educational programs to effect better education. Ways may be found to operationalize this study in educational institutions other than museums.

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GLOSSARY

cycle--The interaction of two or more spatial elements. The cycles in this dissertation usually consist of three elements. The cycles can be represented in diagrammatic forms.

education--Education in this dissertation concerns only those learning processes that occur in museums. Education in museums usually refers to tours, but in this dissertation the term education includes not only tours, but all aspects of perception that might offer opportunity for learning now or in the future.

fellow worker--Member of museum staff; a docent (guide), usually a fellow graduate student or undergraduate in education.

kinesics--Study of human body movement through/in space (Birdwhistell, 1963).

microethnology--Study of man in his origins, distribution, relations, and characteristics within a setting smaller than ethnology ordinarily employs; a division of anthropology dealing with institutions that are parts of a greater whole, and analyzing that part by using the same techniques used in ethnology but on a smaller scale appropriate to the institution.

microworld/microcosm--A community or other unity that is an epitome of a larger universe (Webster's Seventh New Collegiate Dictionary). For the purposes of this study, an entity which can be treated for analysis with all the methods existing in the real (actual) world.

peripheral worker--Worker in the museum of anthropology or in the department of anthropology who has some connection with the museum through either interest or work duties.

proxemics--Study of human use of human space (Sommer, Hall, 1965).

set/contrastive feature/pair--Consists of two elements which are comparable (Saussure, 1922), and thus opposite to each other; in structuralism, a term referring to elements which are descriptive and are in binary opposition to each other, thus which can be transferred to an examination using Boolean algebra. These sets are representative of the group property and thus group structure (Piaget, 1970; Lane, 1970).

structuralism--A methodological approach in a system is examined whereby contrasts, distinctions, and ultimately oppositions exist. Typically, structuralism involves, according to Piaget (1970), the location of structures in three possible sources: (1) as the result of some kind of preformation, either predestination or biological determinism; (2) contingent creation; (3) they may arise from acts of construction, out of experience. It is the third source that this dissertation is most concerned with.

structure--The elements of an entity, or the position of such elements in their relationships to each other; the composition of conscious experience with its elements and their combinations; gestalt; the action of building; something made up of interdependent parts in a definite pattern of organization, manner of construction. (Note how gestalt is a meaning for the word structure--Webster's Seventh

Collegiate Dictionary. "A structure is a set of any elements between which, or between certain sub-sets of which, relations are defined" (Lane, 1970).

Three basic structures are said to assume all other existing structures (Borbaki in Simmons, 1963). These are called mere structures (mother structures, matrix structures). They are: (1) algebraic structures (prototypically the group) characterized by the presence of operations; (2) structures of order, having to do with relations, whose prototype is the lattice, being concerned with predecessors and successors; for example, kinship and social structure; (3) topological structures based on the concepts of neighborhood, continuity, and limit.

Certain kinds of machines and some living organisms--particularly the higher living organisms--can modify their patterns of behavior on the basis of past experience so as to achieve specific entropic ends. In these higher forms of communicative organisms the environment can modify the pattern of behavior into one which in some sense or other will deal more effectively with the future environment.

--Norbert Weiner

Kids are what the game is all about.

--John Culkin, S.J.

Learning is something that people do for themselves.

--John Culkin, S.J.

THE MEDIUM IS THE MESSAGE. THE MEDIUM IS THE THING TO STUDY. THE MEDIUM IS THE THING YOU'RE MISSING. EVERYBODY'S HOOKED ON CONTENT: PAY ATTENTION TO FORM, STRUCTURE, FRAMEWORK, MEDIUM. THE PLAY'S THE THING. THE MEDIUM'S THE THING.

--Culkin on McLuhan

the medium alters the perceptual habits of its

the medium itself

GETS THROUGH.

USERS independent of the content

The act of cognition is concerned with involvement.

--McLuhan

CONSCIOUSNESS IS CREATED BY ABRASION. CREATIVITY OCCURS ONLY AT THE POINT OF ABRASION. CONSCIOUSNESS ITSELF IS AN INTERPHASE OF THE SENSES

THE WHOLE WORLD IS FLOODED WITH REPRODUCTIONS.

--Parker

Our world may be a reproduction, a simuleletronic universe created in an analog computer.

--Galouye

CHAPTER I

JUSTIFICATION AND BASIS FOR THE STUDY

The state of museums in this country is one of basic contradiction. By tradition, museums are honored and valued for their historical and cultural treasures, and, as such, become both status and practical institutions. However, museums seem to have little relation to the present curriculum in schools and multi-media oriented children.

Museums have traditionally been privately supported and privately maintained (Belmont Report, 1968). One reason is that family lineages often pass on the curatorships and in doing so concentrate more on acquisition of objects rather than on adaptation of displays to the general public. As a result, school children, who often see the museum as part of a school excursion, may not benefit as much as they could if the museum concentrated more on educational relevance and need. Another aspect of the problem is that family-controlled museums depend on private funds. Part of the relevance problem arose because private wealth produced or resulted in private and not public aims. Although museums have recently been funded by government agencies (1970), many of the governing boards continue to be composed of the "elitist" ranks of society (Belmont Report, 1968; Ripley, 1969; Wittlin, 1949, 1970; Low, 1942; Bazin, 1967). The small and the middle-sized museums are usually the most needy, but are often the ones to

receive the least support (Belmont Report, 1968). In many instances, the public schools that use the museum for field trips never contribute funds, although they expect some kind of valuable educational experience for their children. The revered institution of the museum is facing the prospect of becoming an antiquated and irrelevant resource (Cameron, 1968; Karas, 1970; Bremer, 1970; Globus, 1970; Dixon, 1970). Basically, the museum situation is one of a status institution which receives little funding. Funding might increase if museums were more relevant, but more money is needed to make them so. Although money alone is not enough, it is a necessary condition for museums to improve so that they may attract more funds and ultimately make a greater contribution to education in the total culture.

This dissertation proposes to create an alternative to this circular situation by gathering knowledge from previously unused or little used fields, and building a model designed to improve education in the museum. It is first necessary to determine what kinds of roles museums have played in the past in order to understand what kinds of roles they are playing in the present and can play in the future.

Museums and culture have been closely related ever since the initiation of collections of artifacts. Bazin's Museum Age (1967), one of the most comprehensive historical-philosophical accounts of museum history, shows that museums were rooted in class elitism: it was a status symbol to have collections which were rare, valuable, and restricted to certain members of a society. The richest and thereby the most cultured members of society became patrons of such collections,

and thus museums were born.

Paradoxically, museums may house artifacts of a culture but often do not hold meaning for the culture which tours them (Lamson, 1970). Educationally, a museum should first analyze the kind of community it serves, and then implement displays aimed at communicating with the needs of the viewers (Naumer, 1970; Love, 1970). The philosophy of museums has been theoretically centered around the aims of the public: primarily that collection and exhibition of objects is valuable for the education of the community (Adams, 1937, 1939). In practice, museums have not always been able to accomplish these aims because not enough has been known of the museum audience itself, nor has enough been known of how museum space operates. This dissertation intends to bridge the gap between museum space and the people who move through it. The model will be directed towards anthropology museums, although applications might be made to many kinds of museums.

The earliest anthropologists were concerned with museums and their arrangements, notably Bastian, 1881; Boas, 1896; Lowie, 1941; Graebner, Ankerman, and Foy (Frese, 1960). The influence of anthropological theory upon anthropological method, including museum methods and techniques, is extensive. The most important theory among the various theories that had a direct influence was functionalism.

The structural or functional school of thought in anthropology began to be formulated in the twenties. Its method was that of investigating cultures as integrated wholes (Frese, 1960).

The sociological school of Durkheim aided in the development of this view, since it held that social facts were to be explained from

other facts (Durkheim, 1895). It was with this concept that Mauss (1925, 1947) influenced Levi-Strauss (1950). Mauss also believed that any matter of sociological relevance must be examined by all aspects it assumes in reality. The school of thought diverged with Radcliffe-Brown and Malinowski, as did the other British social anthropologists. They felt that social facts could only be drawn from descriptions of observed societies.

This kind of functionalism also influenced museums, but the influence was minor in France (Frese, 1960). Piddington (1957) and Kroeber (1954) noted that the preoccupation of social anthropology was with social structure, which kept it largely aligned with sociology, and therefore out of direct contact with museums. This preoccupation with social structure changed again (Wittlin, 1949) towards a functionalist approach in museums, where objects began to be displayed in relationship to each other and against a backdrop linking them to a total culture and its aspects. In this way, anthropological thought was reflected in actual physical arrangement of materials, with displays reflecting process. For example, Mauss (1947) stated that anthropological museums are the material archives of the investigated societies. Boas also influenced museologists with his theory of cultural development based on trait distribution and cultural diffusion. Because of Boasian theory, museologists of the time arranged displays to reflect similarities between certain cultures as they arise from borrowing (Herskovits, 1953). Frese points out that museums other than anthropology museums seem to reflect the general theoretical concerns of their

field--period rooms in history and art museums, and habitat groups in museums of natural history. He concludes that "in museology . . . as in anthropology, a functionalist trend is observable" (1960, p. 67).

The changed outlook of social sciences has implied a reconsideration of its constituent parts. In the museum this concept was directed toward the artifacts, constituent part of the museum society.

As the field of anthropology grew, it increased in diversity. Frese notes how anthropology and education have "fertilized museum anthropology with the newer and wider insights" (1960, p. 69). But museums have lagged behind cultural anthropology in the United States (Frese, 1960). Levi-Strauss (1954) suggests that this condition exists in the museum field because of the changed significance of artifacts and technology in the study of non-western cultures. Objects tend to be less an indicator of cultural differences than they were previously thought to be. When this factor is added to the inadequacy of many museums to handle their public from an educational standpoint (Belmont Report, 1968), a need becomes evident for a more workable system. An examination of a museum can provide new ways of handling all the sources which are a force in anthropology today in order to build a model applicable to the museum.

Only in the last twenty years has attention been paid to museum audiences as well as to the nature of the museum display and its content as an interacting system. McLuhan, Carpenter, and Parker were early media specialists concerned with museums as systems (McLuhan and Parker, 1968). Actual research about museums has been primarily presented in

dissertations concerned with museum surveys (Nicholson, 1962; Naeseth, 1963; Marantz, 1962). Little work has been done in the area of proxemics or kinesics--work which is basic to the understanding of the museum audiences. Research about spatial effects in museums could lead to a better understanding of the museum population and how it interacts within spatial distributions.

It is the purpose of this dissertation to build a model which later may be applied to the study of spatial distributions. It is expected that a better organized human environment in terms of space will be the result of this model. In turn, once the aspects of people and objects are more fully understood, education in the museum can be more fully implemented.

The method of structuralism will be applied to different sources in order to bring them together in a holistic manner. From the underlying structures that can be determined to be operating in the museum, components can be listed and built into a model concerned with space which will allow for better education.

CHAPTER II

REVIEW OF THE LITERATURE

Introduction

This chapter deals with a review of the literature used in this dissertation. The first section includes books and articles about museums, museum history, educational programs, and philosophy in the museum. These are treated briefly, since the sources were cited mainly as historical references in Chapter I. More importantly, the chapter also contains a discussion of the contributions of a number of writers in the social sciences whose work has relevance for this dissertation. These writers are classified in four broad categories: Environmentalists, Interactionists, Perceptualists, and Structuralists. Each category is discussed in order to demonstrate its contribution to the building of a model of museum space.

Museum Literature

Only a limited number of materials exist on the subject of museums in general, and hardly any are of a research nature (Belmont Report, 1968; Low, 1942; Ripley, 1969; Wittlin, 1970). Naumer (1970) and Love (1970) have written about programs which exist for teachers, while de Borhegyi (1963) has written on the importance of setting and Cameron (1968) on the museum as a communication system. Two early works by Robinson(1928) and Porter (1938) researched such factors as fatigue, time per visit, and time per display. A number of authors

(Adams, 1937, 1939; Cameron, 1970; Karas, 1970; Bremer, 1970; Bazin, 1968; Dixon, 1970; Lamson, 1970; and Globus, 1970) have made contributions in the areas of the history and educational philosophy of museums.

Bastian (1881), Durkheim (1895), Boas (1896), Lowie (1941), and Graebner and Foy (Frese, 1960) are anthropologists who were prominent in museums and who influenced early museum displays. Mauss (1947), Levi-Strauss (1950, 1954), and Kroeber (1954) also influenced museums via anthropology, while McLuhan and Parker (1968) have made contributions in relation to the museum as a medium of cultural expression.

The Environmentalists

The largest group of contributing writers are classed as environmentalists. These writers range across many fields, but their common reference point is environment as the stimulus of culture. These authors believe that environment stimulates or sets a condition for a response to it. This response is seen in the form of social structure. In turn, all elements of that social structure reflect the response to a particular kind of environment (Herskovits, 1945). This is an oversimplified view, however, for most of the environmentalists (also called materialists) believe the environment-culture phenomenon to be a feedback system or an equilibrium loop (Binford, 1969, personal communication; Sahlins and Service, 1960; Birdsell, 1959; Linton, 1955). Similarly, anthropologist William Laughlin (1963) refers to it as a "bio-behavioral system."

The researcher of such a system most often uses some kind of structuralism in order to determine the various contributing factors

within the system (Scheffler, 1966). Structuralism does not consist of different schools, or even of recognizable factions. Structuralism does attempt to analyze systems holistically by identifying underlying elements and structures. However, there are different points of view which revolve around theory and method (Redfield, 1942). These points of view are shown in the following sections in order to explain how portions of various theories may prove valuable in the construction of a model.

Authors often contrast cultural systems comparatively in order to determine or illuminate environmental and socio-cultural conditions (Sahlins, 1958). Some authors, such as Mead, are not primarily known as environmentalists. However, her studies, Children and Ritual in Bali (1925), for example, gave inspiration to anthropologists-- Birdwhistell for one, who attributed much of his interest in culturally acquired forms of behavior to the work of Mead and others. Although many of these anthropologists were, and still are, considered "culture and personality men," their approach and underlying philosophy is that environment structures social response, and that form follows function. They use the idea of territoriality (Altman and Haythorn, 1969). In this respect, these studies are comparable to those of sociologist Robert Sommer, whose spatial theories are also of a functionalist nature. In Personal Space (1969), Sommer discusses the human use of human space in various institutional settings--schools, mental institutions, and bars. He concentrates on form following function, and on how one may discover function in order to plan for the better

use of space and form for human beings. He also discusses the effects of physical setting on behavior and attitudes. McLuhan and Carpenter are functionalists of the same school, as are Buckminster Fuller and Edmund Hall. Each of these writers are concerned with total space and are interested in total environments. As functionalists, all of those mentioned above are also structuralists. It should be noted here that all anthropologists are not environmentalists and all social scientists are not structuralists. For the most part, the work of writers used in this dissertation share the characteristics discussed in the above section.

While most of the environmental studies are not applicable to the study of space in the museum, they provide sound models for comparison of structural similarities which can be modified in the construction of an overall model. Many environmental studies offer insights into spatial boundaries of the museum.

The most important space in the museum involves process and not categories. The process occurs between people and spatial elements. Since the museum is a microculture, the study of microethnology with appropriate field methods will be used in comparing the people, persons in binary opposition according to roles, and the use of spatial boundaries. Boundaries may include meeting places, play forms, and manners. Play forms are invaluable references to the study of space in the museum, but can be found in other sources as well as anthropology (Friedberg and Berkeley, 1970; Flynn and Segil, 1970). Play forms are useful in studying the types of model programs that may be set up

in the museum, as well as in analyzing the kinds of space that both children and adults need.

The Perceptualists

Writers such as Allport and Kilpatrick are difficult to classify for the purposes of this dissertation. However, it will suffice to say that they occupied both categories of perception and interaction. Kilpatrick's The Problems of Perception in Extreme Situations (1947) is useful because it suggests how visitors in the museum may react to cues which have no immediate meaning or relevancy. Equally useful is Allport's idea of personality as an open system (Allport, 1960). Anthropologist Hudson (1960) studies how perception affects interaction. Fantini and Weinstein (1968) report on the perception of disadvantaged groups. Other perceptualist writers such as Solley and Murphy (1960) deal with the perceptual development of children. They offer insights into how to construct a museum model based on what children perceive. They also propose a basis for what to examine when one is observing spatial behavior in the museum.

Among the perceptualists are included writers who deal with proxemics and kinetics. Birdwhistell (1952) and Hall (1956, 1963) are major contributors, known for their work in body movement and spatial analysis. Perceptualism can exist in fields other than psychology; e.g., Peter Brook's idea of empty space theater, in which he sees the theater as a space where people gradually develop and evolve revelations (Mademoiselle, 1970). In some ways, museums are like theaters; they have, for instance, high ceilings, lighting, drama, speakers, and separation of displays and visitors.

Other sources are non-literary. Benno Friedman's Beings Without Clothes (Mademoiselle, 1970) is a show which examines the nature of shadows as guides to perception. He suggests that there are many planes to reality and that we may perceive another dimension in addition to this one, if only for a moment. Such ideas are basic to the examination of the museum world in terms of the social sciences literature because it provides a basis for creating a museum model. Social science offers some perspectives for viewing a museum, since it is a world of people as well as a perceptual experience in its own right. McLuhan is an important source for seeing the museum in terms of his "medium is the message" concept (1964, 1969). Buckminster Fuller (1963, 1969) is equally valuable in the treatment of physical space. He deals with the space of architectural structures, as does Rowland (1965). Hall is more useful for the treatment of human space in the museum, especially in understanding the culturally bound nature of that space. Ruesch (1956) deals with ways to understand and classify non-verbal communication, and his work is useful for treating space in the museum.

The Interactionists

The interactionists are another of the major groups in this review. Their focus is the stimulus-response action between two or more people, with three being the usual number for minimum interaction (Goffman, 1965). The prominent interactionists are Berne (1964), Allport and Postman (1947), Goffman (1959, 1965), Shibutani (1965), and Smelser (1962). These writers, often students of collective behavior, differ from the environmentalists in approach and often do not

consider as many elements as the former would, since their focus is on group activity. Often they neglect some causal factors in the group activity, such as environment, cultural background, and varied individual interests. They are more concerned, therefore, with observing actions and interpreting them than with determining underlying structures as the environmentalists do.

Other interactionists, such as George Simmel (1950), study the group but stress individuality over the mass. Some theorists, such as Turner, explain the kinds of collective behavior that occur. It is important to note that collective behavior refers to a kind of behavior which is normally uninstitutionalized * mobilization for action (Smelser, 1962).

From observation of such groups over a three-year period, the writer noted that museum visitors from a specific group give evidence of collective behavior which is distinct from the directives which may be given by a museum guide or other persons. However, here the distinction is the way the group reacts as a group against the institutionalized forces of the museum, and how it may react in spite of these forces. For these reasons, the group of authors classified as interactionists can contribute to the understanding of group behavior and interaction in the museum.

*A museum group normally would not constitute an uninstitutionalized group which could or might mobilize, since a museum is an institutionalized setting. This occurs because groups are often guided, and their behavior is seemingly formal and could not give rise to group movements.

The Structuralists

This section deals with writers who employ the structuralist method. Michael Lane's Introduction to Structuralism is a main source, as is Jean Piaget's Structuralism. Piaget is valuable for his earlier structuralist studies of cognition, perception, and child development (1969). Many of his ideas, especially developmental psychology, are helpful for the construction of a museum model, since it is partially concerned with children and education. He provides a basis for observing such groups in the museum and for noting landmarks of cognitive development. Gearing programs to appropriate ages is directly applicable from his works. Leach is another useful source for applying structuralist methodology to the museum environment (1961a, 1961b, 1954), as are E. Z. Vogt (1965) and Levi-Strauss (1962, 1967).

Structuralists are found in many disciplines, and their application is not immediately discernable for the museum. The explanation of what structuralism is about and the various controversies in the literature regarding it are included here to show what kind of structuralism will be used in the model building. The founder of structuralism is often regarded as Saussure (1922). Other structuralists include Vygotski (1962) and Needham (1962).

Needham is an important figure in structuralism in that he attempted to explain and champion one of structuralism's principle figures, Levi-Strauss. Levi-Strauss did not, however, agree with Needham's explanations of his writings. The incidents and debates (Homans and Schneider, 1955) are key events in structuralism because of the amount of activity caused in the literature for several years.

Structuralism split into two basic camps: those who explained it as a theoretical perspective (Leach) and those who explained it as a permanent reality (Levi-Strauss). Goddard (1965) follows these two concepts of structure and presents the debate. He sees Levi-Strauss as deriving his kind of structuralism directly from a rationalistic-humanistic tradition of Durkheim and Mauss (1903; Needham translation, 1963) and Marx. This kind of structuralism represents a pre-determined reality and a critique of that reality. Leach (1954), however, sees a social structure as a device which does not exist outside the scientist's mind, but as a model which is hypothetical and describes how the system works. He does not differentiate between a model and theory. It is as though he were saying that to describe a model of structure is to offer a structural theory of how a society operates (Goddard, 1965).

Goddard believes a model can also be a theory if the theory can be represented in model terms in the shape of a diagram. The diagram could be a one-to-one representation of museum processes and cycles. In this view, a model is constructed to classify a theory or certain features of it. In Scientific Explanations, Braithwaite (1963), suggests the only legitimate function of models is to facilitate theory. Levi-Strauss does not use the term "model" in this sense. His structure is conceptually abstract and articulated in a formal model which he believes is not abstract. Levi-Strauss considers a model to be a true description of a society's structure since it reflects the true nature of the society under consideration.

The British social anthropologists, with the exception of Leach, do not regard social structure as a model of any sort. Structure to

them is only inferred from facts under investigation, or inferred from facts, and is not some unconscious infrastructure underlying them (Evans-Pritchard, Radcliffe-Brown). However, as Goddard (1965) points out, none of this group clearly shows to what extent Levi-Strauss is different from them, nor do they discuss the nature of the difference. Basically their work revolves around the structural descriptions of a particular society. It is the conception of social reality which most distinguishes the British social anthropologists. Levi-Strauss is engaged with a structural code which exists beneath social relations and organizes them, while the British, particularly Fortes, are interested in a set of social relations which can be abstracted from empirical reality (Fortes, 1949). In brief, the British and Levi-Strauss are probably differentiated in expression, though in fact both are dealing with a structure which is derived from the workings of a society, a common reference point for both schools.

What causes the structure to happen in the particular way that it does is not necessarily or directly a function of the relationships or systematic events that occur. Structure may be seen as an abstraction drawn from concrete observable relationships. It is the analysis of a system which involves the production of a model reflective of the structural interrelationships of the system. Basically, this is the kind of structuralism that will be dealt with in this dissertation. The former theories are identifiable in the literature as structuralist by such phrases as "structure characteristic of species" or "representative sample leading to a certain form of structure" (Radcliffe-Brown, 1953).

Typological classification may be the method and/or the outcome, as in the case of the British, while the purposes of this dissertation are based on the total possible structures.

As Levi-Strauss says, "Classification has a value of its own, whatever form the classification may take" (1962). Taxonomy is basically linear and diachronic, while structuralism is circular and synchronic. All theoretical science is ordering, and if systematics is equated with ordering, then systematics is synonymous with theoretical science (Simpson, 1961). For Levi-Strauss and Leach, "structure is an explanatory concept meant to provide the key to the observed facts of social existence, the logic behind the social reality" (Goddard, 1965). However, Nadel (1965, pp. 150-151) considers structure analysis "to be more than descriptive method, not an explanation." For the purposes of constructing a model, this kind of structuralism is not limited. Therefore, building a museum model does not call for an explanation of causal relationships, but a model should note in the construction process relationships which are more critical than others to the existence of a good model museum plan.

Nadel (1956) and Goddard (1965) both deal with the problem of models being isomorphic with the structures they represent, and with models and structures being circular within each other. By definition, models of hidden realities cannot be checked. Thus, though an "unconscious structure" [not ordinarily observable (Levi-Strauss, 1954)] may be involved, an unconscious model will not.

A key to following the dissertation is realizing that it employs the model building of structuralists and the structure discovery of the

semiologists. Semiology is the projection of linguistic knowledge onto verbal systems of knowledge. In many ways it resembles structuralism, which is the reason for clarification at this point. Semiology uses Saussure's ideas of linguistics as structuralists, who believe an element gives meaning or quality only by contrast with another, would in structuralism be referred to as "binary opposition of elements." Levi-Strauss has done this in Le Cru et le Cuit. Semiology and structuralism both aim at discovering patterns, and what they communicate in a structure is not always evident to the members of a culture. This "unearthing" of an underlying structure inherently involves the classification of the metalanguage, or deep structure language (Chomsky, 1957, 1968b). However, a semiologist would typically be involved in contrastive features, while a structuralist would be involved in generative or transformational features.

Alexander, Duffy, and Freedman are concerned with the recognition of patterns in order to solve conflicts of choice in spatial design or use (White, Design and Environment, 1970, p. 50). It is in this realm that the anthropologist Hall has worked, since he sees architectural forms as a sub-language. It is the nature of the sub-language of space we are trying to determine in the museum, using space as a form in itself. To give a quick example of the elusiveness of where space lies, ends, and begins, observe the following (Merleau-Ponty, 1964):

A-B C-D E-F G-H I-J

Is the space between A and B or C and D, or is it actually between B and

C or D and E or F and G? If A and B are the set, and not B and C, where are the boundaries? Except for cultural conditioning of perceptions, only A and B and C and D appear as sets, although any combination could be a set. The set determines the space. For these purposes, setting up arbitrary models or sets in the museum will allow us to examine space and its boundaries through the binary opposition of structuralism. The differentiation of space must be determined before a model of how to use the "sets" better can be planned. "The existence of differentiating features," says Levi-Strauss in La Pensée Sauvage (p. 75), "are of much greater importance than their content." Once in evidence, they form a system like a grid which can be applied to decipher a text. Then divisions and contrasts can be introduced.

It is important to note at this point, that the categories of environmentalism, perceptualism, and interaction are not sufficient for a causal explanation of structuralism in the museum. They are used for the purposes of constructing a model with the least number of broad categories necessary. For this reason, many of the principles of general systems theory will be used in constructing a model from the structural elements treated in the three categories mentioned above. Bertalanffy in General Systems Theory (1968) and Weiner in Cybernetics (1968) will be used as sources for this. In addition, other writers on general systems theory will be included, although some fall under one of the other categories in this review. These are Cantril (1962), a perceptualist; Geertz (1962), an anthropologist and environmentalist; Allport, a perceptualist; and Watts (1966), a philosopher. General

systems theory, gestalt theory, and structuralism have a holistic attitude in common, which is the reason for incorporating them in this study at the model building stage.

In addition, a number of mathematical and design sources were included in constructing the final model. These are Flament (1963), Cartwright and Harary (1958), Lazarsfeld and Henry (1968), and Davis (1963).

This chapter contains a review of the literature pertinent to the dissertation and construction of a museum model. It reviews the literature dealing with the cycles operating in the museum--perceptual factors, interactive factors, and environmental factors.

CHAPTER III

ORGANIZATION AND METHODOLOGY OF THE STUDY

Organization of the Study

This dissertation is an attempt to investigate the nature of space in the museum and the effects of space and spatial boundaries in museums through the use of the structuralist method. One result of this investigation is a model constructed to utilize space more fully for better education. The museum, the main field of investigation, will be viewed as an environment containing two basic categories--people and objects. Because the museum is an environment, it may be treated as a territory. For this reason, the concept of territoriality will be basic to the study of space.

The review of the literature discussed four schools of thought which have relevance for applicability of space to museums, and this review of the literature was divided into four sections. These four areas represent the divisions of the study.

Environmentalism is used in understanding how the museum functions as an environmental system. Because the museum is viewed in this way, two components of that environment, people and objects, require extensive examination and will be studied under the headings interaction and perception.

The second section of the review of the literature, the area of perception, is used to understand what kinds of affective and sensory elements are operating in the museum. These perceptual categories will

be lighting, color, size, form, texture, temperature of the artifacts, displays, rooms, and overall structure of the building.

The third section of the review of the literature, the area of interactionism, is used to aid in the understanding of how people in the museum interact in space. Just as the perceptualists help us to identify what kinds of stimuli are operating in the museum, the interactionists help us to understand what kinds of interactions are taking place between different groups of people in the museum. Some of the relevant dimensions include comparative categories of "sets," such as museum personnel and guided visitors, guided visitors and unguided visitors, peripheral personnel and educational personnel.

The fourth category of the review of the literature, the area of structuralism, is used to aid in identifying the elements in the museum and how these elements function alone and together in cycles. The method of structuralism unites elements and builds a model for an understanding of space, which results in better education.

There are three basic ideas employed in building a model in this dissertation. They involve the museum as an environment, the museum as a sensory-perceptual experience, and the museum as a place of interaction between individuals and groups. These three ideas are to be examined in terms of the literature on these subjects in order to decide what important elements are at work in the museum.

The museum as an environment involves the following ideas: the museum as microworld, territoriality, social structure and feedback, and homeostasis in order to examine the operation of space in the museum environment.

The museum as a sensory perceptual world discusses perceptual factors in the museum, space perception, sensation, discrimination, and minimal-maximal cueing. Such perceptual factors as the luminous, sonic, and thermal environments enable us to examine how space and perception are operating in the museum.

Interaction in the museum deals with interactions between guide and visitors, non-guided visitors and personnel, educational personnel and other personnel, and guided visitors and personnel in terms of space in the museum. Each of the elements within the three broad categories will be examined, using structuralist methodology to explain how all the elements in the three categories work together. Once the underlying elements have been identified, a model may be constructed using them. The process involves the identification of a series of contrastive features or comparative sets, and the examination of them in opposition to each other (Piaget, 1970). In using structuralism, differences are isolated in order to build on similarities. Elements are identified and synthesized in the building of a total model and will be examined in terms of space. Each set of elements will form a cycle, which collectively will be used to build the model designed for better education in the museum.

Bertalanffy (1968) feels that the structure of logic is comparable to the structure of the central nervous system. He sees it as a digital computer with basically yes-no answers which correspond to Boolean algebra. He also says that thought processes occur in terms of opposites, and that this is one basis for structuralism. However, he

observes that most of the theoretical concepts, including the ones used here, i.e., environmentalism, homeostasis, and perceptual processes, lack something in explanation, and that in many ways, they are one-sided in that they account for maintenance but not for dysfunction or disequilibrium. They are also non-spontaneous, non-creative, and non-holistic in that they reduce man to a "bundle of nerve endings." Cantril (1962), Bertalanffy (1968), and others agree that perception is a product of man, that man creates his environment and is not simply a passive receiver of stimuli.

This dissertation proposes to use general systems theory in order to explain the discrepancies which each of the concepts used in the dissertation may present. Bertalanffy and general systems theorists consider man himself as the creative factor in the life process. Man is independent, according to systems theory, because he is irreducible: man can be further broken down into parts, but none of the parts is man. The theory of environmentalism may be broken down in various ways, but the idea of environment is still the basic feature. General systems theory shows how seemingly disjointed cycles or elements can be balanced in a final model.

Contrasting each of the composite elements and cycles, three categories emerge: environmentalism, interactionism, perceptualism. This dissertation will account for a total and holistic system in terms of general systems theory, observing the rules of structuralism by contrasting opposites, such as holistic against non-holistic, objects against people, and non-creative concepts against creativity. By

contrasting the findings with man, a kind of model which is people oriented--and thus a museum which is "living" will be created. The possibility for better use of space for people is the result. This can be accomplished by contrasting human categories with physical, non-human elements such as education. Both can reverse in this system. This writer suggests that the museum operates in a gestalt sense in the final model. Structuralism will be used to separate the elements for examination, and general systems theory to put those elements back into a whole for our model. As Bertalanffy (1968, p. 200) says, "Conceptual models which in simplified and therefore comprehensible form try to represent reality are basic in any attempt at theory." As the cultural universe is a symbolic universe, this dissertation will identify which symbols are important in building a museum model by examining those elements in space.

Information Retrieval and Research Methodology

The ideas for the sets of elements, or contrastive features, are drawn from several sources. These are the concept of the museum as an environment, the concept of the museum as a sensory-perceptual world, and the concept of the museum as an interactive process. Structuralism, and, to a lesser extent, general systems theory, will be used to synthesize the conclusions from these sets into a model. The major function of this dissertation is one of constructing a workable model which may be applied by those in the museum or education field, but which may be used by other similar institutions.

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Categories and set sources include the literature, observations from fellow and peripheral workers over a three-year period (1968-1971), and observations about exhibits.

In addition, the participant-observer method was used over a three-year period. These categories involve the following conditions. The observations from fellow workers were of a random nature, and it is the writer who noted specific patterns or consistencies in these observations. Although some observations were based on verbalization that was random, others occurred at weekly meetings over a three-year period. These meetings were on the order of in-service education, and staff meetings were designed to identify any problems or positive occurrences during that week. Other observations were from a signed diary kept by all guides on the education staff of the museum with dates of the given tours. The guides were instructed to record whatever observations they thought important, interesting, or humorous, and to write any problems in the diary. Thus the author was able to find data and patterns which were emergent rather than predesignated. Visitors also recorded observations in a questionnaire sent out after each tour. The observations about special shows and/or effects involve patterns of reactions from visitors and staff. All of the above reactions were solicited at least once a week over a three-year period. Techniques of participant-observer methodology were used over this three-year period.

Through the three sources, structuralist categories may be identified and checked in opposition to another for data control. Each item

thereby checks against another and each checks in at least two categories for validity, stability, and consistency. The latter checks will be non-statistical. This consistency is part of the structuralist method (Lane, 1970), although it is also a part of general field techniques in participant observation (McCall-Simmons, 1969). Each set is to be a part of a continuous series, which leads to discovery of underlying structure in the museum, and thereby permits model construction.

CHAPTER IV

SPATIAL ELEMENTS IN THE MUSEUM

Introduction

A museum, especially an anthropology museum, may represent cultures from all over the world. It depicts man, his various environments, and the objects belonging to his material culture. But more importantly for our purposes, a museum is a world within itself--a microworld where its action parallels the systems and structures it displays. A museum may be viewed as a place with its own boundaries, rules, and actions within space. It contains people and objects. As a separate realm or entity, a museum is an environment, perhaps a limited one, but an environment nonetheless. Because a museum is seen as an environment, one may properly conceive of it as a system in which the applications of ethnology on a small scale may be applied. Thus a study of its inhabitants and its material objects are proper to the study of the museum as a spatial environment.

In order to study the museum as an environment it is necessary to elaborate on its elements. To build a model, it will be necessary to examine the relationship of these elements to each other within the total system in order to postulate the basic structures. Structuralism is the method that is used here to examine the museum as an environment in a way analogous to the way in which an anthropologist would examine a culture to discover or elaborate its componential features to

arrive at a description and analysis of the whole. As Scheffler (1966, p. 76) says, such structural ethnographers look for the distinctive features from which they "construct a model of an entire conceptual domain, an indigenous model." The above descriptive features leading to model building are noted as adequate when "it enables him [the anthropologist] to specify the conditions under which particular labeling responses would be judged appropriate by his informants" (Scheffler, 1966, p. 76). In order to elaborate these elements, the use of techniques of microethnology are appropriate.

A museum can then be defined for our purposes as a micro-culture with people and objects operating in certain manners through space. The understanding of these forms and the nature of the space, and of reaction and interaction of forms in space will aid in a better use of that space.

Our primary concern in this section is to explore the museum as a systematic environmental world and to describe the kinds of conditions that exist in the museum so that a basis will be laid when the inhabitants and artifacts of that environment are later discussed.

A museum does not have a natural environment, and so, in many ways, our discussion of it in that sense is somewhat limited. But it is a created environment since it is man made. If all cycles in the museum are equal, then structural balance may be said to be operating. From this standpoint it becomes necessary to understand what kinds of cycles do exist within the museum environment in order to study the balance and stress within the system.

Museum Territoriality

The inhabitants of an environment soon come to view certain spaces in that environment as theirs. This concept can be either an individual or a group phenomenon. Ethnologists have recognized this in animal behavior where the idea of territoriality arose from an animal's protectiveness primarily of his hunting territory, his specific ecological niche. Early hunting societies of humans also displayed this kind of behavior (Laughlin, 1963), and modern hunting societies still do. In recent years it has been noted that the concept of territoriality is closely allied with the concept of dominance (Sommer, 1969, p. 12), in that the possession of territory creates a position of dominance in the owner if he is threatened by another for possession of that territory. On a more individual basis, humans possess an individual territoriality which Hall (1965) refers to as space bubbles and Sommer (1969, p. 26) as personal space. Personal space refers to an area with invisible boundaries surrounding a person's body into which intruders may not come (Sommer, 1969, p. 26). Although Sommer uses this concept on a broader range, both he and Hall are dealing with man's concern to possess and protect a spatial boundary around himself. This phenomenon may be the result of increased population pressures and an expanded technology in which communication between individuals lessens and communication between groups increases, causing people to attempt to hold their personal space bubbles intact from increasing pressures. Sommer (1969, p. 12) notes that animals given the wrong kind of space will develop diseases and antisocial behavior. This observation is not new, but its application to group

behavior is recent. If this is as valid as Sommer believes, space must play an important role in education. The concept of territoriality in the museum must be examined for the better use of space for improved education. Spatial studies indicate, for example, that people stay a certain distance from each other in loose crowds, characterized by a distance of six to eight feet. In heavy crowds this distance is ten square feet per person (Sommer, 1969, p. 27). If personal space can affect the distribution of persons, it can be an important factor for analyzing group and individual behavior in the museum and the positions and distances of persons interacting with museum visitors.

Since we are to view a museum as territory, it follows that the people who inhabit that space for whatever period of time develop attitudes of ownership towards it, even if temporarily. Certainly many of the staff members refer to cases and displays they construct as "my case," and they display protective attitudes about it should revision or a new case supplant it. Members of the various divisions of a museum develop attitudes of ownership about the objects and people within their special realm. For example, the education staff would view visitors as "my people." Members of another division, on seeing a group of visitors enter, would often remark, "your people are here." Such attitudes do not seem to be engendered out of a lack of responsibility or disinterest on the part of non-members of the group in question, but seem to arise out of a mutual respect and recognition for "property" or territorial rights. Whether it is natural or not to establish territoriality at all, let alone in an institution which is public

like a museum, is a moot point. The aim of this dissertation is to discover whether or not this aids or disrupts structural balance. By examining territoriality as a "set," we can suggest logical criteria for building a model, which might not occur if this were examined from a value-laden standpoint. As Leach (1961a, p. 2) states, one can embark on a generalization with a hope of arriving at a satisfying conclusion "by thinking of the organizational ideas that are present in any society as constituting a mathematical pattern."

The explanation of territoriality in the museum seems to offer a clue as to how to overcome it and what kinds of specific problems ensue. Victor Hugo, quoted by Sommer, observes, "Every man a property owner, no one a master," and Sommer notes that "when everyone possesses an individual territory, the reasons for one man to dominate another disappear" (Sommer, 1969, p. 12). The key words here are "individual" and "dominate." If by "individual," Hugo refers to a more generalized geographical region, as this section does, and if by "dominate" he means some kind of behavior designed to displace one in space, or to acquire the other's territory, then this writer agrees.

One of the key space problems within the education division of the museum which this author directed for three years was a lack of work space for all workers, but especially for the educational division. Because space was at a premium (every man not a "property owner"), spatial boundaries formalized to the extent that unwritten conditions about use and time of use arose. Museum workers with supposed higher rank were given their choice of seating, while those members who were

classified as unpaid volunteer workers would often stand or offer their seats to the more permanent members. This might be due in part to the fact that the museum is a hierarchical system, just as many status organizations are. But more importantly, each person staked out his territory by displaying objects of his own such as vases, pictures, cartoons, etc. These signs were, of course, noticed by the other members, and served as extensions of the persons when they were or were not there. The permanent staff of the education division spent more time at the office than the volunteer workers and tended to make the space theirs by placing these articles around. While the process was probably unconscious, it does show that people in museums, as people elsewhere, tend to make attempts to possess and protect a territory, if only symbolically. These signs are read by the different people within a museum. Body actions also display a tendency towards territoriality. For example, if certain members continually occupy the same desk or chair, others come to regard that spot as theirs. Often this writer would walk in and someone would say, "Oh, here, let me get out of your chair,"--or desk, as the case may have been. The writer would also exhibit this unconscious behavior by offering to get up from her co-worker's desk. Members on duty seemed to display more territoriality towards their desks and chairs, even if the objects were not actually in use. Similarly, members who were off-duty and had just dropped in, seemed eager to relinquish their seats to on-duty workers. This fact might explain why feelings of possessiveness were shown over one's displays or charges (people included), as might be the case.

As Linton (1955, p. 41) remarked, "All cultures, even the simplest, seem to be in a continuous state of change." A museum program can be seen at once to be in a state of change, especially if it deals with people from an educational standpoint where improvement is inherently sought in the quality of its programs. On the other hand, because a museum is devoted to preserving artifacts and records, part of its philosophy is conservative and therefore protective of drastic changes which might alter the status quo. (Wittlin, 1970).

As Herskovits (1945, p. 143) writes:

A society may never be so small, never so isolated; its technological equipment may be of the simplest, its devotion to its own way of life expressed in extreme conservatism; yet changes constantly take place as generation succeeds generation, and new ideas, new alignments, new techniques come into the thinking of its members. For no living culture is static.

Attitudes towards property will be explained using the concept of homeostasis in the next section, but here the concept of territoriality is also at work in the museum. Because structuralism and general systems theory is used to explain how the museum does operate in space, it will often seem that more than one theory or explanation is operating. In fact, that is the case. The idea of territoriality in the museum demonstrates that space can be explained by many concepts. Initially all concepts bear equal weight, but as the study progresses structuralism will emerge as the most cohesive and important method and theory.

It is important to remember that the objective is not to quantify or weigh elements or explanations, but to state what operations are at

work in the museum. In this case, territoriality is seen to work in two opposing directions: first, as an effort to preserve one's space and the things in that space, and second, as a disequilibrium not promoting change, since the balance and non-staticity of the museum, as of any institution, depend on the museum as a territory achieving its primary ends. The primary end of a museum, whether it be to preserve and display artifacts or to instruct people who visit that museum, is one of a public direction. If the people working within the museum display territoriality to any degree, one can say that the primary function and direction of a museum is being thrown out of balance, since this territoriality is structurally opposed to the public aims of that museum. Other factors balance out this territoriality in the workers, but on this level alone, it would misdirect the cyclical balance of the museum environment.

Territoriality in the museum is of two basic kinds: the personal (Sommer, 1969) space which is natural to human beings and would be found outside as well as inside the museum, and the staking out of a geographical region and/or the occupants, objects and space of the museum itself. This category is operant only within the museum. It is the second definition that is of concern in this section of the dissertation. The first category, the personal space of the museum worker, will be treated under the sixth section, which is concerned with interaction in the museum because personal space is affective only when it causes or facilitates communication during interaction. The space bubble that Hall (1965) deals with is not relevant until it can become a problem.

This occurs at the time of interaction. The second kind of territoriality described above can cause serious problems in interaction, but in this section it is important to establish how this kind of territoriality is disruptive of structural balance. The evidence would seem to indicate that territoriality in the museum may be a learned reflex based on the previous experience and kinds of physical use of space between workers. While territoriality in the museum seems to be influenced by a social hierarchy, it seems more important that the critical factor is one of how much and what kinds of contact prevail among workers within the various divisions and among the divisions themselves.

Sommer (1969, p. 13) notes that territoriality and the dominant behavior connected with it "are ways of maintaining a social order, and when one system cannot function, the other takes over." He adds that when two dominant people are placed together in a situation, no stable order may be found, and so aggression is limited by strict adherence to territoriality. Sommer defines territoriality as a person's particular use of certain benches, chairs, beds, etc. This definition coincides with the one used here. The idea, however, of two dominant people limiting aggression by staking out places and adhering to them only partially applies in the case of the museum. Part of this is caused by the process of interaction in which people may be unconsciously adapting to each other's body in space. An example might be that of two viewers of a display, one of them unconsciously standing too close to the other's space and consequently dominating that space. . . . Body odor, sneezing, prejudice, and other non-verbal actions are some of the conditions which could "force" a person to move. Women are

probably familiar with the technique of getting someone to move by standing too close, as one may do by looking over a person's shoulder in order to get at a rack of clothes in a store. These are examples of dominant persons who might be described as displacing others in space, thus acquiring the others' territory. These persons do not, in fact, limit their "aggressions by strict adherence to their territory," as Sommer noted (p. 14).

Territoriality in the museum operates for staff members on a similar, but slightly different, level than it does for visitors to the museum. Museum staff members tend to view the whole museum as their territory, although the various divisions view their own space as more theirs than belonging to other divisions. Because of this members actually possess more space in the museum than does the visitor in the range of physical freedom. This freedom is based on a conception of the museum as a known or familiar territory. As was previously discussed, members of the staff who actually build displays exhibit feelings of ownership towards their ideas and models, and thus feel more familiar with these categories than the visitor would. So, while a visitor might stand so many feet back from a display and hesitantly touch it, a staff member, especially one who executes the displays, will probably stand as close to it as possible, touch it, handle the objects, even step into it, if that is possible. However, territoriality is a transitive quality which can be transferred visually from one person to another. If one visitor touches an artifact, it is more likely that other will touch it if they see the first person do so.

Within the context of museum membership, space which is personal is looser than it would be for a visitor, but space which would be classified as territorial as a geographical region is more rigid. Therefore, if one contrasts a visitor to a staff member with respect to general museum space, the staff member has a greater range of freedom. If one contrasts a staff member with another staff member, the range is considerably lessened. The latter category would then be divided into two parts: territoriality among staff members of the same division of the museum, and territoriality between staff members belonging to different divisions of the museum.

Territoriality for members within the same division does seem to fit Altman and Haythorn's (1969) definition that aggression is limited and stability maintained by an adherence, though informally maintained, to the same places, desks, chairs, etc. Thus, because of group aims, solidarity is promoted by the ritualized forms of territoriality. Such territoriality serves to regulate the system and allow for normal functioning. However, in general, territoriality is a non-static reaction in an overall general system of structural balance.

In the second category, members belonging to different divisions of the museum create a disbalance in the overall cycle if territoriality exists, because the isolation and distinctiveness of each group increases as the staking out of each group's territory increases. Other common names for this phenomenon are compartmentalization, segmentation, partitioning, and, in general systems theory, disjunction. Polarity of groups limits communication, and the resultant disbalance would

create a negative cycle. This cycle might balance out later if some other elements in the museum are positive, but there is disagreement over this, and the topic is treated later. Essentially, if a factor promotes polarity in an organization dealing with communication, as a museum does, then the end result is a lack of communication and a division of opinion which would be reflected in the communicative organ-- in this case the museum.

Social Structure in the Museum

This writer views the museum as a kind of environment. Because the environment is essentially a created one, the museum is an adapted environment; that is to say, it allows for continual adjustments in its structures, these being people and objects. Because the museum is an adaptive structure, the people within it constitute the social mechanism of that adaptation. The social structure of the museum contains the elements of that adaptation.

Social structure in the museum refers not only to people but to all elements which are part of the social process. Thus we can properly consider the following to be elements of the social structure: the visitors, the museum personnel, and the material objects that the people use in the "society." Included in the last element would be the displays, the objects they may contain, and the objects used in the activities of the "society." Laughlin (1963) views the environment as directly influencing material culture within a society and the artifacts in turn reshaping the economy of that society. He terms this a bio-behavioral system. In the museum, the artifacts are not only the

conceptual tools used to disseminate information to the public, but they constitute a part of the environment of the museum within the context of the museum as a social structure, a world separate from the outside. The economy of the museum means the social stability and functionalism of the elements of the social structure, the visitors, the staff, and the material objects within the museum space. The stability or homeostasis of the system depends on this cycle being balanced, either within itself or in juxtaposition to the other cycles.

The elements of the cycle of social structure in the museum are opposed to each other. As Fuller (1969) holds, it is tension which creates strength and balance in a structure. The visitors of our society are structurally opposed to or form a contrastive feature with the staff of our museum. Both groups are held together by the material objects of the society, a feature which is contrastive, since it is non-human as our groups are, and at the same time holds these groups together, since material objects are the commonality of the visitors and the museum staff.

The museum staff may be further differentiated into its various divisions, which creates another problem in structural balance. At present, the former cycle will be considered as the primary cycle of social structure in the museum. This is represented in Diagram 1, p. 41. The source of this method is balance theory and is used both to describe and to plot points in a cycle and show whether it is balanced positively or negatively. This model is borrowed from Davis (1963), and

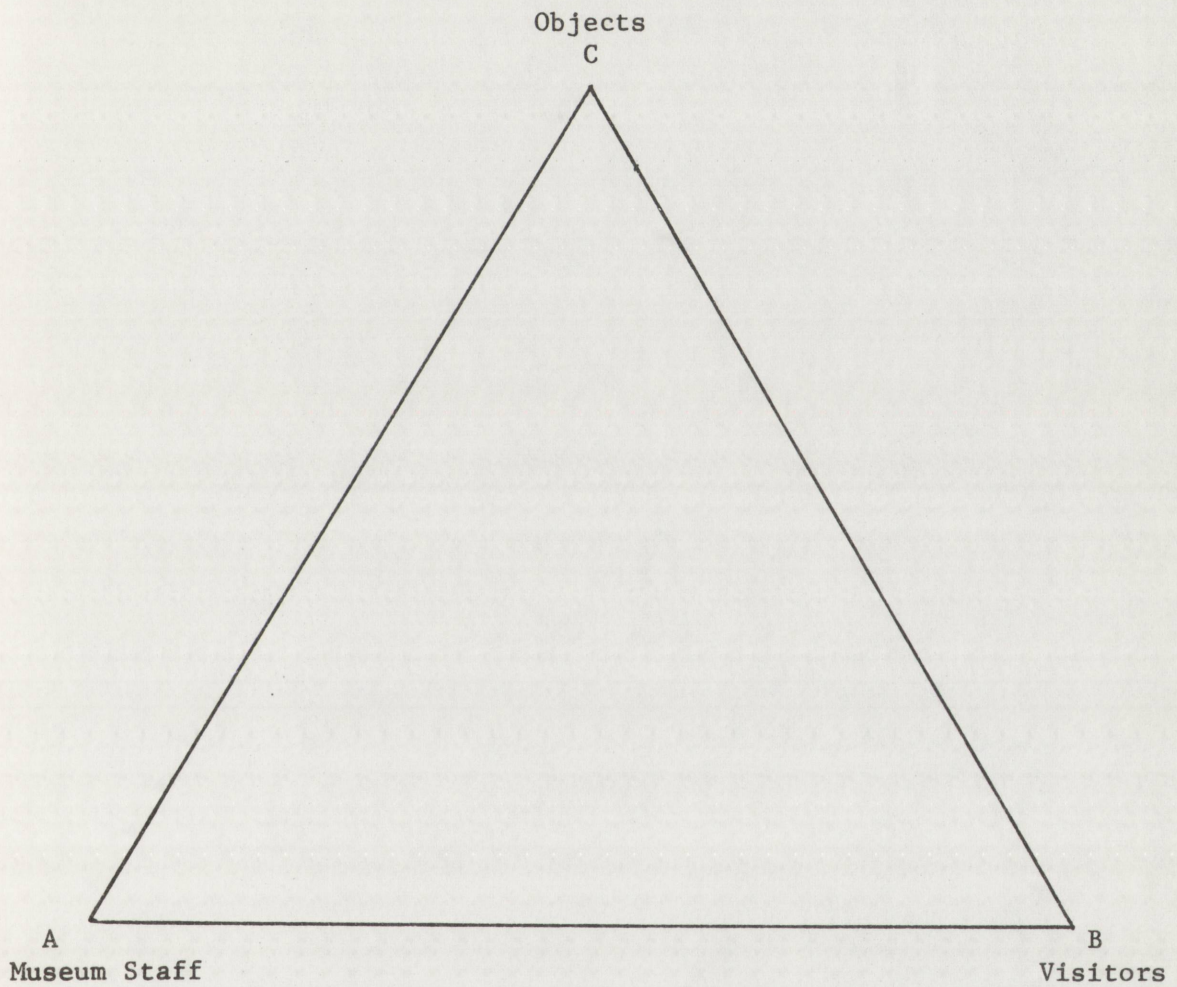


Diagram 1. Primary Cycle of Social Structure in the Museum.

has been called the POX method where P represents person, O represents other (individual), and X may represent a "value, object, or a third individual." For our purposes here, and to clarify the matrix which will be discussed under the chapter on model building, we will refer to POX as ABC with the points ABC being labeled differently for each cycle that we shall discuss. It is important to note here that although balance theory is being used, set theory will be used later to transform the elements and sets into a matrix by which a model can be generated.

By viewing the basic cycle of social structure in the museum, one can see where stress may be created. If the museum staff feels ambiguous about dealing with the artifacts, then the visitors will also feel this ambiguity and react less favorably to displays. Similarly, if the staff does not display behavior which is suitable to the visitors' own standards, then the material objects will not be as effective in the museum.

Just as artifacts in a culture can either aid or depress cultural development and communication, material objects in a museum may either further or hinder communication in the museum "society." And, as objects within a real culture may be utilized more or less depending on the communication between its members, objects in a museum may be utilized less fully than possible if communication and interaction is at its maximum structural balance within each cycle and within the total system.

The cycle model is divided into two diagrams, one showing the points of participants, and the other showing the points of the process.

Diagram 1, p. 41, shows the points of the participants of social structure, while Diagram 2, p. 44, shows the points of process. Aligning these diagrams together gives us the two parts of each cycle and the building block of our entire model of the museum system. As Leach (1961a, p. 2) notes, generalizations can become satisfactory in regard to social structure "by thinking of the organizational ideas that are present in any society as constituting a mathematical pattern." By examining the process cycle of social structure we can see three points: the visitors as members of a society attempting to gain access to the environmental resources, namely the displays, objects, and material objects; the staff member wishing to exhibit or explain those objects; and the material objects as the common resource interest of both members of the museum world. This is represented by Diagram 2, p. 44. Each cycle is a flat representation of a process, which in reality is three-dimensional and thus forms a tetrahedron. Two three-dimensional triangles together thus form a tetrahedron and this is our building block or the model. The two triangles are, as before, representational of the people or objects in the cycle and the process points of the cycle.

Structural disbalance may result if the staff members and the visitors do not view the material objects in a similar way. Although the museum is enriching because it may offer many different reactions, there must be a common meeting point where the material objects function in the same way for the visitors and staff. Although both have different reasons for dealing with displays and objects, each group must make some basic assumptions about the nature of the displays and artifacts

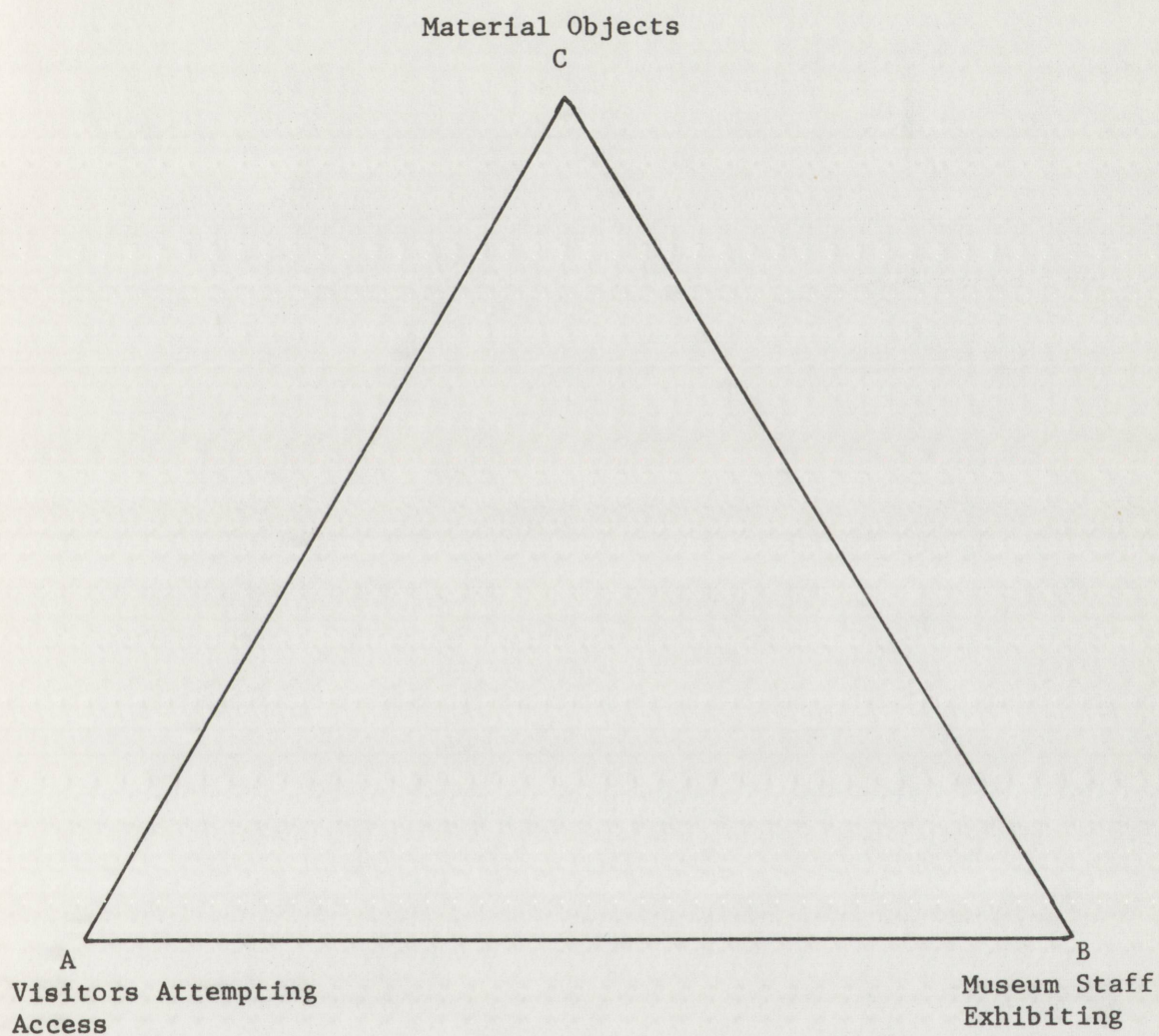


Diagram 2. The Process Cycle of Social Structure.

for them to become meaningful. The displays and artifacts must retain their identity for visitors and staff to make communication at some primary level. Thus problems may arise when staff members design and/or plan according to knowledge about an area but forget the most suitable means of conveying this information in terms of visitors. A visitor looks for basic information and meaning, while the staff member may be more concerned with design, artistic qualities, or availability of materials. These aims need not be mutually exclusive (Frese, 1960). However, in terms of dysfunction or disbalance, problems can be created. This is one of the arguments for the existence of an education museum staff of people who are trained to work with visitors and members of museums where concern is strictly in planning and designing museum displays and constructing artifact facsimilies. Education staffs can create a balance within a cycle, even if their aims tend to be different from other museum workers. This opposition could be considered a negative feature in that particular cycle.

This leads us to an important point. All cycles may not be positively balanced; yet, in terms of another structure, the whole model may be balanced. Such a balance among structures or cycles creates a total homogeneity within the whole model, though a preliminary examination of cycles does not always show this. This is why it is so important for our purposes, as it is in all institutions and societies, to show how all the elements are interdependent for total balance and yet independent for identification and analysis. As Marshall McLuhan notes (1964, p. 39), "Concern with effect rather than meaning is a

basic change of our electric time, for effect involves the total situation, and not a single level of information movement."

Feedback and Homeostasis in the Museum

As a microworld, the museum is always moving towards change on the one hand, and attempting to solidify its structures so as to promote stability on the other. Just as in the organic world where advances of an evolutionary nature take place through the succession of dominant types, providing for structural and functional improvements in organization, the museum is also evolving as an environment and as a culture within that environment. As Sahlins and Service note (1960), in their law of cultural dominance "that cultural system which more effectively exploits the energy resources of a given environment will tend to spread in that environment at the expense of less effective systems." The word "balanced" may be substituted for "effective" in applying this law to stability and homeostasis in the museum environment (p. 75). Three main categories will be considered in this dissertation as subsystems within our total system. These are the environmental, perceptual, and interactive systems. If balance is not equal between and among the three, one will tend to spread at the expense of the other in keeping with the law of cultural dominance. However, cycles may not all have to be positively balanced as discussed before. From the previous sections homeostasis may be summarized in this study as operating between three cycles. The first cycle is concerned with the museum as a territory or environment. The second cycle has information as the central focus of visitors and staff. The information

centers on material objects in that environment. The third cycle involves the process of implementation of information sources by the members of the museum society, these members constituting a social structure. This is presented in Diagram 3, p. 48.

The Museum as a Sensory-Perceptual World

This writer refers to the museum as a sensory-perceptual world because it is a created environment. Every environment, including natural ones, requires responses in perception from its living inhabitants. All environments as noted previously are in a constant state of change, though the change may be barely perceptible to the inhabitants of the environment. In the museum change is man-made and man-inspired and revolves around the spatial changes of humans and objects. Just as the displays may change in a museum, the human arrangements within the museum space also change daily, even momentarily. Change is an intrinsic part of the museum environment. Perception may be studied from the standpoint of an immediate happening, but in the museum emphasis is given to a process which is more ongoing in that units added to the existing structure are often made in terms of older cases and displays. In this sense, the museum is a holistic institution which attempts to preserve older structures while introducing new ones. The meta-language of perceptual concepts in the museum are the forms, colors, textures, lighting, temperature, size and designs in the artifacts, display rooms and overall building. In addition to perceptions which are listed above, audio stimuli play an important part in the museum environment. Flynn and Segil (1970) also consider what they

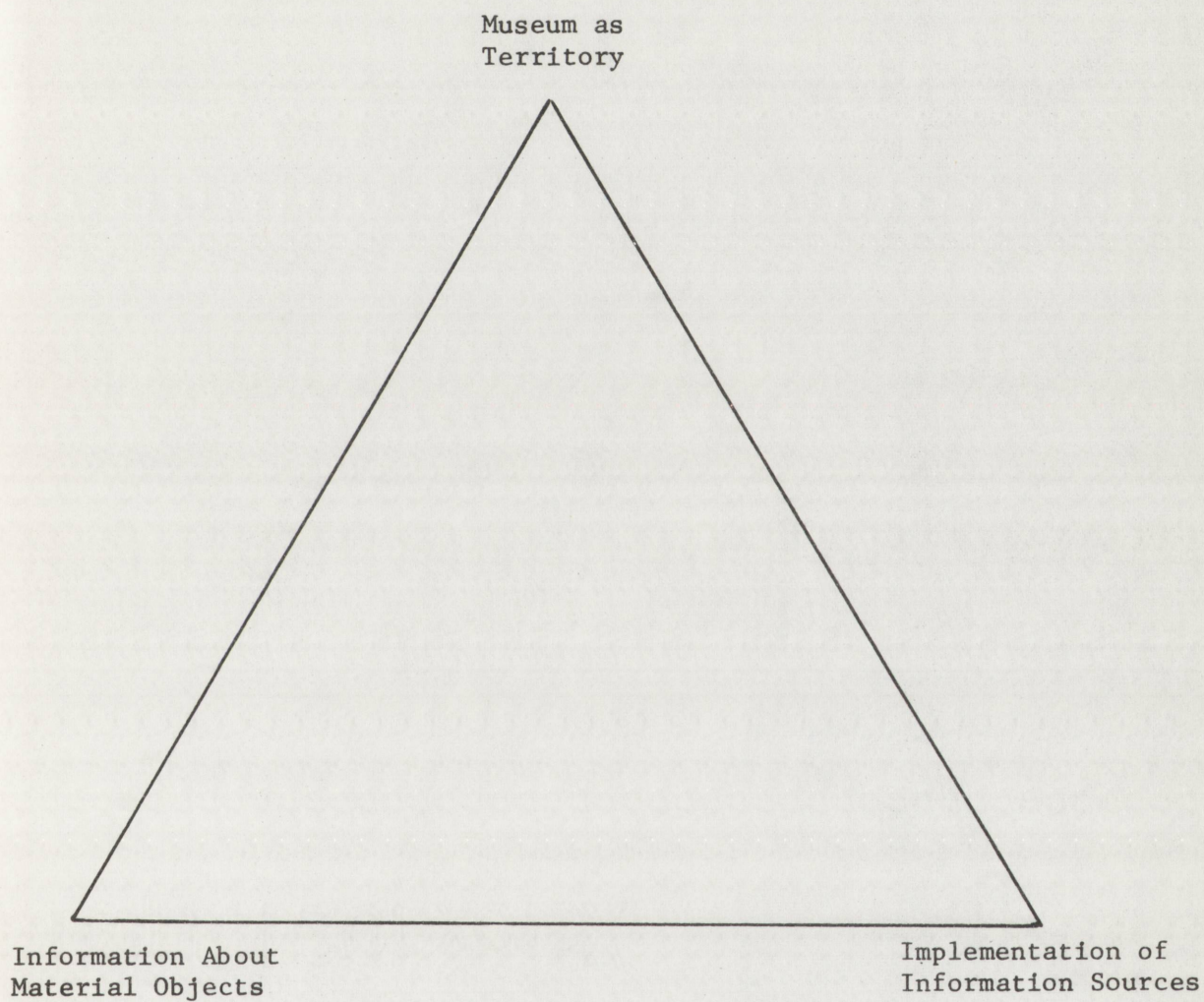


Diagram 3. Homeostasis in the Museum.

term the sonic environment, in which they include the concept of sonic territoriality. While museums are thought of as quiet places, most museums today feature education programs which stress sound, either from machines or humans. Flynn and Segil (1970) divide the interior of architectural systems into a classification which is well suited for the purposes of application to a museum. They name them the luminous, sonic, and thermal environments. (See Diagram 4, p. 50.)

The process points are symbols, information, and reactions. Since this is a three-cycle process, it is applicable to this writer's model in the museum. In addition, these authors consider the basic spatial patterns within the context of a "comprehensive environmental system" (Flynn and Segil, 1970, p. 1). Furthermore, they consider the ideas of closure and distribution networks in that system. These patterns encompass an equilibrium system, since they also discuss changes and contrasts--possible disruptive factors in an equilibrium system. Flynn and Segil's description of environment is incomplete, since the model of this dissertation must also include the elements of texture, form, and design. In addition, people form another class of the perceptual field within a museum, but they will be considered as elements of the interactive cycle. The perceptual cycle in this section deals exclusively with non-human categories.

Perception has been applied to many areas (F. Allport, 1955; Saylor, 1962; Broadbent, 1958) of space (Hall, 1959, 1966; Birdwhistell, 1952; Hudson, 1960; McLuhan, 1962), but perception applied to museum studies has dealt with either the displays or the artifacts. There have

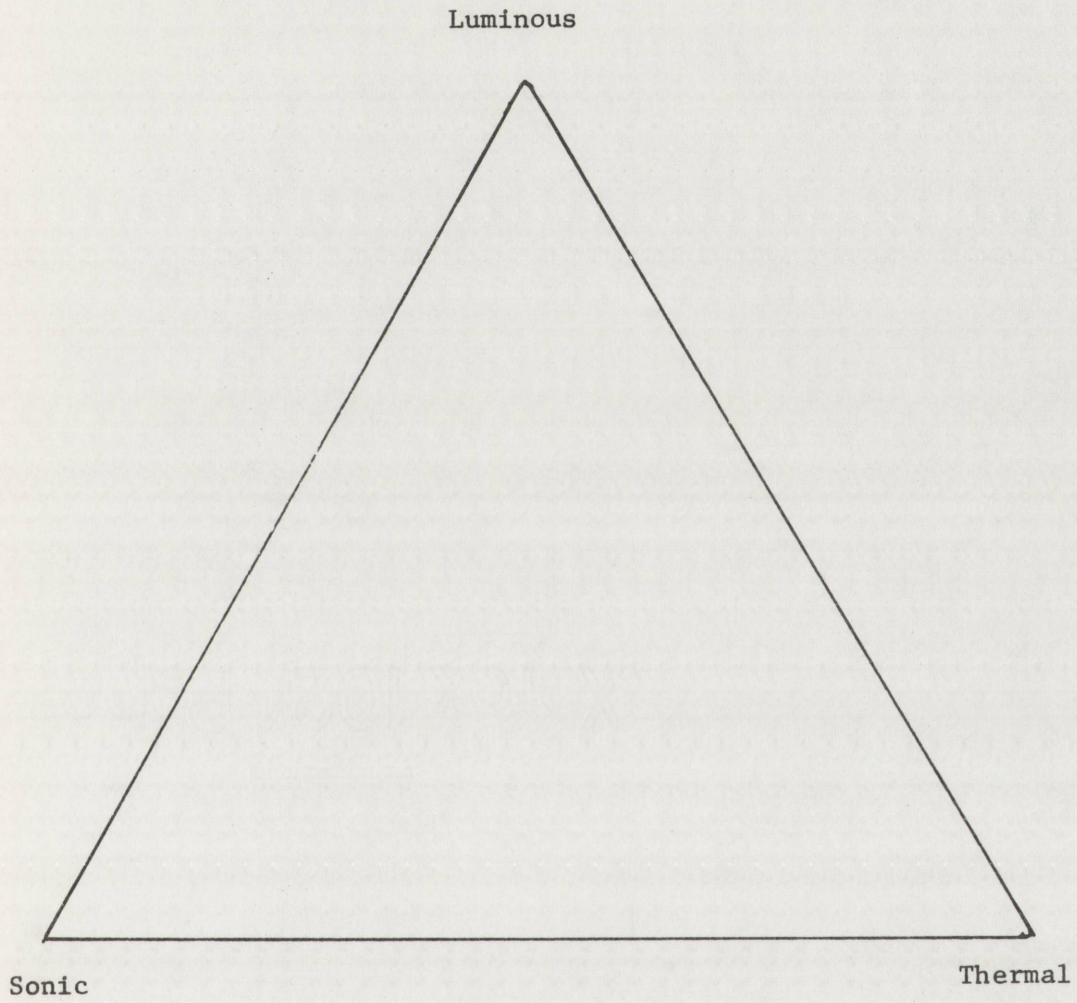


Diagram 4. The Perceptual Environment Cycle in the Museum.

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been no studies that have dealt with the problem of perception from an integrative standpoint in terms of the entire structure of a museum. Displays which are planned around audience behavior and needs are still neglected for the most part (Fantini and Weinstein, 1968).

As Flynn and Segil (1970, p. vii) note:

There is recognition of the fact that perception and appreciation of a space by an individual or group is dependent, in part, on the interaction of various forms of energy (light, sound, heat) and in recognition of that fact that this energy has, as a recent development, become manageable by mechanical means.

They add that it becomes important to discover the place of individuals within the environmental system with reference to the various sensory relationships. It is important to describe these experiences in the forms of human participation if education is to occur. A preliminary system analysis can give a general sense of the problem for the museum model. In this way, one may elaborate the factors so as to promote a major function of the museum as a building which is to "provide for all of these sensory perceptions, and to establish and maintain order in the sensory environment" (Flynn and Segil, 1970. p. 1). To the word "order" we may add balance in keeping with the structuralist method. While engineers and architects refer to comfort, reference may properly be made to a cycle which shows positive balance. Flynn and Segil suggest that the designer should understand the nature of distractions, because over a period of time they may cause fatigue and strain. An objective of interior environmental building is to "organize facilities, forms, and systems to minimize such stresses

so that activities and spaces will not become offensive and attitudes towards work and organized activities will not become impaired" (Flynn and Segil, 1970, p. 5). This should have application for museums in that both the work of the staff and the activities of the visitors will be integrated, and the environment will contain balanced cycles of perception for both. Thus, a good design can orient the museum visitor in a sense of direction and aid the museum staff worker by creating work areas and activities. Both groups will as a result be motivated to constructive participation in the museum environment.

In this section, perception deals only with the language of objects, these being museum artifacts and displays. As Ruesch and Kees (1956, p. 190) note, "Object language plays an enormous role in archaeology and anthropology." Objects in an anthropology museum create the perceptual field, and everything else (displays, programs, building structure) revolves around these objects. For this reason the perceptual cycle in a museum would involve people, the museum environment, the total space, and the building. Perceptual factors may be shown by the cycles: light (including color), sound, form (including design), and shape. These three sets work in processes such as sign language (gestures), action language (all movements that are not used exclusively as signals), and object language (all intentional and non-intentional displays of material things) (Ruesch and Kees, 1956). The museum acts as a ground for the objects. The objects, alone or in displays, form a ground or grid. This ground is the most noticeable feature in the museum. Emphasis on the objects, or ground, makes the

greatest impression and causes an imbalance in the cycle, since more attention is paid to field than ground, the space of the museum itself. The space of a display says just as much as the objects within it, but an object-oriented museum, as a people-oriented museum, is only a part of the whole structure. The space in the museum which is responsible for sensory-perceptual states is the most difficult to operate. As Watts (1961, p. 33) notes, "All languages represent the world as if it were an assemblage of distinct bits and particles. The defect of such grids is that they screen out, ignore, or repress inter-relations. This is why it is so difficult to find the words to describe such fields as the organism/environment." The distinction between field and ground when a museum viewer and a museum worker are treating both in a gestalt manner makes the separation of processes difficult. On the other hand, since structuralism usually examines categories like light/dark and good/bad, it is possible to evolve some preliminary distinctions for the purposes of a model. In the case of perception in the museum, it is difficult to separate the event of initial perception from deeper levels of meaning. It is difficult to assess the degree of minimal meaning an object must contain for it to be perceived by a visitor. Similarly, the staff has difficulty deciding when a display is finished. All the criteria must be met, content as well as construct. The difficulty here stems from the western world's system of separating points within a process. As Watts (1961, p. 33) says, "The individual no more acts upon the world than the world upon the individual. The cause and effect turn out to be

integral parts of the same event." Semiology and structuralism both attempt to discover what kinds of meta-language operate in order to reconstruct a more valid model in terms of a balanced positive cycle.

Although there are many sub-cycles in perception in the museum, we can postulate a basic one for the model. It involves the points of symbols, knowledge or information, and reactions (see Diagram 5, p. 54a). The perceptual factors of light, sound, and form become singly or in combination symbols of other cultures. These symbols offer knowledge or information about the cultures which the museum displays, and they elicit reactions or responses from the visitors of that museum. In addition, the symbols elicit reactions from all the staff members. The individual workers in the museum as well as the visitors experience these perceptions differently. An individual's conception of space results in different learning (Piaget, 1969) as well as in different reactions (Birdwhistell, 1952). Since individual requirements of space differ, perceptual factors cannot be mass-planned. In order to solve this problem it would be appropriate to estimate the kinds of groups that will use the museum, and plan light, color, sound, etc., based on observations and knowledge of the groups. Perceptual studies from non-standard fields could become useful in applying a model to museums. Studies such as Peter Brook's (1970) empty space theater, where he sees the theater as a space in which people gradually develop and evolve revelations, may be useful in that one may view a museum as a theater of culture and history. With their high ceilings, lighting, drama, separation of display and visitor, guide and visitor, museums resemble theaters. Other

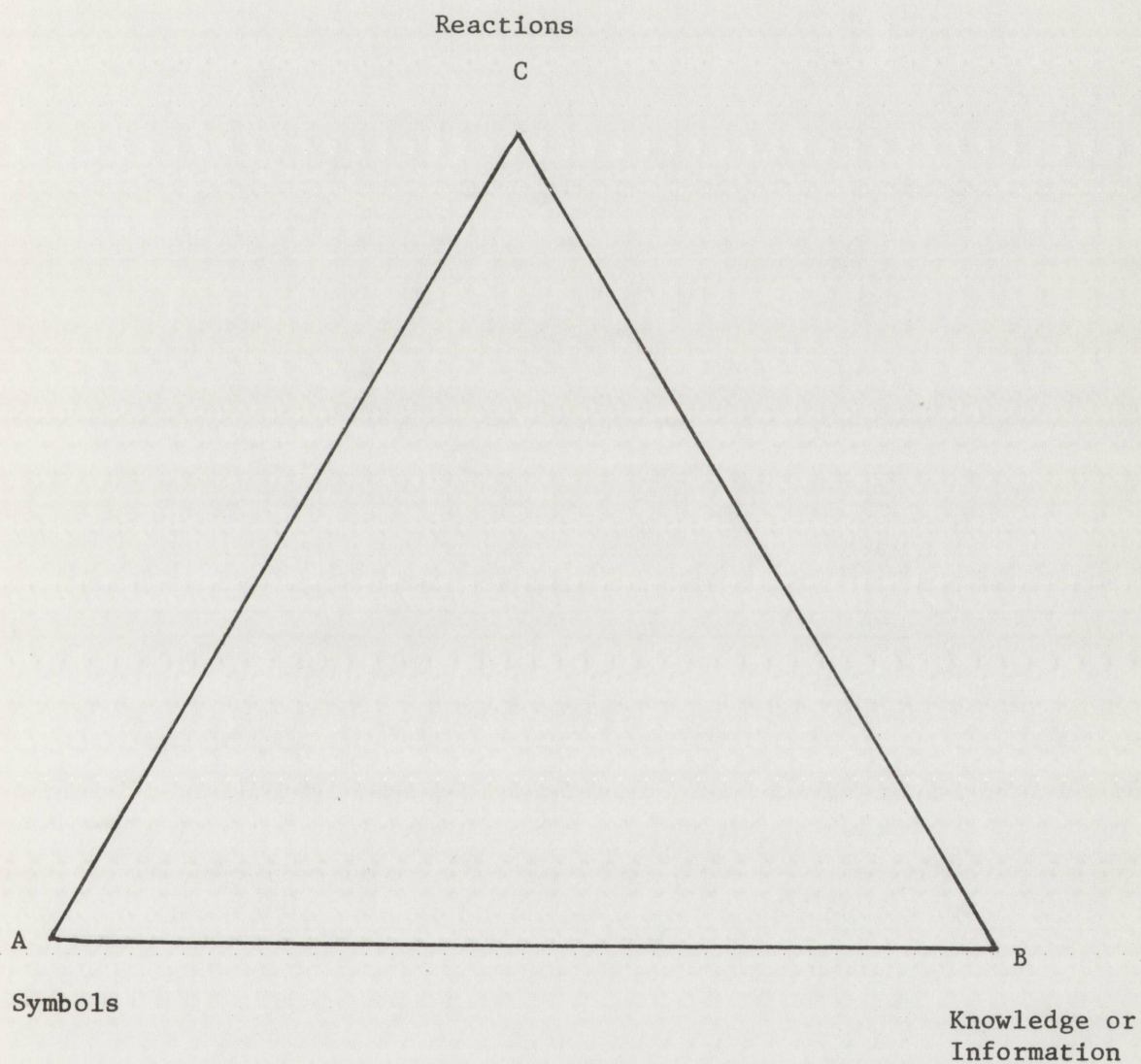


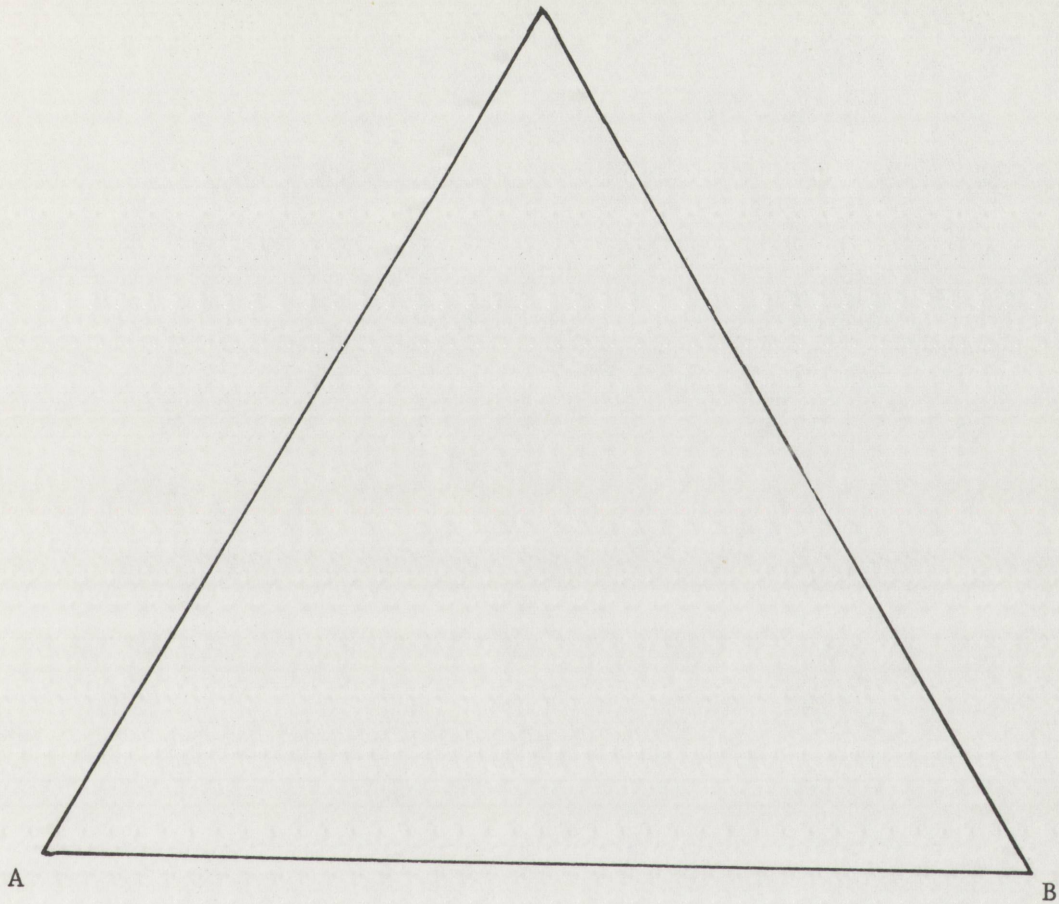
Diagram 5. The Basic Perceptual Cycle.

non-academic sources may contribute to museums, such as Benno Friedman's (1970) Beings Without Clothes, a show which examines the nature of shadows as a guide to perception. Friedman suggests that there are many planes to reality, in some of which we may perceive another dimension, if only momentarily. Such theories offer revitalization to the museum and suggest that many planes of reality are operating there besides a variety of sensory stimuli.

Interaction in the Museum

Interaction forms the third part of the basic cycles operating in the museum. It combines with the environmental and the perceptual factors. Interaction is used to pertain to the interrelations between the various human groups. Perceptual elements dealt with the museum's non-human factors that operate between the personnel and the visitors and between the museum divisions themselves. These two categories may further be reduced into smaller categories or set comprised of the guided and the unguided visitors, the educational personnel and the other members of the staff, the educational staff and the guided visitors, and the museum personnel and the visitors, both guided and unguided. The interactive cycle in the museum is based on any of the above two groups with the museum as point. (See Diagram 6, p. 56.)

The interaction of any society is based on the social structure. The above categories represent and contain the elements that may be operating in the museum, although, of course, not all function at once. In order to maintain maximum efficiency it is necessary that these divisions remain separate so that their various aims can be carried out and



Guided Visitors	-----	Unguided Visitors
Educational Personnel	-----	Other Staff Members
Educational Staff	-----	Guided Visitors
Museum Personnel	-----	Visitors (guided and unguided)

Diagram 6. The Interaction Cycle in the Museum.

structural symmetry remain. Structuralism is applicable to the museum especially in studying the interactive processes of all the elements because structuralism requires the separation of those elements in order to build a model, just as these divisions in reality must remain separate to fulfill their aims and maintain stability. The writer's observations over a three-year period demonstrated that the aims of each division could not be carried out if there was interference. Such interference would slow down maintenance of the system, even to the point of causing dysfunction. The aims of the education staff were people-oriented, while the other divisions showed a tendency to be more concerned with the physical factors in the museum, such as material objects. On the basis of the writer's survey, most museums responded to people-oriented questions superficially, thus indicating the interactive processes were played down, and the collection aspects of a museum assumed a more important role. It has been pointed out previously in this dissertation that neither the people nor the object-oriented museum is sufficient in itself, since both are integral parts of what a museum must be. Without a balance between the people, the objects, and the surroundings, a museum is structurally dysfunctional.

Because the museum is a man-made environment, the interactive processes within it are lacking in homeostatic mechanisms. For this reason the various groups represented in a museum can easily become special interest groups which promote their own aims at the expense of others. Whether this is a natural function of all societies is debatable, but the important point is that each interest group has its primary focus in the museum, even if that group takes its own direction. The

interaction, then, may be based on different aims, but if the system is to achieve a kind of functional homeostasis, the interaction must be balanced. Difference does not preclude structural balance, for in structuralism a basic idea is that points or elements are held together by the tension of difference, and that this opposition paradoxically creates or accounts for the balance. The purpose here is to stress the importance of identifying groups in the museum which may be analyzed for their own structure.

For the purposes of studying this structure, the authors who deal with rumor transmission (Shibutani, 1965; Allport and Postman, 1947) are useful in understanding interaction in the museum, since they deal with group processes. For the most part, social science has not made applications in this area. Other authors who are students of collective behavior are equally valid for application, since some of the behavior in the museum falls under the category of collective behavior. Collective behaviorists, as their designation implies, suggest that behavior which is mobilized in an institutionalized setting is collective (Smelser, 1962). While a museum is institutionalized, observations by the author seem to indicate that groups form a collective in spite of the rigor introduced by museum personnel in the forms of programs and rules. This kind of behavior was not noted in unguided visitors, who would tend to stay apart from other visitors and consult staff instead. The behavior was observed especially in the organized groups in the museum, which, in spite of institutionalized rules and programs, would behave in an unexpected manner. If one person became

listless, his attitude would occasionally spread to the group, or if some members wandered during an organized tour, the rest would do likewise.

Thus, this writer observed two kinds of behavior in visitors: the kind which conformed to expectations and rules, and that which the group seemed to regulate and decide upon by itself. Both kinds of behavior were more or most evident in groups which were already known as a unit by some previous classification. Examples of this type of group are Senior Citizens or classes from the public schools. Collective behavior increased noticeably in groups in which the society stressed unity, such as Indian groups. Often single visitors would notice a tour in session and join it. Since all tours were made by appointment, such individuals seemed to find a necessity to join a group, out of curiosity, perhaps, or some other factor.

Of particular importance for the building of a museum model is the concept of the social structure in the museum. The points of interaction within the social structure are important to the extent that levels of integration are researched and found to be present. As the anthropologist Redfield (1942, p. 63) notes, "Pressures are integrated . . . if change in one affects another and always results in some compensatory regulation in the system." He suggests further that one may consider that integration has occurred in an aggregation of individuals if "(a) one may describe the aggregation as defined in space-time (a population) (b) with properties additional to or different from those characterizing the component individuals (c) which properties

are the result of interaction among the individuals--and of the individuals with their environment" (1942, p. 63). Social relations, he says, may be reserved for integration in which there is some adjustment of the individuals with respect to interests of the others by the convergence or limitation of conflicts.

A museum population exists in synchronic time; that is to say, the features of the groups present are held constant through time; although the actual membership changes over time, the constancy of features makes for an identifiable population. The different aims and characteristics which create the divisions of the social structure in a museum make them separate for the purposes of identification, and the properties which characterize each group in a museum are formed from the interaction of the groups based on their relationship to each other as a result of the levels of meaning within a museum. Social relations, as Redfield (1942) describes them, can be more or less balanced positively or negatively according to the degree with which individuals and groups adjust to each other's respective interests. If they do not so adjust, social relations become strained and the system dysfunctional. In our terms, a culture is negatively balanced.

Integration of interaction is closely allied to a degree of balance in the cycles of perception mentioned in the last section. This is because the museum is dedicated to the preservation of objects and their surroundings, and a perceptual and spatial basis for the kinds of interaction that occur is promoted in this way. As Redfield (1942, p. 65) notes from Carpenter, "The coordinated actions of two or more

primates involve reciprocal exchange of stimuli and responses, acting on a background of previous social integration." Thus the common grounds of perception in the museum create the setting and kinds of social action. Goffman (1959, 1965) notes that two or more people are necessary for interaction, thereby proving basically that a three-cycle model is necessary to study interaction.

The relationship between perception and interaction may best be studied under the heading of play forms. Play forms are useful because they elaborate the interrelationship between people, objects, and space. They also study the relationships between form and function in terms of human use of space and human needs (Friedberg and Berkeley, 1970).

Three ideas are basic to discussing spatial elements in the museum: the museum as a sensory-perceptual world, the museum as an environment, and the museum as a place of interaction. These three concepts form the basis of spatial cycles in the museum. As seen in this chapter, an element or feature may be negative, yet structural balance may still be maintained. Chapter V will show how this is possible by discussing spatial elements in detail and by building a model.

CHAPTER V

A STRUCTURAL MODEL OF SPACE FOR A MUSEUM

"A scientist wishing to discover the essential nature of a substance often analyses it into its component parts. When he has discovered its true nature in this way, he may carry out a synthesis (putting together) of the components in order to rearrange them in such a way that the new substance has certain advantages over the original one" (Rowland, 1965, p. 97). Structuralism is the method which is applied here in building a model for a museum, a model which is simplistic in the sense that it discusses the component parts which are already known. It is new in that the parts are put together in a new manner. Hopefully the rearrangement has advantages over existing ones, since its methods of analysis can be transferred to any structure or institution. It further attempts to suggest a means of applying mathematical and structural concepts to a social institution in order to analyze the function of that institution by stochastic measures at some later date. The models built here may be analyzed using a variety of methods by others should they choose to.

First, it will be useful to discuss various aspects of structure, structuralism, and what a system is, and finally, how it may be represented in mathematical and diagrammatic terms. The transformation of our cycles into such mathematical and diagrammatic structures will represent the sets which are a part of structural analysis.

Piaget (1970, p. 7) says that the notion of structure is composed of "three key ideas: first, wholeness; second, transformation; third, self-regulation or entropy." Discoveries of structure, he notes, give rise to formalization, which in turn gives rise to theories in the hands of a theoretician. Structure exists apart from the person. Piaget says that these theories give rise to logical or mathematical equations, and sometimes "pass through the intermediate stage of constructing a cybernetic model." He also distinguishes between structure and aggregates, "the former being wholes, the latter being composites formed of elements that are independent of the complexes in which they enter." The elements of a structure are subordinated to laws, and it is in terms of these laws that the structure or whole system is defined. He defines wholeness in that manner. Wholeness raises the question of formation and nature of the whole structure. This idea is important because it provides the basis of structuralism, and also aids in identifying some of the divisions or viewpoints in structuralism. One viewpoint holds that "social wholes emerge from the union of individuals" (Piaget after Durkheim, in Piaget, 1970, p. 8). Another holds that the composite wholes are and have been in process of composition, and that the idea of wholeness within them is not disseminated or disintegrated by this process. Because structuralism is concerned with synchronic time, or an historical time (Lane, 1970), structures may be seen to be holistic in process, since the investigator is looking at the structure momentarily and not across time. For the moment or slice of time, the structure is whole. A structure then is

continuous and circular if it may have applied its laws of transformations. Structuralists view structures as transformable into other structures, and "not given to causal laws but to laws of transformations" (Lane, 1970, p. 17). Piaget describes transformations as changes in elements of a structure (1970, p. 12). He sees "all known structures--from mathematical groups to kinship systems--as systems of transformation." He describes self-regulation, a third feature of structuralism, as involving two ideas--maintenance and closure. Self-regulation involves the use of three basic mechanisms: rhythm, regulation, and operation. Self-regulation makes a structure balanced if the operations can be mathematically reversible. This requires that errors be excluded before they occur, since "every operation has its inverse in the system." A model, then, at the outset may reflect a perfect regulation of structures if the above conditions exist.

Levi-Strauss, one of the leading structuralist figures in anthropology, borrows many of his models from general algebra (1950, 1954, 1969). The basis of these models is the mathematical "group." The groups are a system or cycle of sets of elements, either positive or negative, or both in combination. These groups obey all the laws of mathematical groups and are coordinated. The applicability of them to the construction of a museum model is useful because the groups or cycles as we refer to them always infer "that an inverse operation be possible, or a return to the starting point, and that the condition of the goal be attainable by alternate routes without the itineraries affecting both the point of arrival--associativity" (Piaget, 1970, p. 19). The group is cohesive because it is self-regulating, governed

by an internal system, and because they are transformative, or can be intelligibly changed. "Transformation of dimension may change but shape does not" (Piaget, 1970, p. 21). Under displacement, angles vary, but lines and parallels remain constant. However, even straight lines may be considered elastic, since they may be transformed and retain identity as long as bi-continuous correspondence of points is preserved (Piaget, 1970). Thus, in this paper, the shape of the model may be changed from linear to circular as long as the points remain the same. Thus, in terms of transformative energy, a structural model is a conservative model. It therefore suggests improvement from a standpoint of collection and redefinition of what exists, rather than a disruption of what exists. Structuralist models propose change which is based on inherent features of an already existing system. Literally speaking, it makes a phoenix rise out of ashes.

The structures which structuralists analyze to determine underlying elements and sets are for the most part latent structures (Lazarsfeld and Henry, 1968). They deal with probability relations because they deal with items of observation (Lazarsfeld and Henry, 1968). These structures are latent as opposed to manifest because they "are not simply convenient theoretical constructs; they exist apart from the anthropologist, for they are the source of the relations he observes" (Piaget, 1970, p. 112). It is at this point that structuralists disagree. Some believe that observation is inherent in the construction of a model, while others, such as Levi-Strauss, believe models "emanate from the intellect." In a tradition stemming from Durkheim

and Mauss (1903), Levi-Strauss has accepted a "primacy of perception" in which social relations are the basis of all structures, and the foundations of these structures is not explained. In these ways, Levi-Strauss borrows much from Merleau-Ponty (1948, 1964) when he sets forth elementary features as if they were the basis of a model. As Goddard (1965) observes, "Levi-Strauss asks us to think of social structure as a model, and not as somehow 'there' in the observed facts" (p. 410). British structuralists (Radcliffe-Brown, 1935; Leach, 1954) use field work as the basis of their models, while "Levi-Strauss, like all good rationalists, starts with a tabula rasa" (Goddard, 1965, p. 410). The difference between the schools of thought is that one might be written from an armchair, whereas the other is based on observations in the field and could not have been written without those observations. This dissertation is of the latter variety. Leach (1954) argues that models represent the anthropologist's hypothesis about how the social system works. In Chapter II, this writer noted how models and theory may be the same, should the theory be presented in model diagrammatic terms.

The basis of the model for a museum is the elements that appear in sets. These sets are also called groups and cycles; as such they contain points. Each point represents a cycle of its own; for example, the point of the educational staff, which appears in several of the cycles or groups, is really a complex of variables in itself. For this reason, cycle refers to group and to each point within it. This is the basis of the model. The cycles or sets which were discussed in Chapter IV

are the following:

A. Environment

1. members: territoriality: museum aims
2. territoriality of staff members: territoriality of visitors: museum aims
3. visitors attempting to gain access: staff member exhibiting: objects
4. territoriality: information: implementation

B. Perception

1. luminous environment: sonic environment: thermal environment
2. sign language: action language: object language
3. objects: people: total space

C. Interaction

1. symbols: information: reaction
2. visitors: staff: museum
3. guided visitors: unguided visitors: education staff: individual activity: specialized division activity: museum aims and interactive coordination.

Each of these cycles may be represented by a triangle for analysis of balance (Cartwright and Harary, 1956; Davis, 1963). They may be represented three dimensionally by a tetrahedron (Fuller, 1969). In a true structural analysis, all elements are independent but related to each other in a total systems framework. Because a structural analysis of elements has been done in this study, each of the sides in our model

are independent and can be arranged in any manner. Two tetrahedrons joined together at their bases form a representation of the members or points involved--points of the process involved (see Diagram 7, p. 69). The entire representative model forms an icosahedron (see Diagram 8, p. 70). Because the parts of the model are independent and related, it is possible also to arrange the parts in a different manner. Therefore, we may arrange the six sides of the two joined tetrahedrons in the shape of a hexagon (see Diagram 9, p. 71).

Some anthropologists believe the hexagon is the arrangement that societies take for maximum proximal organization (Binford, 1969, personal communication), while others (Fuller, 1963, 1969) believe the tetrahedron satisfies the conditions for maximal packing. The above model, the hexagon composed of two tetrahedrons, would seem to satisfy both points of view and provide a model allowing for maximum integration of spatial elements in the museum.

Since the writer is proposing that it is space itself which is the key "maximizer" in the museum, both of these diagrams would satisfy spatial requirements. It is important to remember that space was defined as that space around and including objects, that space around and between people and groups, that space between the former and the latter, and all other spaces. In this sense, space is the most important feature in the diagram because it unites and influences all other elements in the model. From all of the cycles, three areas may be found: the environmental factors, the perceptual factors, and the interactive factors. These may be seen as a triangle for the purposes of balance analysis. They may also be seen as a tetrahedron in the

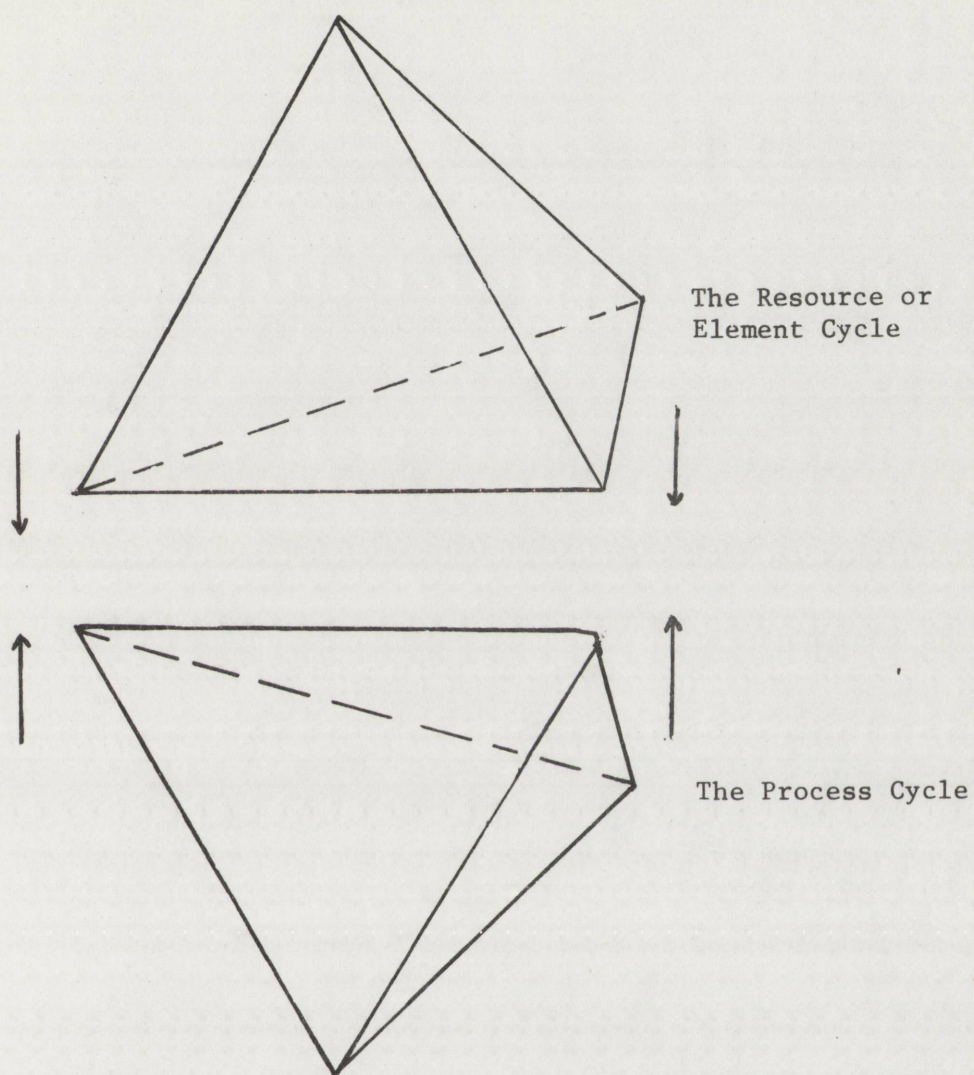


Diagram 7. Tetrahedron.

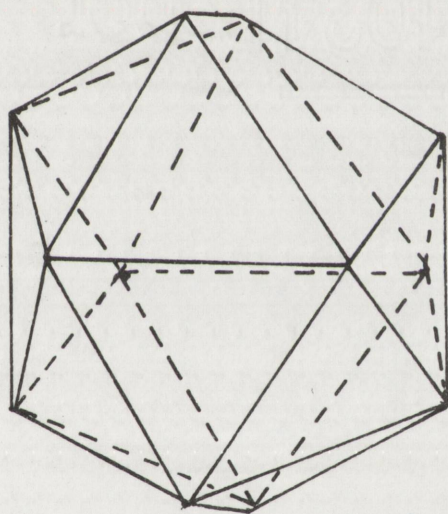


Diagram 8. Icosahedron.

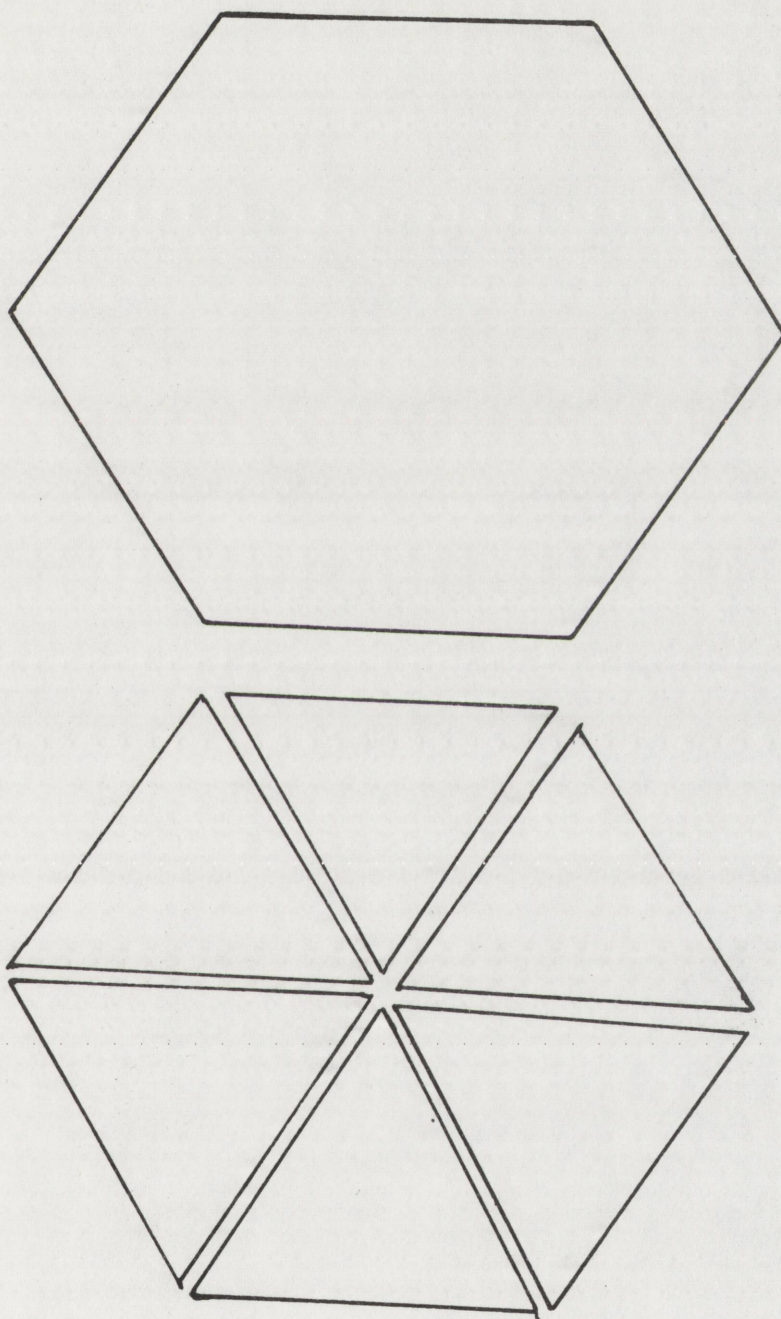


Diagram 9. Hexagon.

model. However, if each line is considered equal to one half an arc or one half of a circle, by transformation six lines, six arcs, or three circles result. Thus there is an interaction.

$$(A \cap B) \cap C = A \cap (B \cap C)$$

This may be represented later in diagram form.

Since all arcs may be transformed into flat lines, the model can be transformed into a geometric formula. The cycles contained in the points A, B, C may be seen as sides of a tetrahedron. Social structures may be bonded or united at different points. Thus they can adjust topologically for different requirements in different museums or other institutions. If the circles which were transformed from the tetrahedron are viewed as arcs which may be straightened to lines, graph theory (Flament, 1963) and vector analysis may be applied. Thus the study has shown that it is possible for structures which are cyclical and circular to be analyzed. It is possible to determine an underlying structure in an institution such as a museum by the following steps: (1) examine the total number of elements in the system, (2) examine them against other structurally opposed elements in that system, (3) apply balance and set theory to these elements to determine where balance exists, (4) by transforming those cycles into a model which may be examined in terms of mathematical and geometric structures, (5) then use these steps to recombine elements in such a way that better organization in terms of space is a result.

The examination of the cycles in the museum by means of a structural method not only builds a model, but offers some insights into the relationship of the three cycles to space. A structuralist model is synchronic, and is not concerned with historical time. However, by examining the cycles, this writer concluded that in the museum time does operate but in a much different sense than ordinary diachronic time. The space in the museum is compressed and composite because it must necessarily reflect many periods of time in many anthropology museums. In this sense, space itself acts as time, since it is time-constructed or reconstructed out of space. A display may encompass hundreds of years, and a few steps to the next display may equal thousands of years in representative space. The special use of space in the museum to represent time applies to that portion of space which is either between people and objects, or between objects and displays. The space which we describe as being concerned with people and groups does not displace time.

In addition, the study of the elements in the museum by means of balance theory (Cartwright and Harary, 1956) also seems to indicate that not all cycles in the museum need to be positively balanced for an overall balance to operate. As was seen in the section on territoriality, members of divisions in the museum tend to stake out sections of the museum for their own, a negative feature. Each of the sections tends to have distinct aims and philosophies which are in contradiction to the public image of the museum as a united establishment. This is also a negative feature. These two features become

positively balanced in the light of the fact that the divisions are united by the common aims they have for the well being of the museum. Cartwright and Harary (1956) mention two negatives and a positive as a positive balanced cycle. From this factor we may gather that the museum is a steady state system in which tensions are dispensed in activities for the common good, thus advancing toward "higher organization and order" (Bertalanffy, 1968, p. 208). This probably occurs since the spaces of the elements in the museum further common boundaries--environmental, perceptive, and interactive--that offer a systematic outlet for the reduction of structural tension. Space, as we have defined it, then, acts cohesively to bind the elements in the museum together.

From the foregoing it can be stated that in the museum space acts as time, space integrates all levels of structure, space is the most pervasive juncture in the museum system, and therefore space is the most important aspect for the consideration in rebuilding present museums for the future. A museum model, such as the one presented here, could reflect a living organism in that it offers a way to examine living systems in a holistic manner. As Weiner (1961, p. 266) commented:

Certain kinds of machines and some living organisms--particularly the higher living organism--can modify their patterns of behavior on the basis of past experience so as to achieve specific entropic ends. In these higher forms of communicative organisms the environment can modify the pattern of behavior into one which in some sense or other will deal more effectively with the future environment.

Spatial examination and consequent reconstruction can offer a means of dealing more effectively with the museum complex.

The sub-cycles in the model are drawn from the discussion in Chapter IV. In Chapter IV, the points in each cycle were mentioned and

a re-explanation given of how the cycles could be balanced negatively or positively. This section deals with a presentation of diagrams and a closer examination of how these cycles operate.

The environmental cycle consists of museum aims, which produce a membership, which in turn produces behavior forms known as territoriality. Museum aims require a society or members to carry them out. A possession of boundaries and rights and adaptations to those boundaries are necessary for the membership to function. However, that territoriality, or clinging to certain areas of space, is contrary to those museum aims centering around the museum as a public territory. This creates a negative feature. Thus we have two positive and one negative features. So, according to Cartwright and Harary (1956), this becomes a negative cycle (Diagram 10, p. 76).

The environmental process, however, may be positively or negatively balanced, even though the necessary components of the environment create a negative situation such as is seen in Diagram 11, p. 77. The environmental process consists of visitors' access to the environment through objects and displays, which are dependent on the staff's exhibition of the displays and objects. The access is a positive feature because of educational possibilities. The objects and displays are also positive features, as they reflect cultures and knowledge of those cultures. The exhibition of the displays by the staff is a crucial point in this cycle because it is at this point that the cycle may become negatively balanced if that exhibition does not give rise to access for visitors. Access means that information is passed on

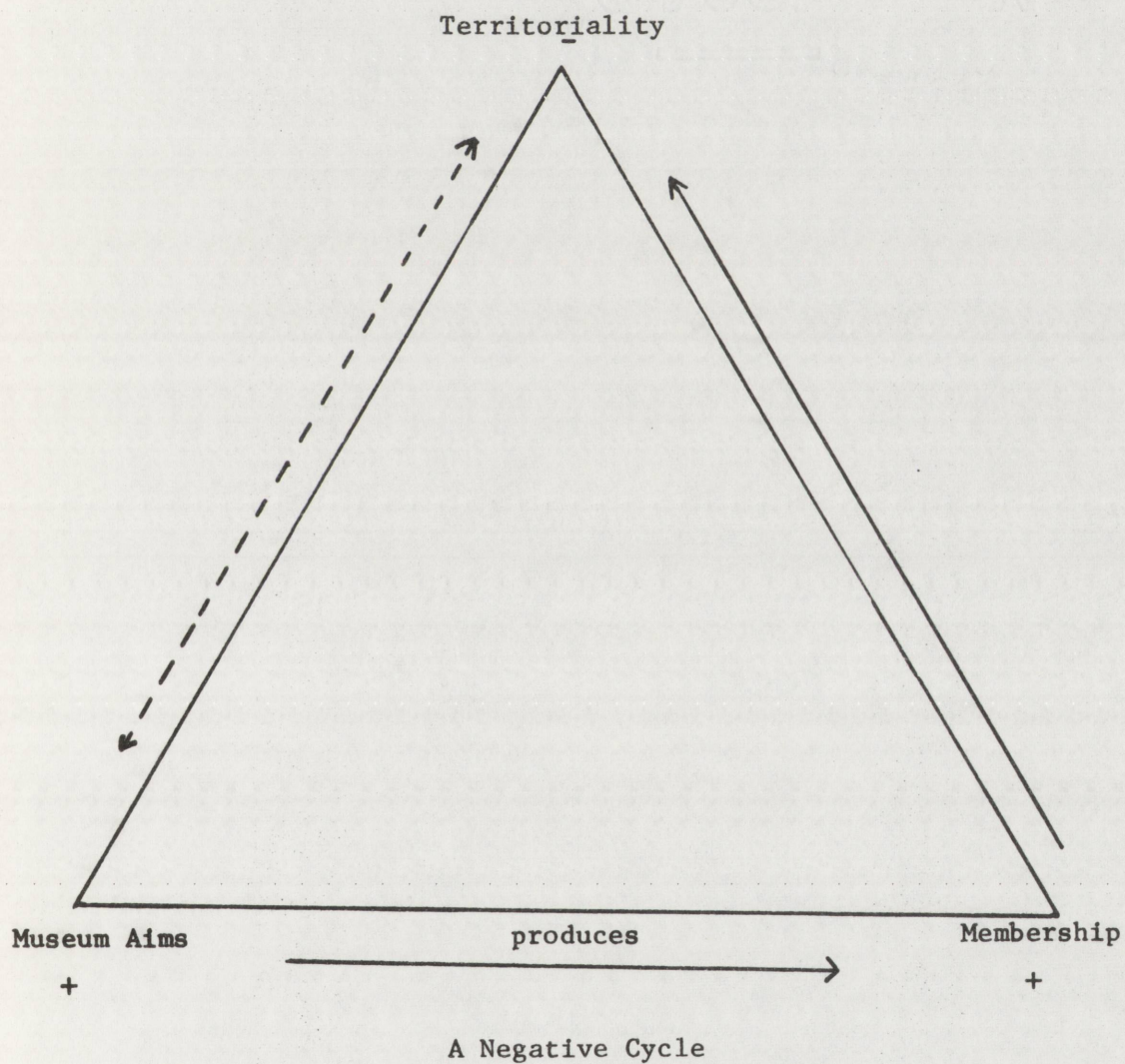


Diagram 10. The Environmental Cycle.

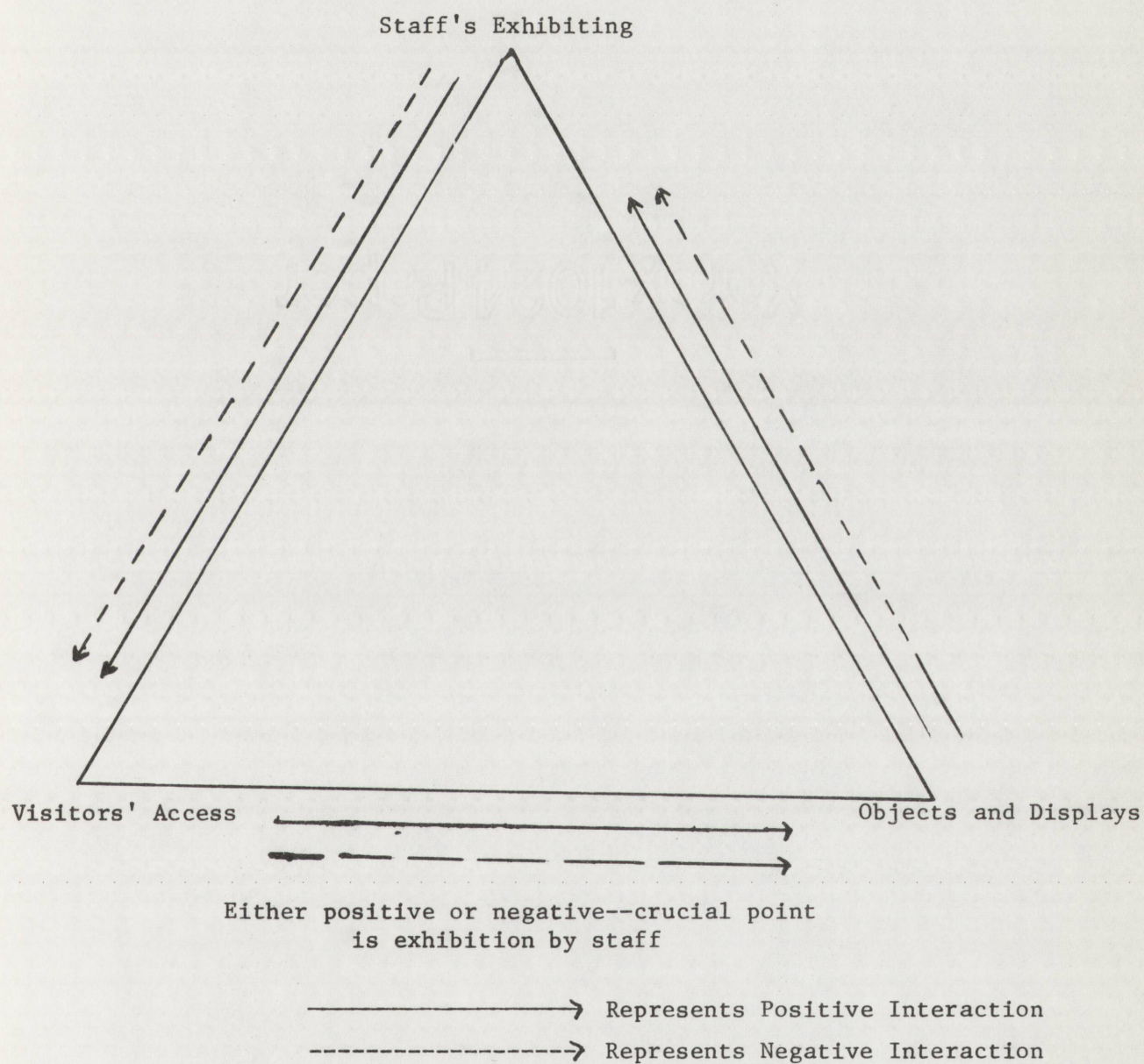


Diagram 11. Environmental Process Cycle A.

to the visitors only if the objectives of the display have been carried out by the staff. Should this not occur, staff exhibition becomes a negative feature, and we would have a negative cycle--two positives and a negative. Ideally, the process will contain three positive points and it will be positively balanced. This is represented in Diagram 11, Environmental Process Cycle A, p. 77. Environmental process A is concerned with the relationship between membership and environment with regard to access.

The environmental cycle also contains a second process involving how the environment is utilized in terms of communication (Diagram 12, p. 79). This cycle consists of the territory housing different kinds of information gained through membership feedback about those displays. The information in the museum is utilized by implementation through the use of displays and through membership feedback of those displays. This process is composed of three either positive or negative features. The territory of the museum may be negative and would in turn affect other features such as information and implementation, thus causing a negative cycle. Or the information could be of such a nature that it would not properly fill the requirements of the territory. For example, the information might appeal only to certain individuals and not to a general group, and would thus violate the public nature of the territory. The implementation of knowledge might be faultily carried out, and this could be a negative feature producing a negative cycle.

It is important to remember that while one feature influences another, the influence does not occur to the extent that if one feature

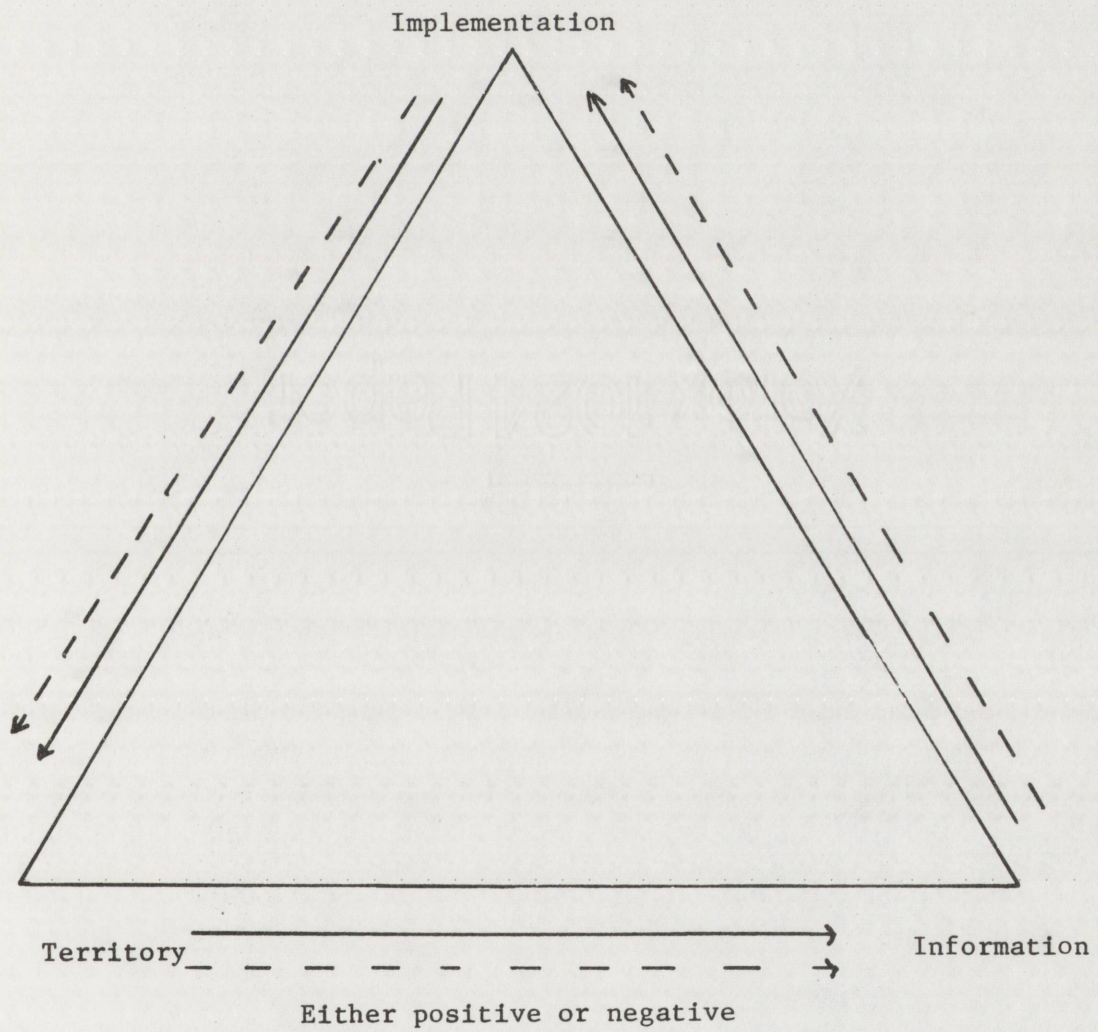


Diagram 12. Environmental Process Cycle B.

is negative they all are. Two features may be negative and one positive and a positively balanced cycle still may result (Cartwright and Harary, 1956). However, because this model is a spatial one, it is difficult to see, at least perceptually, how one negative feature would not have such an impact on other features to create a negatively balanced cycle. By using the method of structuralism, one makes sure each element or point in the cycle can stand analysis on its own so that each point's negativity or positivity must be an inherent part of its nature and not of another's. Territoriality in the museum is so crucial to the understanding of the environmental demands and responses that a separate model is provided here for examination (Diagram 13, p. 81).

By way of section aims, division of territories results in a territoriality of staff members. This territoriality is essentially a negative feature since it results in a division of spatial use in the museum. The division is noted by visitors, who respond to it, using the space in a segmented manner. This feature also is negative. In addition, as was noted earlier, visitors have an informal collective response to museum space and break larger units into smaller designated spaces as their needs demand. It is part of the territorial systematization in the role of visitors. The territoriality of staff members and visitors is in conflict with the positive feature of the public and broad aims of a museum. But because these aims exist, both staff members and visitors are drawn together by common goals. In addition, each group of staff members and visitors is drawn internally together by common goals, even though the move towards territoriality is always in process. Thus, territoriality is congruent with the

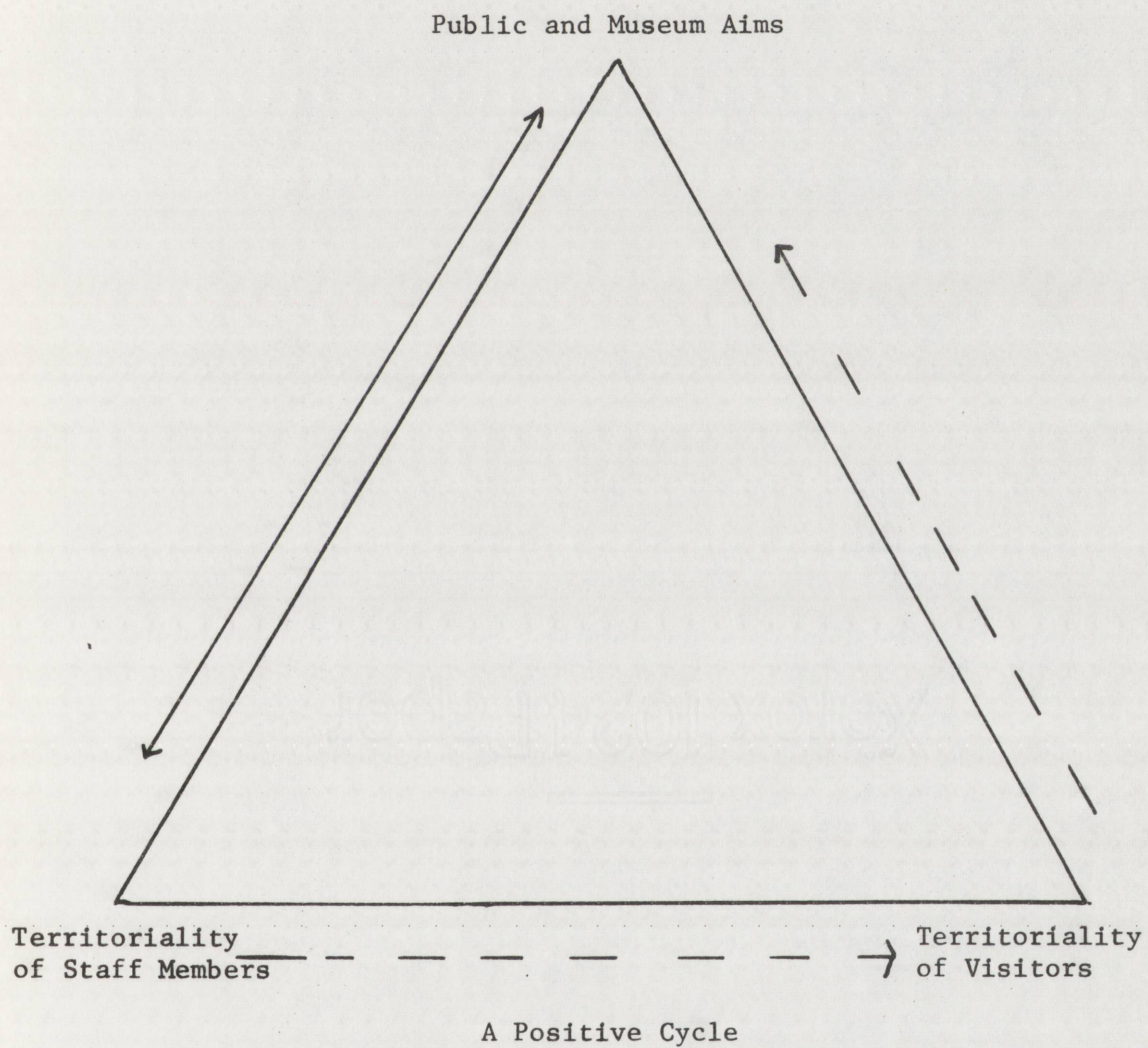


Diagram 13. The Territoriality Cycle.

functional needs of each group to carry out its own particular activity and aims. It may be a negative feature, but in the territoriality cycle a positively balanced overall cycle results from the unity gained from the positive feature of public and museum aims.

The next set of cycles is about how perception functions in the museum. It is best seen through a series of diagrams to examine the structure's balance. The first simply involves the three main elements, which are the basis of all perception in the museum. Involved are material objects and displays, people, and the total space which contains the former and the latter and their operations (Diagram 14, p. 83). These features may be either positive or negative. As a feedback or equilibrium loop, disjuncture may occur at any point and thereby affect others (Bertalanffy, 1968). The perceptual system operates in a gestalt manner, but in keeping with structuralist theory (Lane, 1970), each point or feature maintains identity for purposes of analysis.

The perceptual environment consists of three features: a luminous environment, a sonic environment, and a thermal environment (Flynn and Segil, 1970), as shown in Diagram 15, p. 84. The luminous environment is concerned with lighting, color, hue, value, intensity, both artificial and natural. The sonic environment concerns all auditory stimuli, including mechanical sound systems, such as records, and natural sounds, such as human interchange. It would also enclose all auditory stimuli of an unplanned nature, such as the sounds created by the building of displays or movement of objects. The thermal environment would reflect all features concerned with heat, coldness, and

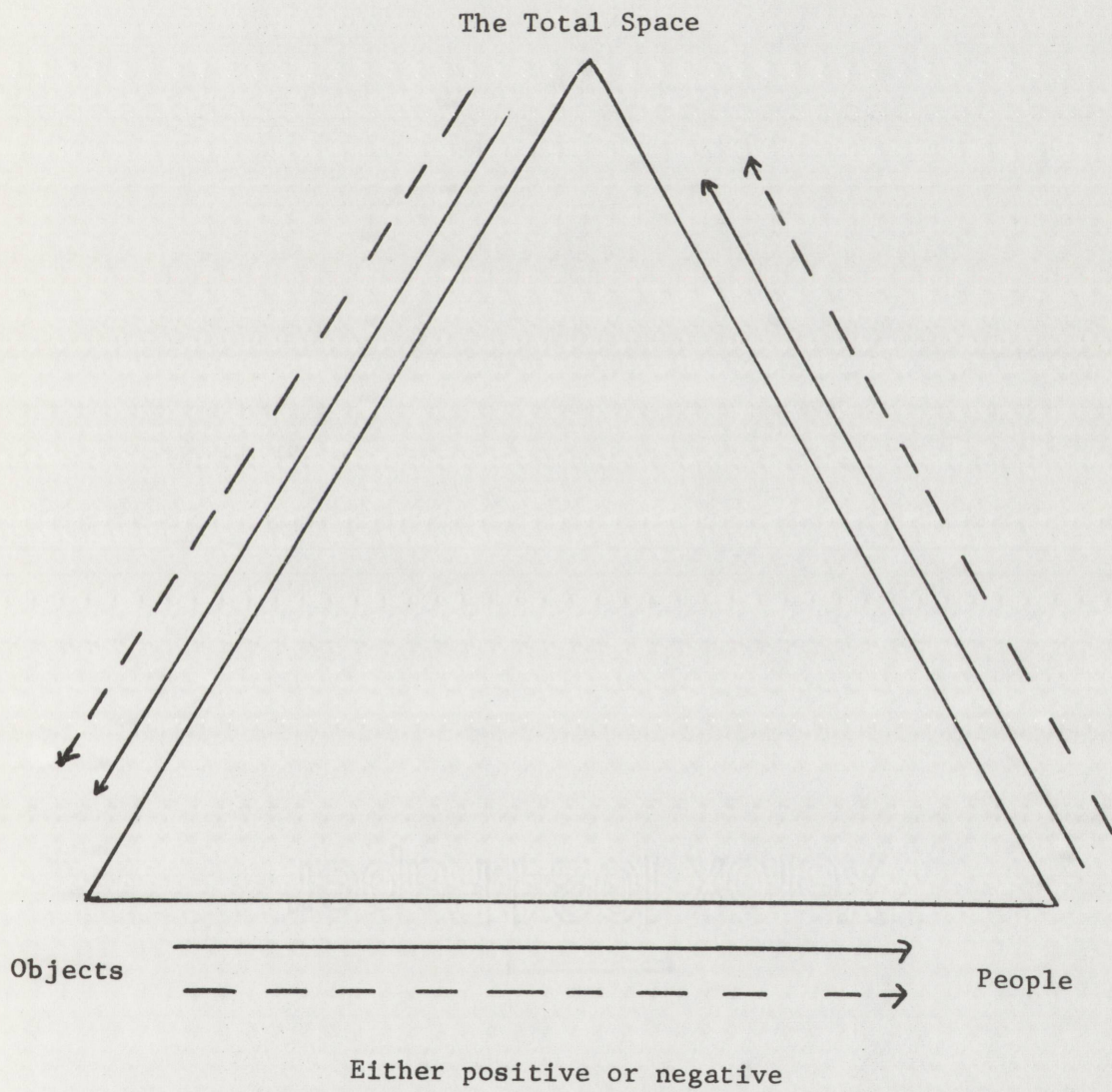


Diagram 14. Basic Elements of Perception.

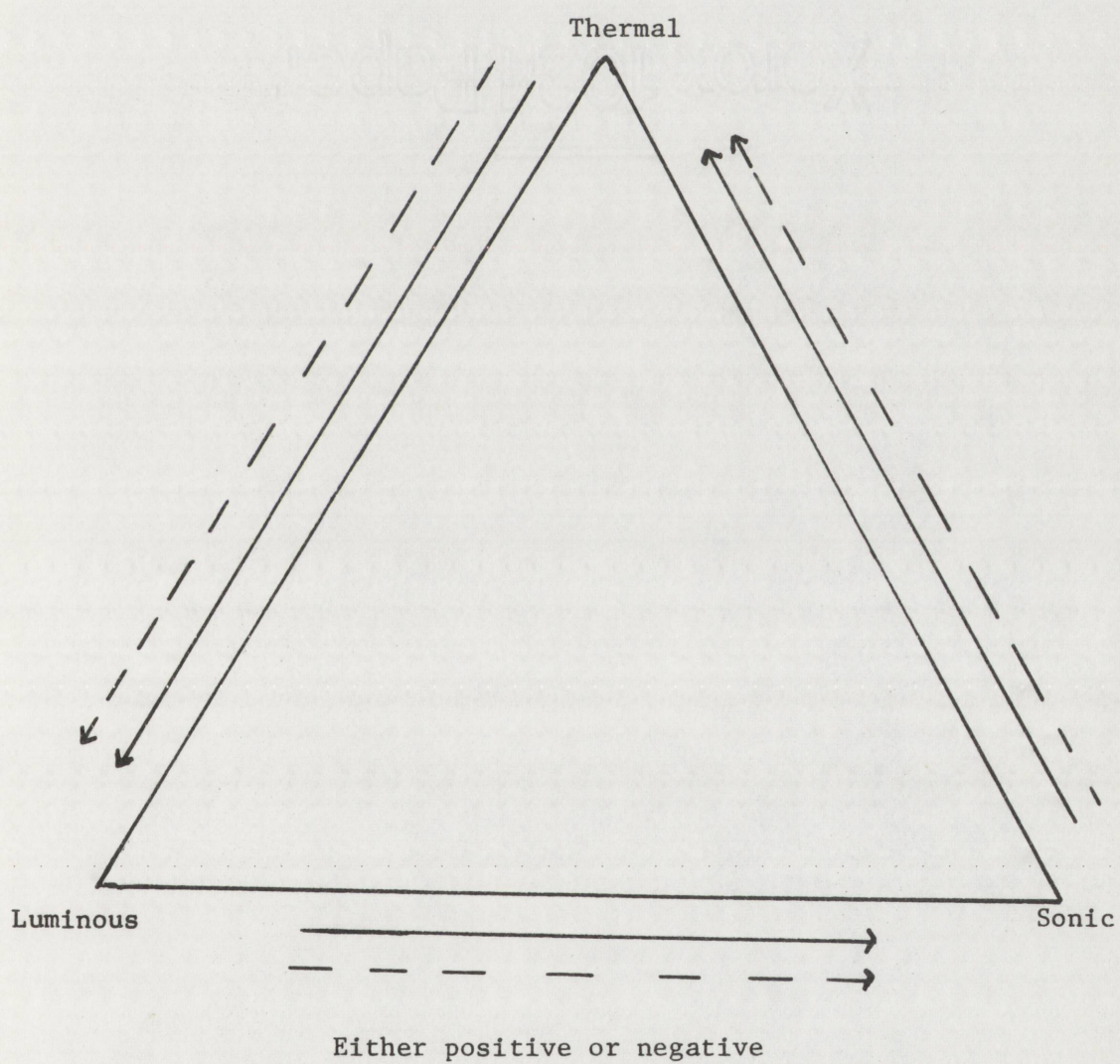


Diagram 15. The Perceptual Environment.

humidity. These features might affect artifact storage and protection as well as humans. The perceptual environment is of particular importance because it, too, is a created field which has a great effect on the use of space and thereby the kinds of education that are possible in the museum. The cycle described here is about kinds of field-ground relationships affecting perception of space. This cycle is the most difficult to deal with since perception is largely gestalt from an observer's standpoint. Here a structural analysis requires separation for purposes of model building. This cycle may be either positive or negative. Because it includes so many sub-sets, each involved in contributing to each feature in this cycle, a very delicate balance exists between features as well as among sub-sets of these features.

The environmental features of perception give rise to perceptual "languages." These features of medium (McLuhan, 1964) are manifest in three kinds of language: sign, action, and object languages (Ruesch, 1956). This cycle may be either positively or negatively balanced, as seen in Diagram 16, p. 86. None of the features have inherently positive or negative features, but take their sign from the meaning and usage given them. Each must retain congruence with the other to maintain a satisfactory relationship leading to a balanced cycle. Sign language refers to all communication devices of a written or verbal nature, while action language takes its meaning in body language, kinesics, and proxemics. Object language derives meaning from features of relevance or history assigned to objects. Sign and action languages are involved in territory as space and people in the museum, while object language is found in displays and artifacts.

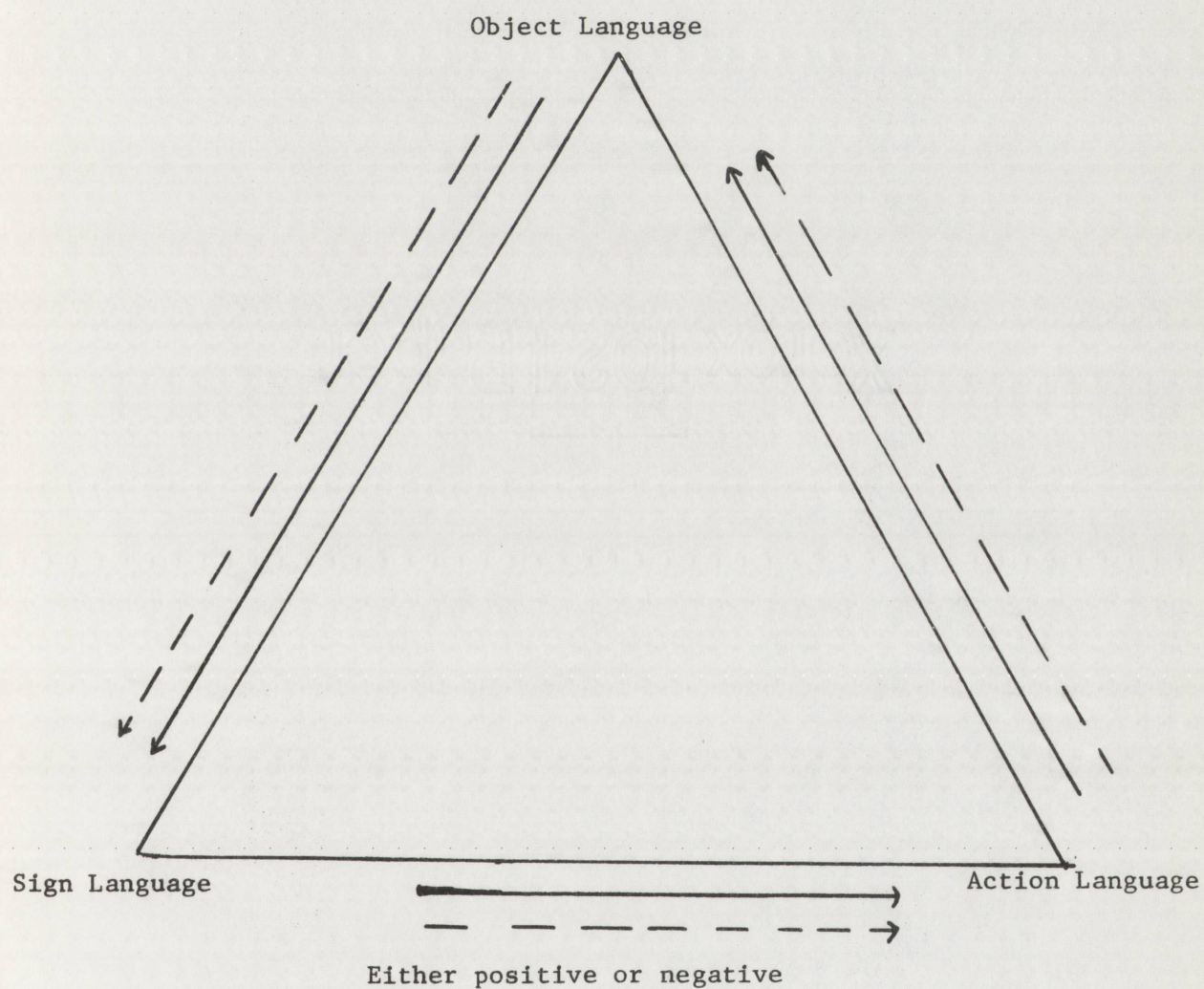


Diagram 16. Perceptual Language Cycle.

Perceptual processes are summarized by a three-feature diagram as follows: (1) symbols as a basis for (2) information and evoking (3) reactions. The symbols as seen from the other perceptual diagrams involve sensory environments and languages. This cycle may be positive or negative, as shown in Diagram 17, p. 88.

The perceptual cycles give rise to structures in which museum participants interact in the environmental setting. The perception of their territory creates a setting for their movement in space that may be recorded as interaction. Interaction in a society calls for a knowledge of societal participants. They are simply visitors and staff, in the context of the society which is the museum. This is the basic interaction cycle represented in Diagram 18, p. 89.

Although this cycle may be positive or negative, a dichotomy can exist between staff and visitors, which, if it is present, can be a negative feature. If the relationships between museum and staff or museum and visitors are both positive, a negatively balanced cycle would result should the staff-visitor dichotomy exist and cause structural strain (Diagram 18, p. 89).

However, the process of interaction creates a positively balanced situation in spite of a tendency for polarization of interactive features or elements in the museum. This same kind of situation existed in the museum territoriality section where disjoint features could produce an overall balanced process cycle though points of the original state might not be balanced. In the interactive situation, individuals are a negative feature since museums are composed of groups. These

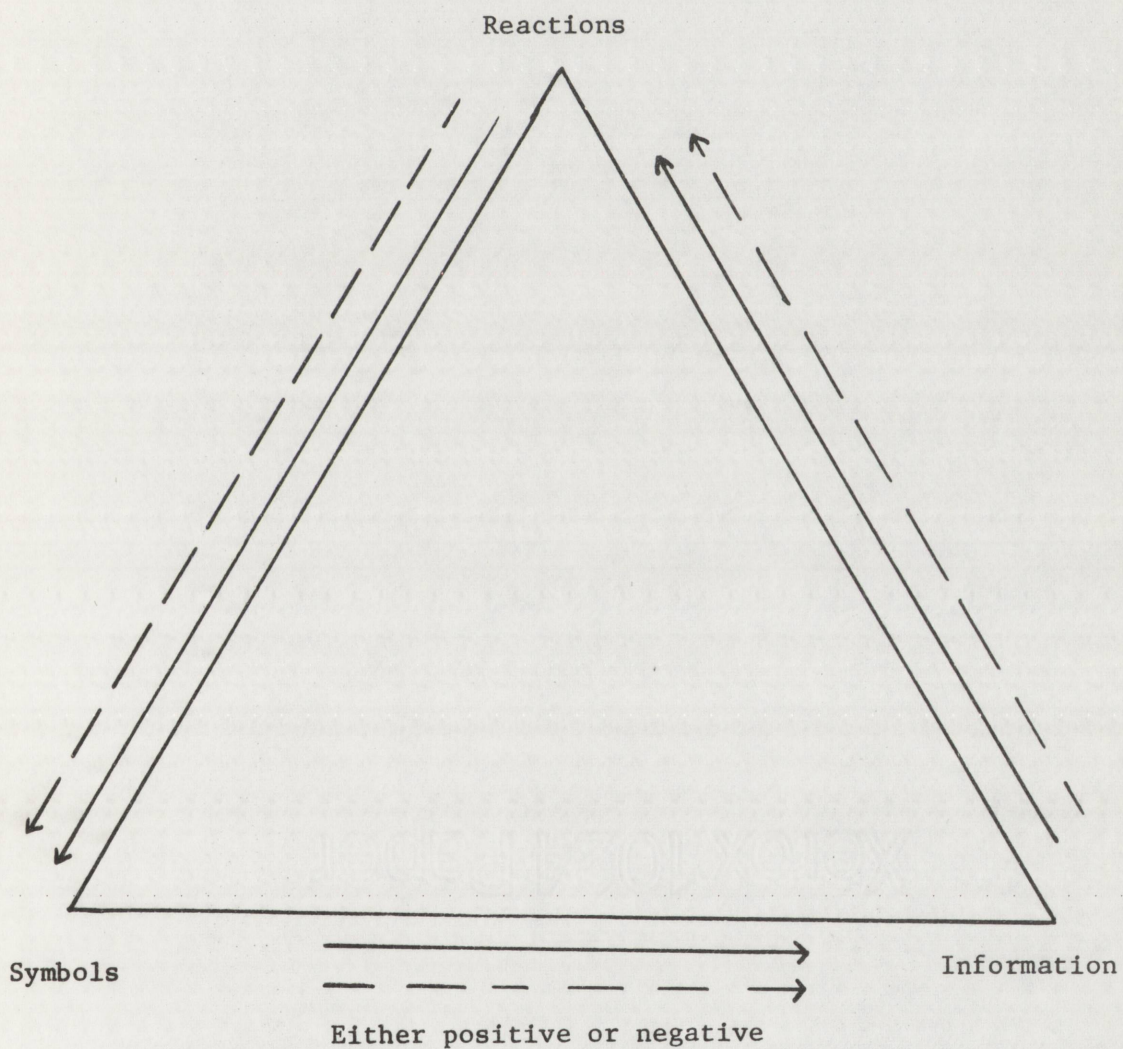


Diagram 17. The Perceptual Process Cycle.

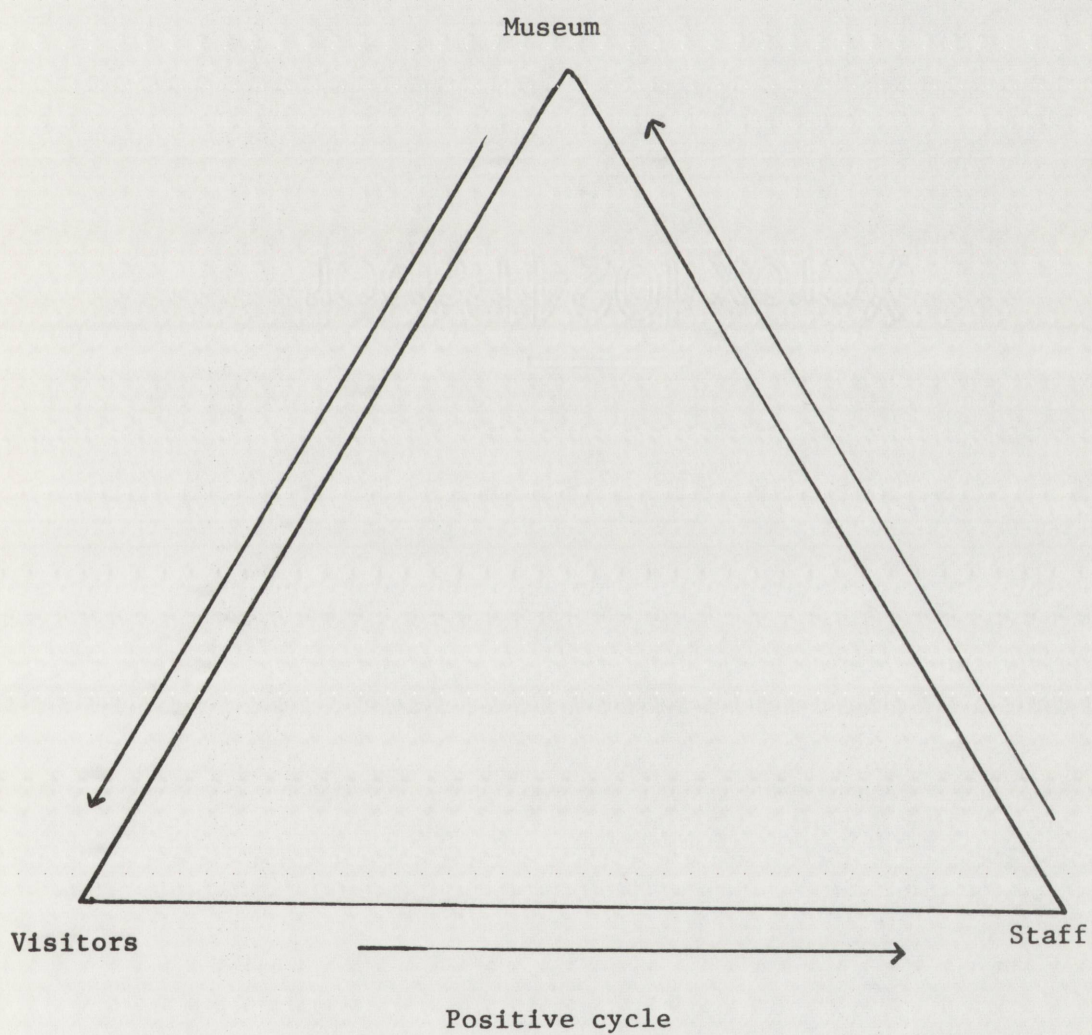


Diagram 18. The Interaction Cycle.

individuals are engaged in specific activities, a positive feature in that it contributes to overall museum coordination and interaction.

The individual's specific activities often do not coincide with each other, and this can be a negative feature. The museum coordination of such segmented activities provides a basis for interaction. Thus, the cycle is positively balanced with two negative features and one positive feature. The museum's broad aims necessitate the incorporation of many dissimilar activities but unite them by common goals. Thus, even within a division, individuals may differ in activities, but can profitably interact, since all activities are necessary for a holistic museum program.

Interaction in the museum is the basis of educational interaction. This cycle consists of education staff, guided visitors, and unguided visitors, as shown in Diagram 19, p. 91. The dichotomy between education staffs and unguided visitors is the crucial relationship causing the cycle to be negative. Since education staffs are usually concerned with formal programs, and thus formal tours for guided visitors, provision is not made for unguided, unscheduled, and other "spontaneous" groups. The movement of visitors through space is usually guided by education personnel. An amorphous situation results in regard to the unscheduled visitor. This may range from complete neglect of visitors to hostility on the parts of the education staff and unguided visitors, or to concentration on selected unguided visitors, with special treatment to the exclusion of others. This occurs because education staff may view education as an active process of

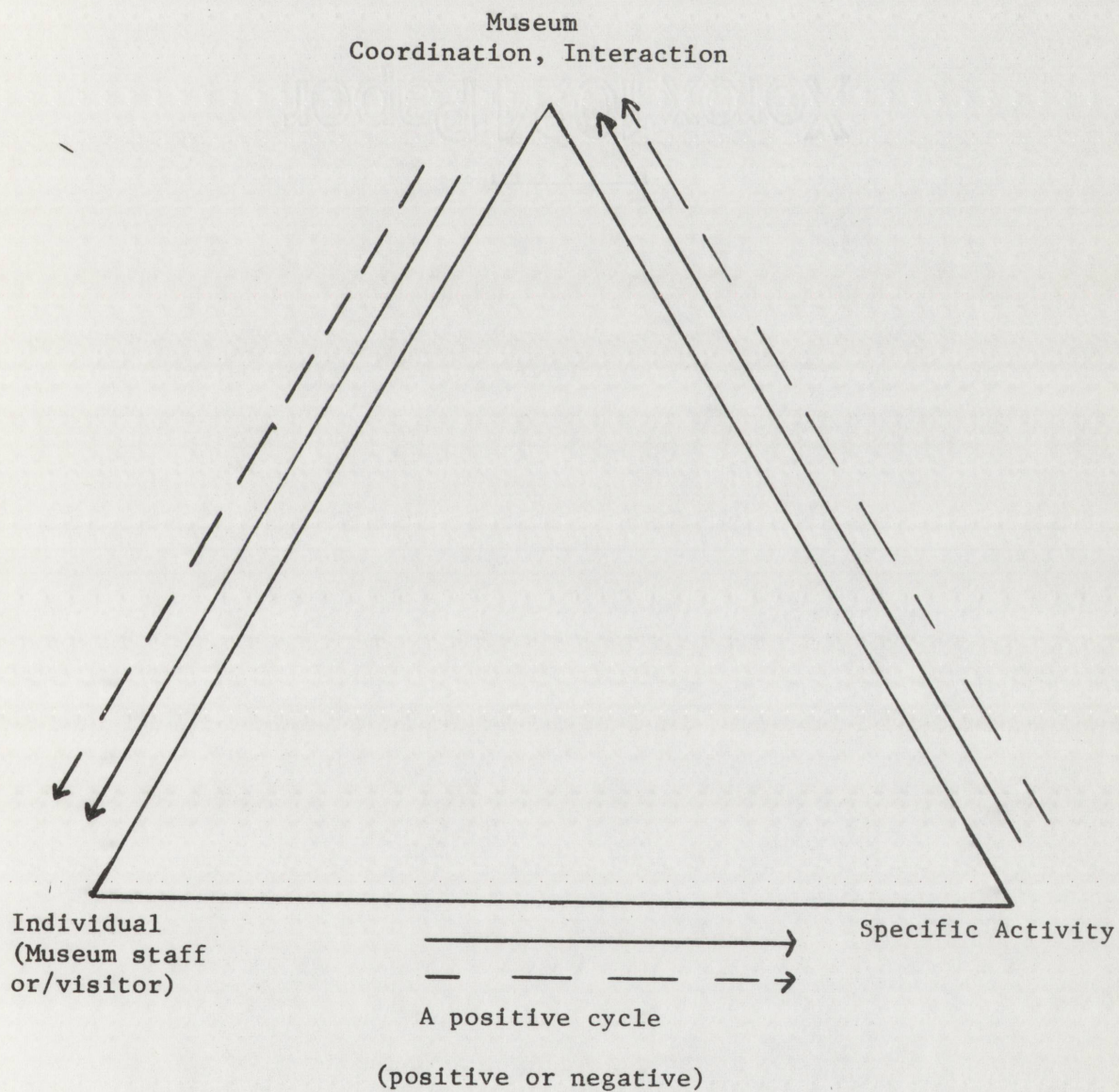


Diagram 19, Part 1. The Interaction Process Cycle.

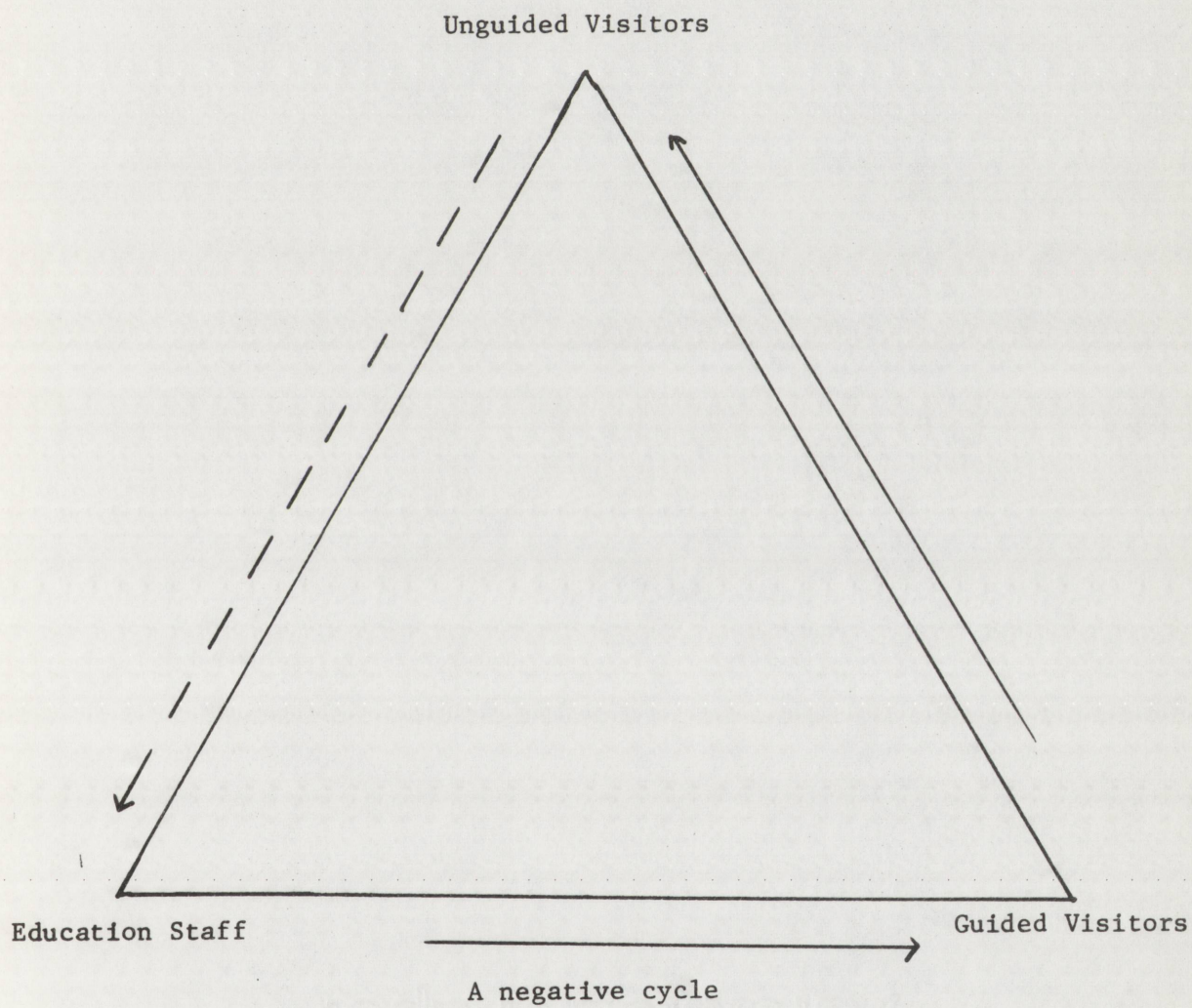


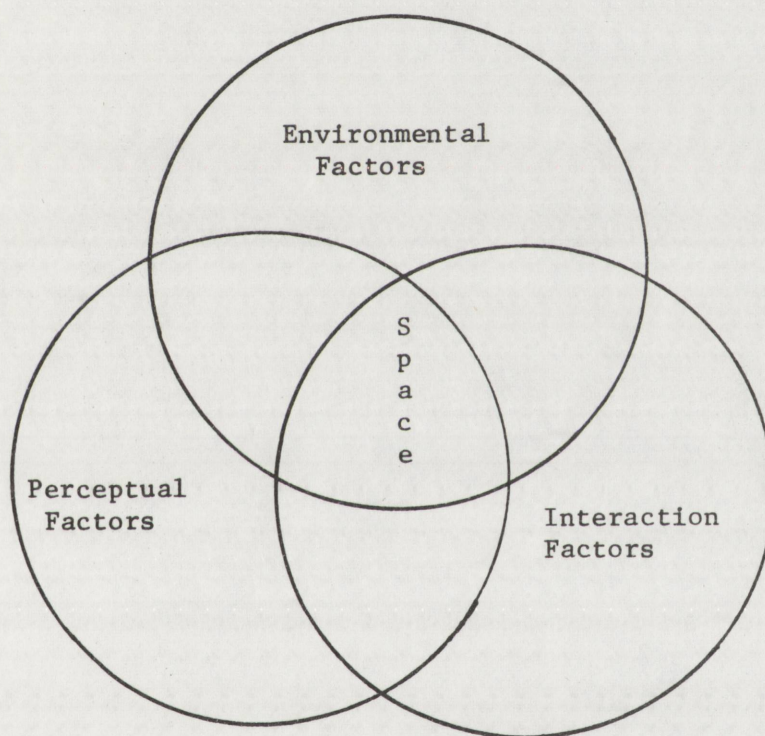
Diagram 19, Part 2. Education Interactive Cycle.

planned participation between themselves and visitors, although education may occur on many levels.

A visitor who "strays" into the museum should be provided for as well as a large scheduled group. Exhibits and staff must be oriented to include and provide for all kinds and levels of education. The educational staff may find such visitors distracting should they appear during a scheduled visit. Some individuals prefer to carve out their territory according to their needs and may resent education personnel interference, even though their purpose is directed towards some level of gaining access of information. The primary reason that educational interaction is negatively balanced and unsatisfactory is that museum education programs center on tours, "per yearly capita," and not on educational experience. In order for this cycle to become positively balanced, education programs in the museum must become client-centered as opposed to tour-centered. This seems paradoxical since it is the distinction of clientele that causes the disjuncture as described in the present cycle. However, a re-examination of the needs of all clients would show that informational needs do differ. Adjustments must be made in terms of kinds of visitor membership and lead to an emphasis of individualized instruction. By this is meant a direction towards considering the environment holistically so that its features may be reordered. Through these efforts, more educational opportunity would be present for guided or unguided groups. The individuals would order experience even in the absence of the education staff by allowing the option for choice to be made at the individual level and not by the staff.

This dissertation has examined the nature of space in the museum and has constructed a model by determining the structure of the underlying elements. A super-cycle may be constructed which reflects all spatial factors operating in the museum. These consist of the environmental elements, territoriality, material access, object display, and a membership in the territory. The perceptual factors are the luminous, sonic, and thermal environments; sign language, action language, and object language; objects and people in total space. The interaction factors are symbols, information, and reactions; visitors, staff, and the museum; guided visitors, unguided visitors, and the education staff; individual activity, specialized activity, and museum aims, and interactive coordination. A super-cycle may be constructed which reflects all of the spatial factors that operate in the museum. This is represented in Diagram 20, p. 94. Should this model be transferred into a linear model, it would have two tetrahedrons, with the exception of the two flat sides where both tetrahedrons meet. This is the shaded space in Diagram 20.

In summary, all of the elements and processes of space may be shown in a balance diagram, also in Diagram 21, p. 95. The essential kinds of space are inner space, outer space, and in-between space. Inner space is micro space (Fuller, 1963, 1969). It consists of structure which is internal, such as inside a body, and what goes on within it. Outer space is concerned with solid space, called forms, and is also micro space. This might be the body itself and its motion, but not the internal mechanisms. In-between space is process space. It involves



A Venn Diagram

Diagram 20. The Super Cycles of the Main Model.

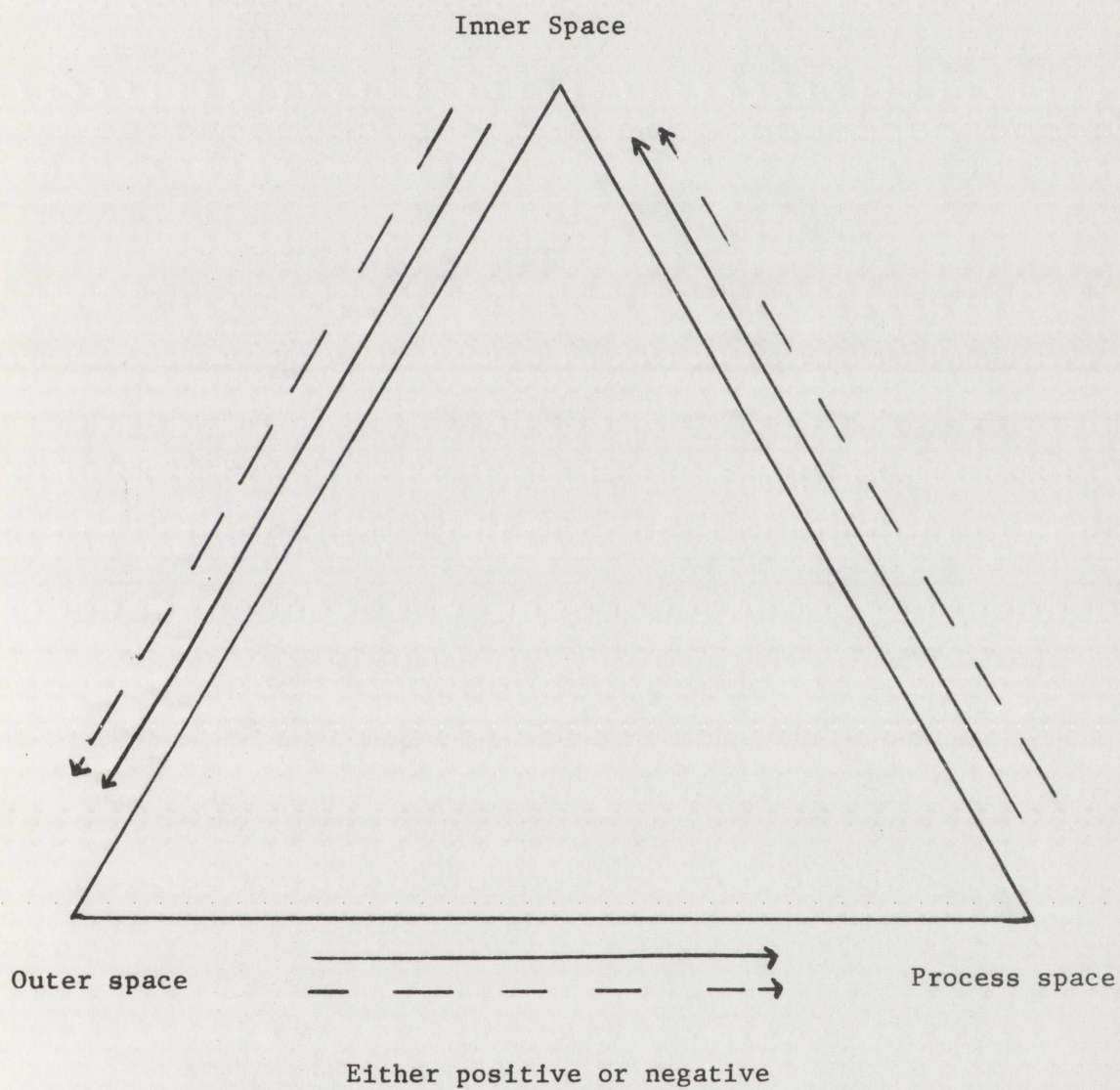


Diagram 21. The Spatial Process in the Museum.

space between solids and total space. Process space is macro space. Process space is particularly important because it suggests that all process (interactive, perceptual, and environmental) occurs between points or the features.

The features or elements discussed in the cycles are structural and have separate identities. The process space is gestalt and cannot be separated into elements. Thus, the model brings two ordinarily incompatible theories, structuralism and gestalt, together. The idea of process space is concerned with energy transformations. It differs from analogies in that it suggests all energy states occur between points and that is what is called steady state. The total space of operations is a system. It is the space between yin and yang, the energy process known as life itself.

APPENDIX A

DESCRIPTION OF MUSEUM IN THIS STUDY

The museum described in this dissertation was the Maxwell Museum of Anthropology of the University of New Mexico. This museum serves the general public , and is used as a basis for research and collections for the anthropology department, to which it is attached. The museum is a member of the American Association of Museums, and on the regional level is a member of the Mountain Plains Museum Conference. The museum was opened in 1935 and has occupied its present building since 1963.

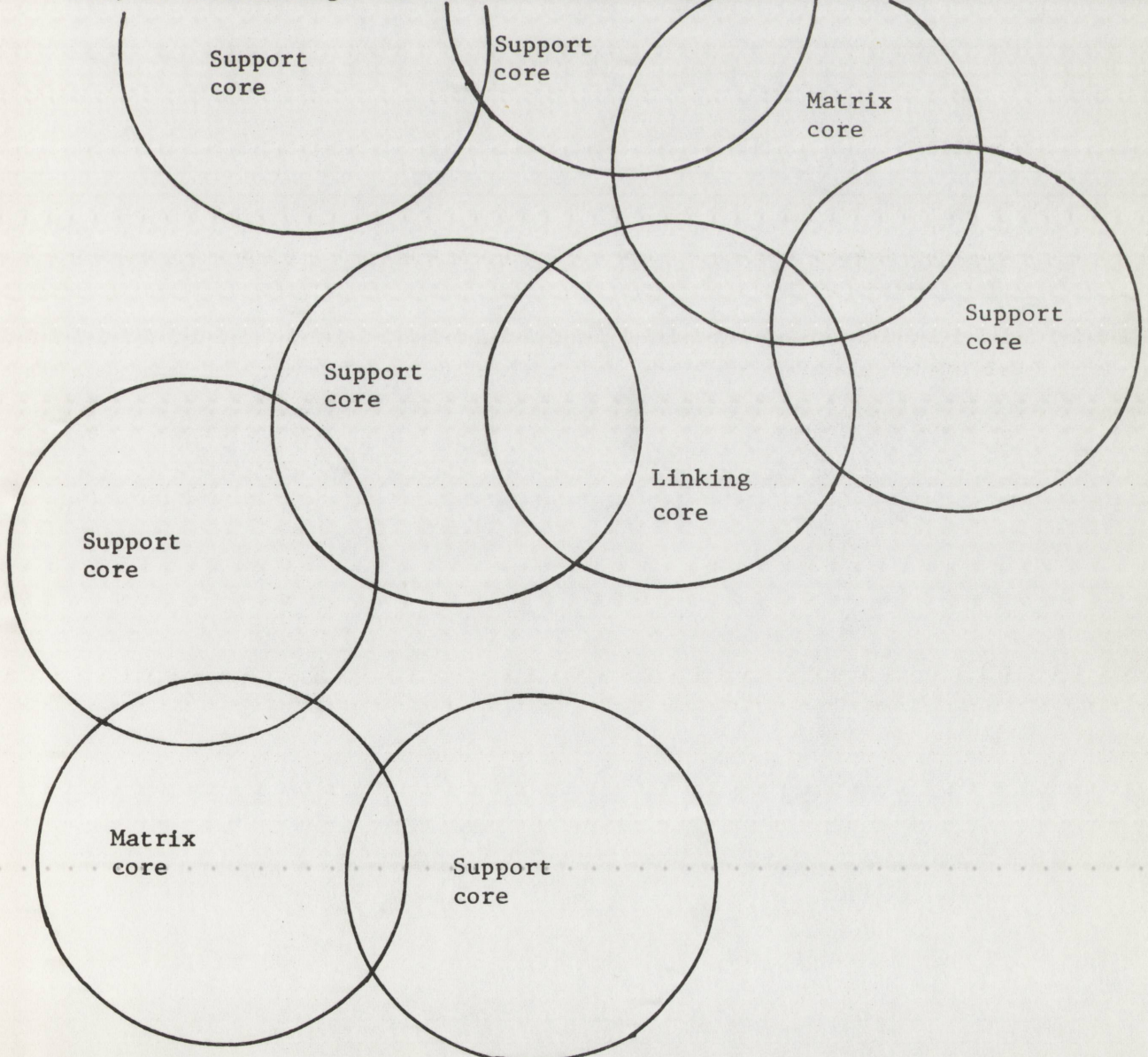
An educational program and division were set up by this writer in 1968. The Education Division staff includes one chief docent or guide, and three docents, who are all graduate students. Twelve ladies who are faculty wives serve as volunteer docents on a regular basis. All of the above personnel contribute to educational policy and procedures, as well as to the other educational activities of the division. The division offers tours to all ages and all kinds of groups, although the major part of its clientele comes from the public schools. In addition, visits are made to schools and occasionally to community affairs. The members of the Education Division aim to offer each group a specialized tour or visit based on each group's needs, background, and cultural heritage. All the guides receive instruction and attend service workshops. The major method of teaching for the tours is the dialogue technique, as opposed to the older method of lecturing.

The museum personnel include an acting director, curator, registrar, and secretary. Work-study personnel serve in many capacities, such as building exhibits and planning displays. The museum has a collection of approximately 50,000 objects.

APPENDIX B

A COREPLAN MODULE

The coreplan is an example of a structurally oriented series of displays. It exemplifies how flexible a learning experience may be in the museum. The coreplan refers to an entire museum exhibit. A module may be further broken down into individual circular units. Sometimes, as in this modular unit, the circular shape is disguised in the overlapping. Note that the matrix is not always in the middle, or outstanding. It is the structural glue, the theme.



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CURRICULUM VITAE

Margaret Ann Ramsey (née Agats) was born in Allentown, Pennsylvania, on September 16, 1945. Her family moved to Albuquerque, New Mexico, in 1953, and she attended schools there.

Mrs. Ramsey graduated from the University of New Mexico in February, 1968, with a Bachelor of Arts degree in Secondary Education. That degree emphasized English, with a minor in anthropology. From February, 1968, to June, 1968, she taught ninth-grade language arts at Cleveland Junior High School in Albuquerque. In September, 1968, she received a graduate assistantship in Educational Foundations to work as Chief Docent and head of the Education Division at the Maxwell Museum of Anthropology of the University of New Mexico. She held that assistantship until completion of her doctoral dissertation in June, 1971. During the summers of 1969 and 1970, she also directed multi-cultural workshops at the University of New Mexico.

Beginning on July 1, 1971, Mrs. Ramsey will be appointed to the faculty of The Pennsylvania State University as an educational anthropologist in the Division of Education Policy.

Margaret Ramsey has two daughters, Karen Karla, born July 25, 1963, and Angela Kristine, born October 6, 1966.