May 25, 1961

To the Graduate Council:

I am submitting herewith a thesis written by Arliss L. Roaden entitled "An Analysis and Synthesis of Theory Constructs in Educational Administration." I recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Education, with a major in Educational Administration and Supervision.

Major Professor

We have read this thesis and recommend its acceptance:

Elbert L. Henson

John W Gilliland

Howard F. Aldmon

Ira N. Chiles

Accepted for the Council:

Acting Dean of the Graduate School

LIBRARY
UNIVERSITY OF TENNESSEE
KNOXVILLE

AN ANALYSIS AND SYNTHESIS OF THEORY CONSTRUCTS IN EDUCATIONAL ADMINISTRATION

A Thesis

Presented to

the Graduate Council of

The University of Tennessee

In Partial Fulfillment

of the Requirements for the Degree

Doctor of Education

---

by

Arliss L. Roaden

June 1961

ACKNOWLEDGMENT

Logic and consistency were the critical factors in the development of this study; such, perhaps, is always the case when one is dealing with abstractions. When these and other problems were encountered--and such was frequent, indeed--Professor Orin B. Graff always made it a point to take time for talking through the problematic issues. Professor Graff's capacity for directing attention to ideas and issues of maximum importance, and always in the kindliest manner, made of learning and writing the joyful experiences they ought always to be.

In addition to Professor Graff, who served as chairman of the writer's graduate committee, all other members of the committee went far beyond the call of duty in sharing their time and wisdom. Grateful appreciation is, therefore, expressed to Professors Howard F. Aldmon, William E. Cole, Ira N. Chiles, John W. Gilliland and E. Curtis Henson. Professor Galen N. Drewry and Dean Dale Wantling, who were committee members prior to their departure from the University, were unusually helpful in the planning stages of the study.

To Mr. Henry M. Chiles, for making available private office space for uninterrupted study and writing, many thanks. Mrs. Harold Wimberly's kindness and generous help to a sporadic writer made her much more than the typist--no small chore within itself.

492550

Members of my family, Mary Etta, Janice and Sharon, were always tolerant and understanding of a preoccupied husband and father--a feat that was not always easy for them.

TABLE OF CONTENTS

CHAPTER		PAGE
I.	INTRODUCTION	1
	General Introduction	1
	Educational Administration as a Focus of Study	4
	Theory of Educational Administration as a Focus of Study	11
	The Problem	15
	Significance of the Study	18
	Criteria for Definition of Terms	22
	Method of the Study	25
	Organization of the Study	29
II.	THE NATURE OF THEORY: ITS BASIC CONSTRUCTS AND ITS APPLICATION IN EDUCATIONAL ADMINISTRATION	32
	Introduction	32
	The Universality of Theory	33
	The Scientific Context of Theory Construction	36
	Review, Interpretation and Elaboration of Discussions on Theory by Selected Authors .	38
	The Basic Constructs of Theory	90
	The Purposes of Theory in Educational Administration	91

CHAPTER		PAGE
II.	(continued)	
	Major Controversial Issues Among Theorists .	93
	Chapter Summary	97
III.	THEORY FOUNDATIONS IN PHILOSOPHIC AND SCIENTIFIC SYSTEMS OF INQUIRY	100
	Introduction	100
	A Deterministic Philosophy of Science . . .	102
	A Relativistic Philosophy of Science . . .	112
	Philosophy of Science and Theory of Educational Administration	121
	Chapter Summary	125
IV.	PSYCHOLOGICAL BASES OF THEORY	127
	Introduction	127
	The Historical Evolvement of Perceptual Theory	129
	Perceptual Theories	134
	Perceptual Determinants	141
	Efforts Toward an Integrated Theory of Perception	146
	Perception and Administrative Theory . . .	152
	Chapter Summary	157
V.	THE ANALYSIS AND SYNTHESIS OF THEORY CONSTRUCTS	160
	Introduction	160

CHAPTER PAGE

V. (continued)

The Analysis 162

The Synthesis 183

Chapter Summary 190

VI. AXIOMATIC BASES FOR THEORIZING IN EDUCATIONAL ADMINISTRATION 193

Introduction 193

Efforts Toward Resolution of Controversial Issues 196

Axiomatic Bases 200

BIBLIOGRAPHY 204

CHAPTER I

INTRODUCTION

A. GENERAL INTRODUCTION

> The difference between the 'practical' and the 'theoretical' in school administration and the relationship between the two is up for renewed discussion. This kind of argument used to be pretty much localized to exchanges between professors and their students. When they left the campus, many students felt they had escaped the ivory tower of theory to enter the 'real' world of practice. This is no longer the case.
>
> Interest in practical theory and in sound theoretical practice has been widely stirred within the past few years. The studies and conferences of the Cooperative Project on Educational Administration has related practitioners and professors directly and in great number. This relationship promises to continue as the Committee for the Advancement of School Administration extends consideration of what is good practice and what is sound theory throughout the profession nationally.[1]

The preceding statement by Van Miller seems to set forth accurately some important considerations by school administrators, professors of educational administration, social scientists and students of school administration. There is a vast range of opinions regarding the nature of administrative theory and of administrative practice in education, whether there is an interdependent relationship

---

[1]Van Miller, "The Practical Art of Using Theory," School Executive, LXXVII (June, 1958), 60.

between the two or if there exists a sharp dichotomy.

The entirety of this study was a detailed examination of the nature and structure of theory; however, because of wide differences in the interpretation of theory, it seemed important at the outset to give some clarity to the interpretation which was adhered to throughout this study. To clarify the position taken, some postulates are set forth in the following paragraphs.

1. Theory cannot be disassociated from the human process of theorizing. This postulate may appear to be self-evident; however, there is substantial evidence to suppose that some writers would be unwilling to accept it. Much has been written about administrative theory, educational theory, and social theory, but far less has been written about the process of theorizing. Consequently, theory has taken on a neutral, detached meaning, which is readily discernible from investigations of the various one line or one paragraph definitions given to theory. It could be said that theory is the product of theorizing by the theorist, a definition not as absurd as it may sound. The only absurdity is the attempt to communicate meaning of abstractions through short definitions. Even the product of the theorist to be of maximum usefulness for another person must be literally re-theorized by him. This discussion leads us to the next postulate which is related to the first.

2. Theorizing is an interdependent combination of deductive and inductive processes. This postulate is meant to thwart immediate engagement by the reader in mentally dichotomizing the two processes. Such a dichotomy erupts in various forms. The more frequent ones being (1) "theory starts with deduction" versus "theory starts with induction"; (2) "theory building is a mental process" versus "theory building is a physical (through experience) process"; and (3) "theory building is an observational process" versus "theory building is a logical process." Certainly no attempt was made to avoid consideration of these issues. The postulate is made for the purpose of freeing the reader for concentration on what appeared to be more logical considerations of theory building.

3. Theorizing is fundamentally and primarily a purposeful activity. This postulate has a host of inferences and implications within the milieu of theory controversies. It seemed more appropriate, however, to draw the inferences and make the implications in subsequent sections of the study where more logical relationships may be shown. The point was made here to eliminate the notion that theorizing is an activity confined to the charlatan on the one hand and to the busy worker on the other hand. Of course, there are degrees of quality of theorizing; thus, the purposes of the theorizer may be on a very low level.

4. Theorizing is on a continuum of space, time, and relevance. Some theories are more comprehensive and general than others; some are of more immediate use than others; and some are more useful than others. Also, there are specific theories of an individual act of administrative behavior, more general theories about administrative processes, still more general theories of social interaction, and finally theories of a broad philosophical nature.

Here again, this postulate has some far-reaching inferences in theory controversies which were postponed for later treatment. Suffice it to say here that dichotomizing scientific theory and philosophic theory is an unfruitful, perhaps an impossible, activity. Of course, for clarity, it is necessary to specify what it is one is theorizing about; but to claim a priority on theory for the philosopher or for the scientist gets one nowhere.

B. EDUCATIONAL ADMINISTRATION AS A FOCUS OF STUDY

With the foregoing introduction regarding the treatment of theory, the next logical inquiry would be to examine its relevance to the study of educational administration.

An implied concern about administrative leadership has existed as long as there has been concern for education, however, this concern historically has not been focused on

administration. As a matter of fact, school administration is a fairly recent arrival in American education.

> At the midpoint of the nineteenth century very few communities employed superintendents of schools. . . . Having just been created by citizens who had come to realize that the direction of education called for knowledge and skills not possessed by laymen, it [school administration] was cautiously but resolutely establishing itself on the educational frontier.[2]

The American Association of School Administrators (AASA) was organized in 1865; at that time the organization was known as the National Association of School Superintendents.[3]

This professional association of superintendents perhaps played the major role in initiating extensive studies in school administration. In 1947 the AASA planning committee recommended that studies and programs be initiated at once to instigate further professionalization of the superintendency through improved training programs, refined standards for selection by boards of education, and more extensive participation in the activities of the profession. The recommendation was accepted by the AASA membership.[4]

---

[2]American Association of School Administrators, You and AASA Going Places Together (Washington: American Association of School Administrators, 1958), p. 5.

[3]Ibid.

[4]Hollis A. Moore, Jr., Studies in School Administration (Washington: American Association of School Administrators, 1957), pp. 1-23.

It was during this same year, 1947, at the annual AASA meeting that plans were initiated for an August meeting of a group, the majority of whom were professors engaged in training educational administrators. The group was to discuss mutual problems encountered in preparation programs and the methods utilized in solving these problems. The first conference of professors of educational administration ever held on a national scale was at Endicott, New York. International Business Machine Corporation provided physical facilities for this meeting. The National Conference of Professors of Educational Administration (NCPEA) meetings became an annual affair.[5]

It was in January, 1946, that an advisory committee on educational projects for the W. K. Kellogg Foundation of Battle Creek, Michigan, recommended to the Foundation that it enter the field of public school administration. As Hollis A. Moore, Jr., suggests, it was, indeed, a recommendation with exciting consequences.[6]

In November, 1947, AASA made an official proposal to the W. K. Kellogg Foundation; the project called for the

---

[5]William R. Flescher and A. L. Knoblauch, A Decade of Development in Educational Leadership (The National Conference of Professors of Educational Administration, 1957), pp. ix-x, 1-8.

[6]Moore, op. cit., p. 1.

appointment of a national commission to conduct a project for upgrading the professional competence of the superintendency of schools. A grant of $75,000 was requested for operation during the first year. Early the next year the Foundation rejected the proposal but agreed to support a series of exploratory conferences of administrators, graduate school faculty members, and representatives of state and federal agencies to ascertain the feasibility of some national study and to make recommendations for consideration by the Foundation.

Five regional conferences were jointly sponsored by AASA, the Council of Chief State School Officers and the National Conference of County and Rural Area Superintendents. Out of the recommendations of these conferences and the foresight and ingenuity of the Foundation came a scurry of activity throughout this country and Canada in a program known as the Cooperative Program in Educational Administration (CPEA). Instead of a program for studying the superintendency there came a nation-wide study of every aspect of school administration. The Foundation invited proposals from universities from which five were initially selected and subsequently three additional ones to serve as regional headquarters for the exploration and research. A five-year project was launched with an initial grant of approximately

$3,400,000.[7] Some of the projects were extended for an additional four-year period. New institutions, particularly in the South and Southwest, were awarded grants for concentration in the area of graduate program improvement.[8] Throughout the nine-year period, 1950-1959, Kellogg awarded grants totaling some nine million dollars.[9] In addition to the Kellogg grants, participating agencies and institutions contributed to the program. For example, Kellogg awarded some $1,025,000 to the Southern States Cooperative Program in Educational Administration (SSCPEA), while participating institutions and agencies contributed what has been conservatively estimated as $1,200,000.[10]

Two additional organizations, the Committee for the Advancement of School Administration (CASA) and the University Council for Educational Administration (UCEA), should be mentioned here. CASA was created in 1955 through Kellogg support as an agency of AASA.

---

[7] Ibid., p. 18.

[8] Hollis Moore, Jr., "Things Are Happening All Over," Phi Delta Kappan, XLI (November, 1959), 42.

[9] Daniel E. Griffiths, Administrative Theory (New York: Appleton-Century-Crofts, Inc., 1959), p. 5.

[10] Truman M. Pierce and A. D. Albright, A Profession in Transition (The Southern States Cooperative Program in Educational Administration and The Associated Programs in Educational Administration, 1960), p. 180.

> The committee's job in essence was to observe the institutional projects as they completed their original plans and as they reached conclusions about actions necessary to give lasting professional status to school administration.[11]

The committee played a vital role in spearheading efforts at professionalization; among these were AASA's membership requirement of two years' graduate study, and the committee drafted for the National Council for the Accreditation of Teacher Education (NCATE) standards for accrediting graduate programs for training school administrators.[12]

One of the last grants by the W. K. Kellogg Foundation in the national school administration program was in response to a recommendation of the CPEA Middle Atlantic Region for the formation of the University Council for Educational Administration. The Council, organized in 1957, is a corporation of some forty institutions engaged in preparing educational administrators, and is located at The Ohio State University Campus. The Council "has been organized to provide a means of inter-university cooperation for improving the preparation of school administrators and for conducting a comprehensive program of educational research."[13]

---

[11]Moore, "Things Are Happening All Over," op. cit., p. 42.

[12]American Association of School Administrators Yearbook Commission, Professional Administrators for America's Schools, Thirty-Eighth Yearbook (Washington: American Association of School Administrators, 1960), pp. 277-278.

[13]Griffiths, op. cit., p. 5.

A decade of accelerated programs of study and research has concluded with indications that there is still much to do and much will continue to be done. The AASA with its Committee for the Advancement of School Administration, the NCPEA and the UCEA are still working to improve the profession. Some of the earlier CPEA regions are still continuing cooperative efforts.

It is of interest to note that early efforts for intensively studying school administration came from AASA, the professional organization of school superintendents. It is a healthy sign when a group of professional people are dissatisfied with the way they are operating and they initiate a study for self-improvement.

Another interesting thing to note is the wisdom displayed by the staff members of the W. K. Kellogg Foundation in their insistence on a nation-wide study of the entire field of educational administration instead of just the superintendency. One can only speculate on the outcome if the initial AASA proposal for studying the superintendency had been approved. It appears that such an approval excluding other levels of school administration would have been most unfortunate.

One can only speculate on the total number mustered in this total CPEA study; in the Southern Region alone more than 35,000 persons--professors, administrators, students

and laymen--had some part in the program.[14]

C. THEORY OF EDUCATIONAL ADMINISTRATION AS A FOCUS OF STUDY

Once serious consideration was given to problems in educational administration, it was inevitable that questions of a theoretical nature would be raised. Moore, reporting on the first five-year CPEA project reported that, "The natural next step from schematic approaches to research in school administration is the development of a theory."[15] At the conclusion of the nine-year project he reported that, "Study of administrative theory is currently in vogue, and the impact of such development is likely to influence research in this field to a marked degree."[16]

The first seminar of UCEA was jointly sponsored with the Midwest Administration Center at the University of Chicago, November 11, 12, and 13, 1957, and was devoted to the role of theory in educational administration.[17] This

---

[14]Pierce and Albright, op. cit., p. 180.

[15]Moore, Studies in School Administration, op. cit., p. 29.

[16]Moore, "Things Are Happening All Over," op. cit., p. 44.

[17]The proceedings of this seminar were reported in Administrative Theory in Education, Andrew W. Halpin, editor (Chicago: Midwest Administration Center, 1958).

seminar was a sharing of ideas among professors of educational administration and social scientists. Two years later, November 1959, the Midwest Administration Center conducted another seminar which included in addition to professors of education and social scientists, those practicing school administrators who expressed interest in examining theoretical concepts and in exchanging ideas.[18] UCEA has continued active promotion of theoretical considerations in educational administration.

The NCPEA membership in 1954 approved Conference sponsorship of a publication which would synthesize research findings in administration and generalize implications for preparation programs for educational administrators. The authors of this book found themselves wrestling with theoretical considerations.[19]

The staff and regional participants in the SSCPEA concentrated their efforts mainly on preparation programs for educational administrators, and their first big consideration was to determine factors relating to effective or competent

---

[18]The proceedings of this seminar were reported in Administrative Theory as a Guide to Action, Roald F. Campbell and James M. Lipham, editors (Chicago: Midwest Administration Center, 1960).

[19]Roald F. Campbell and Russell T. Gregg (eds.), Administrative Behavior in Education; sponsored by the National Conference of Professors of Educational Administration (New York: Harper and Brothers, 1957).

administrators. Thus came formulation of what is known as the Competency Pattern.[20] A prime ingredient of the Competency Pattern was a theory of educational administration; the other ingredients were identified as "job" and "know-how."[21] The relationships of these three elements of the SSCPEA Competency Pattern are outlined as follows:

> The job is central, and evaluation of competence is in terms of job performance. Theory is . . . the base of the pattern and is considered essential since all performance is, consciously or unconsciously, carried on in terms of some theory. Remembering the assumption that 'a workable competency pattern can have but a single theory,' we recognize that theory provides the guideposts and evaluative criteria needed to insure consistency and logic throughout the pattern. The job tasks and the necessary know-how must not contradict the basic theory. . . . the job comprises the body of the pattern. It is composed of the things to be done and is supported by and reflected in the know-how essential to their doing.[22]

The totality of the Competency Pattern may, itself, be considered a general theory of administrative competence.

---

[20]Southern States Cooperative Program in Educational Administration, Better Teaching in School Administration (Nashville: Southern States Cooperative Program in Educational Administration, 1955).

[21]An elaboration on the competency concept in educational administration with emphases on philosophical, psychological and sociological bases is presented in Orin B. Graff and Calvin M. Street, Improving Competence in Educational Administration (New York: Harper and Brothers, 1956).

[22]Graff and Street, ibid., pp. 45-46.

In addition to the NCPEA publication, Administrative Behavior in Education, the Conference members have had "Administrative Theory" as one of several discussion topics at their annual meetings for the past few years.[23] At the 1960 Conference held at Macomb, Illinois, a general program topic was the presentation of papers and a discussion of "The Place of Values in Theory of Educational Administration."[24]

The members of the 1960 AASA Yearbook Commission concluded that, "It is clear that those who have taken upon themselves the scholarly study of our profession agree that empirical administrative processes must give way to theory. . . ."[25]

In his appraisal of research in educational administration, Griffiths says that, "Without doubt, the greatest weakness of research in educational administration is the

---

[23]This particular discussion group attracted more conference participants than any other of the eight groups at the 1960 NCPEA Conference held at Macomb, Illinois, August 21-27, 1960.

[24]Professors Daniel E. Griffiths and Lawrence Iannaccone presented papers in support of the value-free nature of theory. Professors Orin B. Graff and John Ramseyer presented papers in support of the value-packed nature of theory.

[25]American Association of School Administrators, Professional Administrators for America's Schools, Thirty-eighth Yearbook, 1960 (Washington: American Association of School Administrators, 1960), p. 103.

lack of theory."[26]

The above paragraphs should be ample evidence that theory is of wide concern to those involved in educational administration. As was noted earlier, it was inevitable that with the growing concern in educational administration, there would appear the theory problem. An inquisitive child is not long content with manipulating an interesting toy, but soon he starts minutely examining its components, experimenting with new uses for the toy, and determining what its capacities are. So it is in educational administration, or any other field, when inquisitive people become concerned, there results generalizations about the nature, the purposes and the possibilities of the area under study.

D. THE PROBLEM

The foregoing was a brief review of accelerated interest and concern for intensive study in the field of educational administration, especially in the realm of administrative theory.

The purpose of this study was to offer a logical explanation of the process of theory construction in educational administration so that wide differences of opinion

---

[26]Daniel E. Griffiths, Research in Educational Administration, An Appraisal and a Plan (New York: Teachers College, Columbia University, Bureau of Publications, 1959), p. 16.

regarding administrative theory may be reduced. These controversial issues tend to hamper united efforts for improvement of the profession.

The existence of such controversial issues among those engaged in the profession and concerned for its improvement constituted the problem of this study. To attack this problem adequately, five sub-problems were identified for solution. These sub-problems are listed below with some explanation of their treatment in the study.

Sub-problem 1--to determine, through review of literature, some general understandings of the basic nature and constructs of theory, the uses for which theory may be employed in educational administration and to identify the major controversial issues regarding the nature of theory and its uses.

This sub-problem was treated first in the study to provide a setting for the logical explanation of theory construction in subsequent sections of the study. Specifically, the sub-problem was treated to provide an explanation of what theory is generally considered to be. Also, to provide a focal point for the theory construction process, it was necessary to identify some basic constructs of theory. Finally, it was deemed important to identify early in the study the major controversial issues regarding the nature of and uses for theory. The investigations relative to this

first sub-problem were for informational purposes so that the basic problem of the study would be described clearly before efforts at its solution were initiated.

Sub-problem 2--to examine systems of inquiry and psychological research for the purpose of identifying the genesis of and the context of controversial issues regarding theory.

Treatment of this sub-problem was to pinpoint the origin and context of different points of view regarding theory. The historical evolvement of the method of science and the philosophical framework embodying opinions about the nature and uses of science were discussed in some detail.

Sub-problem 3--to examine analytically theory constructs for the purpose of identifying their nature, their derivation and their usefulness for educational administration.

Sub-problem 4--to synthesize the theory elements so that a logical relationship will ensue.

Following the analysis of theory constructs, with the meanings attributed to these elements, it was possible to logically synthesize the elements into an organismic view of theory. For clarity, some mention was made of the synthesis which may have resulted if different logic or a different frame of reference had been employed.

Sub-problem 5--to outline some axiomatic bases for

intelligent theory construction in educational administration.

These axioms are derived from the logic of the study. Their validity rests on the soundness of the argumentation and the logical development of the study. On the basis of findings in this study, these axioms were drawn to provide direction for those who engage in theorizing in educational administration.

E. SIGNIFICANCE OF THE STUDY

It is most refreshing to note the interest that is being given to theoretical matters in education and educational administration. It is a change from the "how-to-do-it" analyses to a careful look at meanings and purposes to give directions for improvement. In discussing the place of philosophy in educational research, Clyde V. Martin points out the following:

> It should be borne in mind that education comprehends the renewal of the very substance of civilization. Its concerns run far beyond the methodological. Only at the greatest peril to civilization itself can education fail constantly to reconsider its basic aims and functions. Quality is as important as quantity. Perhaps nowhere in the modern world does the latter receive more respect than in America, and considerations of the former suffer more from neglect.[27]

---

[27]Clyde V. Martin, "The Place of Philosophy in Educational Research," Phi Delta Kappan, XL (October, 1958), 40.

Martin quotes Robert Ulich regarding the sparsity of research geared to generalization:

> According to the bibliographies of 'Doctors' Theses under Way in Education' in the Journal of Educational Research during the years 1930 to 1936, more than 90 per cent of the intended dissertations were dedicated to techniques, to organizations, to experimental and descriptive forms of psychology, to testing and measurements, while less than 10 per cent were concerned with those problems which give to our whole educational endeavor its sense of direction with values and aims in education and civilization, the thoughts and problems of the great leaders, the relation of education to the history of religion and philosophy and to the development of literature, art, and the sciences, and the great human institutions.[28]

Martin comments that his analysis of doctoral dissertations under way during the academic year 1950-1951 confirm that only a small fraction of the research in education is given over to studies geared to levels of high generalization.[29]

Griffiths points out the sparsity of research in educational administration compared to that done in other fields. For example, in 1957 for some 594 published and unpublished researches in educational administration, there were 9,074 in psychology and 112,000 in chemistry.[30]

---

[28] Ibid., citing Robert Ulich, On the Reform of Educational Research (Occasional Pamphlet No. 2, Graduate School of Education, Harvard University, 1937), p. 22.

[29] Ibid.

[30] Griffiths, Research in Educational Administration, An Appraisal and a Plan, op. cit., pp. 23-24.

The significance of a study on the structure of administrative theory lies not in its being another piece of research in educational administration, but rather its significance lies in the relationship of theory to all research in the profession. All scientific investigation proceeds from theoretical frames of reference, whether stated or unstated, conscious or unconscious.

Since the profession is young and research is limited, it is highly important that theoretical structures be minutely examined to determine their adequateness and reliability to engender research. Before structures can be built with any degree of intelligence it is necessary that there be an understanding of the nature of theory. This understanding can only come about through an examination of the process of theorizing, which is what this study purports to do.

The justification for any study of administrative theory, including this particular study, is invariably determined by two probing questions:

1. What usefulness can be attached to theory in educational administration?
2. To what extent is there commonality of agreement as to the nature and usefulness of theory in educational administration?

Essentially, then, the importance of a topic as a focus for study is gauged by its adequacy for performing certain functions; and, if there does appear to be some usefulness, are there clear understandings about the nature of the topic of study and the uses to which it may be put?

The investigations of this study revealed that there is rather general agreement that theory will provide more comprehensive and deeper understandings of educational administration. However, there is a marked difference of opinion regarding the nature of theory and the methods whereby it can be utilized to provide these greater understandings. Thus, it may be concluded that differences on this second question would render agreements on the first of minimal validity, if not completely invalid. If it is assumed that theory is the means of improvement and improvement is the goal of theory, then a clear understanding of one would require an understanding of the other, and, conversely, vagueness of one suggests vagueness of the other.

There seems to be a polarity of opinion regarding theory, ranging from broad generality to narrow specificity, from the philosophical to a specific incident of scientific inquiry. Another polarity concerns who theorizes. Some would limit this activity to the scientist, some to the philosopher, while others would solve the dilemma and have everyone theorizing. Of course, these differences hinge

largely on different understandings of the origin and nature of the theory (i.e., the process of theorizing). If theory is necessary for greater understandings in educational administration, a thesis maintained in this study, then there is a great need for some refined understandings of theory.

F. CRITERIA FOR DEFINITION OF TERMS

A very important aspect of this study was to identify with clarity pertinent terminology that has been used by theorists and to specify what meanings were intended in this study.

The important thing in any communication is for the recipient of the communique to get the intended message. It is not always possible to communicate meaning even with the most specific instructions for interpretation because of the varied experiences and understandings of people. Even in definitions and descriptions we fall into the fallacy of equating specificity with brevity and, conversely, ambiguity with prolixity. What, seemingly, has resulted is the demand for one-sentence definitions. Dwight Waldo, defining public administration, sums up this fallacy as follows:

> The immediate effect of all one-sentence or one-paragraph definitions of public administration is mental paralysis rather than enlightenment and stimulation. This is because a serious definition of the term--as against an epigrammatical definition, however witty--inevitably contains several abstract words or phrases. In short compass these

> abstract words and phrases can be explained only by other abstract words and phrases, and in the process the reality and importance of 'it' become fogged and lost.[31]

In the first section of this chapter, an effort was made to clarify to some extent the interpretation of theory that was adhered to throughout the study. Of course, the explanation was inadequate; if it were adequate, further investigations in this study would have been unwarranted. Since terminology other than "theory" pertinent to this study are necessary for an adequate definition of "theory," it was concluded that short definitions of those terms here would serve more to confuse than to clarify. These pertinent terms were, therefore, defined in their logical relationships within the theory-building process.

Essentially, the criteria for definitions throughout the study were in keeping with those set up by Professor Ernest Bayles. He proposes that a definition should:

> (1) indicate with clarity any line of action which may be involved; (2) differentiate sharply among alternatives; (3) avoid self-contradiction; (4) be as precise as feasible; and (5) in light of the foregoing, represent as much of consensus among probable users as is possible.[32]

---

[31]Dwight Waldo, The Study of Public Administration (Garden City: Doubleday and Company, Inc., 1955), p. 2.

[32]Ernest E. Bayles, Democratic Educational Theory (New York: Harper and Bros., 1960), p. 148.

Criterion 1, he tells us, was adopted from Charles Sanders Peirce, who thought that if between two ideas or thoughts there is no appreciable difference in terms of consequent action, there is no appreciable difference between the ideas.

Criterion 2 is important because of the practice of confining ourselves to the positive side.

Criterion 3, he asserts:

> . . . is also highly important. For self-contradictions cause one to be one's own enemy--probably one of the worst--and, in communication, to foster frequent confusion or misunderstanding on the part of communicatee, if not of communicator.[33]

Regarding criterion 4, he points out that "to speak with simplicity is promotive of understanding and it would seem that, if one should ever speak understandably, it would be in the definition of terms.[34]

Criterion 5 is a very elusive one and is important only after the first four have been complied with.

> These criteria are formulated on the assumption that the purpose of having a term at all is to use it for communication among human beings. The fifth criterion is proposed, therefore, so as to take advantage of whatever common usage or understanding has already been achieved, thereby reducing to a minimum the necessity of learning and using new terms and new meanings. But full

---

[33] Ibid., p. 149.

[34] Ibid.

> consensus is rarely achieved, even among our most commonly used words, so we hope only to work toward it rather than to achieve it. Moreover, consensus on a definition which would violate one or more of the first four criteria would hardly prove satisfactory.[35]

G. METHOD OF THE STUDY

It was necessary in a subsequent chapter of this study to discuss modern science so that a setting could be established for showing the context and uses of theory. However, since the study proposes to employ the method of logic, it seemed necessary to explain in some detail the logical methods used. There are varied opinions about what constitutes logic in scientific investigation.

An oft-quoted definition of theory has its system of logic built in. Herbert Feigl's definition is, ". . . a set of assumptions from which can be derived by purely logic-mathematical procedures a larger set of empirical laws."[36] Logic has long been allied to mathematics and to philosophy. The alliance with mathematics has provded for some logicians two purposes: (1) The rigidity of mathematics has provided a comfortable base of assurance, and (2) symbolism has been convenient for showing relationships.

---

[35] Ibid., p. 148.

[36] Herbert Feigl, "Principles and Problems of Theory Construction in Psychology," Current Trends in Psychological Theory (Pittsburgh: University of Pittsburgh Press, 1951), p. 182.

F. S. C. Northrop summarizes the method of initiating inquiry suggested by Descartes wherein deductive logic is propounded because of the firm and solid foundations of mathematics.[37] Leibintz conceived the idea of symbolic logic

> . . . in which the elementary operations of the process of reasoning would be represented by symbols--an alphabet of thought, so to speak--and envisaged a distant future when philosophical and theological discussions would be conducted by its means and would reach conclusions as incontrovertible as those of mathematics. Perhaps this was too much to hope, but the actual achievements of mathematical logic have been amazing. Logic, when its power has been augmented by the introduction of symbolic methods, is capable of leading from elementary premises of extreme simplicity to conclusions far beyond the reach of the unaided reason.[38]

Rather than just using mathematics to facilitate logic, Russell and Whitehead

> . . . set out to examine, and if possible to prove, . . . that mathematics is a part of logic: it is the science concerned with the logical deduction of consequences from the general premises of all reasoning so that a separate 'philosophy of mathematics' simply does not exist.[39]

Even with the advent of new relativistic mathematics which do not provide a comfortable solid base, mathematics

---

[37]F. S. C. Northrop, The Logic of the Sciences and the Humanities (New York: The Macmillan Company, 1947), p. 7.

[38]Sir Edmund Taylor Whitaker, "Mathematics and Logic," in What is Science, James R. Newman, editor (New York: Simon and Schuster, 1955), pp. 48-49.

[39]Ibid., p. 52.

is still relied on for logical rigidity.

Dewey took a different approach to logic. He said:

> Inquiry is the controlled or directed transformation of an indeterminate situation into one that is so determinate in its constituent distinctions and relations as to convert the elements of the original situation into a unified whole.[40]

The indeterminate situation not only is open for inquiry but its constituents are not unified. The determinate situation is a closed, finished situation or "universe of experience." He tells us that "controlled" or "directed" in the definition "refers to the fact that inquiry is competent in any given case in the degree in which the operations involved in it actually do terminate in the establishment of an objectively unified existential system."[41]

The indeterminate situation is "a unique doubtfulness which makes that situation to be just and only the situation it is."[42]

> It is this unique quality that not only makes the particular inquiry engaged in but that exercises control over its special procedures. Otherwise, one procedure in inquiry would be as likely to occur and to be effective as any other. Unless a situation is uniquely qualified in its very indeterminateness, there is a condition of complete panic; response to it takes the form of blind and wild overt activities. . . . A variety of names

---

[40] John Dewey, Logic, The Theory of Inquiry (New York: Henry Holt and Company, 1938), pp. 104-105.

[41] Ibid., p. 105.

[42] Ibid.

> serves to characterize indeterminate situations. They are disturbed, ambiguous, confused, full of conflicting tendencies, obscure, etc.[43]

It can readily be seen that in this explanation, inquiry becomes a personal activity employing methods determined by the nature of the problem. So it is a problematic situation which initiates inquiry.

Bayles has differentiated between these two approaches for the presentation of subject-matter. This is the "psychological" versus the "logical." The "psychological" organization he defines as "the type which follows the logic of a growing mind."[44]

With reference to the above explanations of some differences regarding logical procedure, the method of this study more nearly complied with that outlined by Dewey. The sequence of logic was that of "a growing mind," beginning with experiences and methodically progressing from one problematic situation to the next. Specifically, this study began with a look at the problem and employed the analytical method which, Bronowski said, is "to shift our gaze from the thing or event to its structure."[45] Theory construction was explained in terms of a psychological sequence of learning,

---

[43] Ibid.

[44] Bayles, op. cit., p. 200.

[45] Jacob Bronowski, "Science as Foresight," in What is Science, op. cit., p. 429.

i.e., perception to conceptualization and progressively to behavior. This system does not eliminate mathematical logic; quite the reverse is true. A logic of sequence implies orderly progression in space and time. The method here employed does not utilize the comfortable, solid foundation of mathematics, nor does it employ symbols for machine-like (opposed to insight) manipulations.

The literature was examined; the criteria for selecting literature were its availability, its relevance to the study and its compliance with the logical method utilized.

H. ORGANIZATION OF THE STUDY

Chapter I provides a setting and suggests a course of action for the entirety of the study. Specifically, some clarification is given to the interpretation which was placed on "theory" throughout the study; a general background of the study of educational administration and theory of educational administration is provided; the problem and subproblems are set forth; and, finally, justifications for conducting such a study, the methods employed, and the outline of the study are given.

Chapter II immediately attacks the problem of identifying the constructs of theory, generalizing about the nature of theory, and suggesting uses for theory. The chapter concludes with identification of some controversies about theory

in educational administration.

Chapter III identifies basic controversies about the nature of theory with the philosophic system from which the various points of view ensue. Opposing philosophies of science are described; specifically, deterministic and relativistic notions of science are discussed.

Chapter IV examines the psychological bases of theorizing. Since theorizing is a human process, research in perceptual theory is necessary for clearer understandings about this process. The theory controversies are reviewed in the light of knowledges about perception, the process whereby knowledge is gained.

Chapter V analytically treats the theory constructs and synthesizes them into an explanation of intelligent behavior through theorizing. This involves a discussion of (1) the formulation of assumptions, (2) the process of deducing hypotheses, and (3) the nature of hypotheses. The chapter also includes a discussion of propositions and concepts, the vehicles for communicating meaning.

The logic of the discussion of theory construction in terms of possible solutions to the controversial problems is reviewed in Chapter VI. The chapter concludes with some suggested axioms for theorizing in educational administration. These axioms are nothing more than a reply to the question, "If I am to engage in the business of

theory-construction in educational administration, what understandings must I have about myself, about the nature of theory, and about the nature of educational administration?" The validity of these axioms is in direct proportion to the validity of the logic employed throughout the study. Different approaches to theory-construction would necessarily result in different axiomatic bases for theorizing.

CHAPTER II

THE NATURE OF THEORY: ITS BASIC CONSTRUCTS AND ITS APPLICATION IN EDUCATIONAL ADMINISTRATION

A. INTRODUCTION

With the efforts for elevating educational administration as a profession came concomitant efforts to classify educational administration as a science. It was at this point that the theory problem was introduced. The social scientists were called upon to assist in the formulation of a theory of educational administration. Heretofore, theorizing had been largely identified with the educational philosopher. Those concerned with the science of administration apparently felt compelled to specify that their theory was a different theory from that of the philosopher; consequently, explanations of what their theory <u>is</u> have involved converse explanations of what their theory <u>is not.</u> The result has been the drawing of sharp dichotomies between the realm of that which is scientific and that which is philosophic. The ideas proclaimed by many of the administrative scientists were in keeping with the logical positivistic point of view, seemingly in vogue among many philosophers of science.

The philosophic and scientific derivations of theory controversies are discussed in Chapter III. The topic was introduced here to note the origin of theory controversies

outlined in this chapter, and to give some orientation to discussions regarding the general nature of theory and its basic constructs.

It would not be possible to suggest a general nature of theory which would be universally accepted, nor was this feat attempted. However, some general discussion was deemed necessary so that the identification of basic constructs of theory could be contextually related.

Discussions of theory by selected authors were reviewed and abridged, and general conclusions were drawn regarding the nature of theory.

B. THE UNIVERSALITY OF THEORY

To provide a frame of reference for this discussion, attention is called to the first postulate in Chapter I, "Theory cannot be disassociated from the human process of theorizing." Thus, an explanation of the nature of theory is foremost an explanation of a human process. Postulate number four, "Theorizing is on a continuum of space, time and relevance," implies that everyone theorizes to some extent. This implication is unapologetically acknowledged. Therefore, the human process of theorizing about which we are concerned is a process not restricted to any particular group of people nor to any particular topic to which

theorizing is directed. Unless all of one's experiences throughout life are to be trial and error, a complete holocaust of happenstance from one moment to the next, then it must be concluded that the individual is able to provide some organization and direction for his experiences. The normal purposive drives of seeking affection, food, survival, sex, etc., are inadequate to provide intelligent direction throughout life. It is the process of purposive organization and direction that is attributed to theory. "Everyone who makes choices and judgments implies a theory in the sense that there are reasons for his actions."[1]

The question very properly arises regarding the concern for theory in educational administration if theorizing is a process engaged in by the man on the street as well as the philosopher, the scientist, the teacher, and the administrator. The point of concern is one of quality of theorizing which is elaborated further in Chapter V. Obviously, there are those who manage the organization and direction of their daily lives more effectively and more intelligently than others. However, to deny those less effective and less intelligent individuals any degree of theorizing is essentially pronouncing them non-existent, since survival is

---

[1]Arthur P. Coladarci and Jacob W. Getzels, The Use of Theory in Educational Administration, Educational Administration Monograph No. 5 (Stanford: Stanford University, School of Education, 1955), p. 5.

dependent on a degree of expectation of the consequent. This argument rules out a frequently advanced one that there are the theorizers and there are the practitioners. It appears that the epitomy of a training program for educational administration would be to upgrade the quality of theorizing by the practitioner.

> When an administrator's experiences have led him to believe that a certain kind of act will result in certain other events or acts, he is using theory. If the experiences of others have been roughly similar, his theory will not be unique, even though he has never formulated it in so many words or has never heard it stated by others. Those who learn from their experience in ways which mean revising their judgments and decisions (hypotheses) are modifying their theories in a never-ending process of self-correction. Such people are theorizing--it may be poor theorizing, but it is theorizing none-the-less.[2]

The problem for those concerned with preparing educational administrators becomes one of improving the quality of theorizing by the practitioner. It would appear that a false trichotomy of function is promoted in the thesis suggested by Professor Roald F. Campbell that the scientist is a producer of knowledge; the developer (ordinarily the professor of educational administration) is one who must select knowledge for particular ends; and the practitioner is the user of knowledge in an actual situation; and, furthermore, the practitioner who tries too hard to play another

---

[2] Ibid.

role "may find that speculation or confusion dulls the edge of his chief instrument--decision making."[3] It is readily acknowledged that each of these three categories of individuals may theorize with varying levels of understanding, however, the scale is not necessarily a descending one from the scientist to the practitioner.

C. THE SCIENTIFIC CONTEXT OF THEORY CONSTRUCTION

The topic of science needs some clarification here since most of the discussions of theories reviewed in subsequent paragraphs are referred to as scientific theory. Dewey suggests the proper relationship and differentiation between science as a method and science as a body of knowledge:

> . . . A distinction needs to be made between science as attitude and method and science as a body of subject matter. I do not mean that the two can be separated, for a method is a way of dealing with subject matter and science as a body of knowledge is a product of a method. Each exists only in connection with the other. An attitude becomes psychopathic when it is not directed to objects beyond itself. What is meant is, first, that attitude and method come before the material which is found in books, journals, and the proceedings of scientific organizations; and, second, that the attitude is manifested

---

[3]Roald F. Campbell, W. W. Charters, Jr., and William L. Cragg, "Improving Administrative Theory and Practice: Three Essential Roles" (Introduction by Roald F. Campbell) in Roald F. Campbell and James M. Lipham, editors, Administrative Theory as a Guide to Action (Chicago: Midwest Administration Center, University of Chicago, 1960), pp. 171-173.

> primarily toward the objects and events of the ordinary world and only secondarily toward that which is already scientific subject matter.[4]

Dewey continues with a discussion of the scientific attitude which he conceives as a quality that is manifested in any walk of life:

> On its negative side, it is freedom from control by routine, prejudice, dogma, unexamined tradition, sheer self-interest. Positively, it is the will to inquire, to examine, to discriminate, to draw conclusions only on the basis of evidence. It is the intention to reach beliefs, and to test those that are entertained, on the basis of observed fact, recognizing also that facts are without meaning save as they point to ideas. It is, in turn, the experimental attitude which recognizes that while ideas are necessary to deal with facts, yet they are working hypotheses to be tested by the consequences they produce.[5]

In this framework of science, as a method and an attitude for intelligent living, the process of theorizing promoted in this study is contextually oriented. The point that needs to be stressed is that educational administration is not natively a science. It is, rather, a series of processes for the attainment of certain purposes. The important thing is that these processes be subjected to scientific scrutiny and that those individuals engaged in

---

[4]John Dewey, "Unity of Science as a Social Problem," International Encyclopedia of Unified Sciences, Otto Neurath, Rudolf Carnap and Charles Morris, editors (Volume 1, Nos. 1-5. Chicago: The University of Chicago Press, 1955), p. 29.

[5]Ibid., p. 31.

the processes operate in a scientific manner. This removes science from a cold, detached world of subject matter to a personal attitude and method purposefully directed toward certain ends.

D. REVIEW, INTERPRETATION AND ELABORATION OF DISCUSSIONS ON THEORY BY SELECTED AUTHORS

Discussions by Selected Psychologists and Elaborations on Their Points of View

For discussions regarding the nature of theory, selected writers in psychology are reviewed first. Many social and behavior scientists, other than psychologists, have made contributions to the development of theories of social interaction and behavior. However, the psychologists seemingly have been more prone to investigate the nature and structure of theory. It is for this reason that the section here is limited to psychologists.

Calvin S. Hall and Gardner Lindzey describe theory as "a set of conventions created by the theorist."[6] This means that theories are not predetermined by nature or any other determinant source. Data gathered through observation and investigation may be incorporated into any of countless theoretical schemes.

---

[6]Calvin S. Hall and Gardner Lindzey, Theories of Personality (New York: John Wiley and Sons, Inc., 1957), p. 10.

> The theorist in choosing one particular option to represent the events in which he is interested is exercising a free creative choice that is different from the artists only in the kinds of evidence upon which it focuses and the grounds upon which its fruitfulness will be judged. We are emphasizing here the creative and yet arbitrary manner in which theories are constructed and this leads naturally to the observation that we can specify how a theory should be evaluated or appraised but we cannot specify how a theory should be constructed. There is no formula for fruitful theory construction any more than there is a formula for making enduring literary contributions.[7]

Theory consists of two properties, a cluster of relevant, systematically related assumptions, and a set of empirical definitions. The relevance of the assumptions is determined by their bearing on the empirical events which they represent. Also, to permit the deduction of empirical consequences from the assumptions, it is necessary that there be a systematic relationship between the assumptions and their imbedded concepts as well as a clear relationship of one assumption to another within a set of assumptions.

The interaction of concepts within a theory with empirical data is accomplished by empirical definitions, frequently called operational definitions. "Thus, by means of these definitions the theory at certain prescribed places comes into contact with reality or observational data."[8]

---

[7] Ibid., p. 11.

[8] Ibid., p. 12.

Hall and Lindzey have delineated three functions for a theory. It should lead to the collection or observation of heretofore unobserved relevant empirical relations; it should permit the incorporation of known empirical findings within a framework which is logically consistent and reasonably simple; and it should prevent the observer from being overwhelmed by the complexity of natural or concrete events by delineating relationships about which he should be aware.[9]

In promoting a scientific theory of learning, Guthrie has the following to say:

> Such a theory is essential to progress for several reasons. One of these is that unless the beads of fact can be strung in order and pattern on the threads of a theory, there is a strict limitation upon imparting psychological knowledge to others. Theories are mnemonic devices that make science teachable. And theories are the basis of working concepts. They enable men to confront new facts and deal with them successfully. Furthermore, theories are required to direct the search for relevant facts. It is theories that endure, not facts. . . . It is theory rather than fact that leads to new controls over nature and events. From theory inferences can be made and new applications devised.[10]

Since Guthrie places so much reliance on facts in theory building, it is interesting to note his discussion of facts. "A fact," he says, "has a peculiar and intricate

---

[9]Ibid., pp. 13-15.

[10]Edwin R. Guthrie, "Psychological Facts and Psychological Theory," Psychological Bulletin, XLIII (January, 1946), 3-4.

structure. It belongs to two worlds, the world of objects and events, and the world of human discourse."[11] Facts only become facts when they are described by people. "A fact is an event so described that any observer will agree to the description."[12] He hastens on to say that no facts will meet this requirement. "There are, therefore, no absolute facts, and a universe without men and human discourse would be a universe without facts."[13]

Shoben tells us that

> A theory is a generalized statement of something that we know. It is useful because it allows us to understand a multitude of concrete cases through the application of a general principle.[14]

He goes on to say that these generalized statements are inescapable since understanding our world consists in generalizing experiences in particular times and situations to events in other times and situations. Along with this discussion is a word of caution:

> . . . It might be well to belabor the obvious in pointing out that theories are man made. Consequently, they are subject to the limitations, distortions, and errors that creep into virtually all human products.[15]

---

[11] Ibid., p. 1. [12] Ibid. [13] Ibid.

[14] Edward Joseph Shoben, Jr., "Psychological Theory Construction and the Psychologist," The Structure of Scientific Thought, Edward H. Madden, editor (Boston: Houghton Mifflin Company, 1960), p. 153.

[15] Ibid.

Hull[16] points out that the beginnings of science evolve from everyday activities, and from these activities comes a body of observations and simultaneously a parallel body of ideas or interpretations of these observations.

> The orderly arrangement of the observations constitutes the empirical component of science, and the logical systematization of the ideas concerning these observations constitutes the theoretical component.[17]

> Systematic natural-science theory properly consists of three distinguishable portions: 1) a set of definitions of the critical (indispensable) terms employed in the system; 2) a set of postulates concerning presumptive relationships among the natural phenomena represented by the terms; and 3) a hierarchy of interlocking theorems ultimately derived from the postulates by a rigorous logical process.[18]

Marx[19] makes the point that empirical measurement in science is not always possible, consequently a large number of theories or abstract explanatory principles have been developed. He sets forth three basic assumptions in support of arguments relating to theory construction.

His first assumption is:

> . . . The ultimate aim of all natural science is explanation and understanding and not simply

---

[16]Clark L. Hull, "The Hypothetico-Deductive Method," Psychological Theory, Melvin H. Marx, editor (New York: The Macmillan Company, 1951), pp. 218-233.

[17]Ibid., p. 218. [18]Ibid., p. 219.

[19]Melvin H. Marx, "The General Nature of Theory Construction," Psychological Theory, Melvin H. Marx, editor New York: The Macmillan Company, 1951), pp. 4-19.

> prediction and control in a practical sense, as is often assumed. . . . Theory, or general explanation, is the ultimate objective of science.[20]

His second assumption is: "In the development of any scientific theory it is impossible to avoid direct dependence upon empirical operations."[21] Because of the inevitability of some kind of bias in all empirical measurements, the empirical and the theoretical cannot be completely separated; however, a plea is made for delimiting as much as possible the theoretical components.

The third assumption stresses the necessity for verbal communication of all scientific investigation. With the underlying assumptions that the ultimate aim of science is understanding, that theories are dependent on empirical operations, and that all scientific investigation must be verbally communicated, four general characteristics of theories are introduced:

> 1. All theories aim at explanation, which means the establishment of functional relationships between variables. . . .
>
> 2. A theory is both a tool and an objective. Which of these functions is emphasized largely depends upon the degree of confidence--or social acceptability, and thus 'factualness'--that it has achieved. . . .
>
> 3. Theories are always relative to the bias not only of the theorist, but also of the various observers upon whose empirical reports he has depended. . . .

---

[20] Ibid., p. 5.

[21] Ibid.

> 4. It follows that alternative theoretical approaches can be directly compared, scientifically, only if they make <u>different predictions</u> within the same observational framework. . . .[22]

To get a proper understanding of what Marx intended by the last two characteristics it is necessary to look at his elaboration of the points. First of all the point regarding the inevitability of personal bias in a theory (characteristic number three, above) was made to clarify the position that theories are not absolutely "true" or truly representative of "reality." "All problems of ultimate 'reality' are entirely extra-scientific questions, or 'metaphysical' ones, as the logical positivists would say."[23]

Characteristic number four was explained in practically the same manner as was number three, above:

> Scientifically, their /theories/ value is a matter of empirical test, rather than philosophical or logical test, or even practical application. The various a priori biases which in actual practice account for much of the polemic and invective generated in psychological controversies ought to be recognized more clearly and explicitly as just such, and not disguised as the apparent functions of purely scientific analyses.[24]

Special note should be given to these assumptions of science and characteristics of scientific theories. The point of view promoted by Marx is representative of elaborations which provide the major controversies among theorists.

---

[22]<u>Ibid.</u>, pp. 6-7. [23]<u>Ibid.</u>, p. 7. [24]<u>Ibid.</u>

These controversies are noted and elaborated in a subsequent section of this chapter.

Marx suggests that theory construction depends upon three major elements (types of verbal statements or propositions): (1) empirical propositions--statements of "fact" of what has been observed, (2) hypothetical propositions--statements of supposition, or conjecture, of what is predicted in observation, and (3) theoretical propositions--generalized statements concerning functional relations among variables.[25]

It should be noted that the discussions on theory reviewed above are discussions by psychologists, comparatively late-comers to the realm of science. At this point some elaboration is in order regarding the nature of theory promoted by the authors noted in the preceding paragraphs.

Hall and Lindzey[26] interpret theory as a conventional structure of the theorist. Theory has two basic constructs, a set of assumptions and empirically defined concepts. The purposes for theory are to lead to a systematic expansion of knowledge, to consistently organize known knowledge, and to focus the researcher's attention only on that which is pertinent to the theory.

---

[25]Ibid.

[26]Hall and Lindzey, op. cit., pp. 10-15.

Guthrie[27] thinks of theory as a pattern and orderly arrangement of the beads of facts. Facts, he suggests, belong to the dual worlds of objects and events and of human discourse. Theories are useful to (1) provide the basis of working concepts, (2) enable men to confront and deal with new facts, (3) direct the search for relevant facts, (4) lead to new controls over nature and events, and (5) provide a framework for making inferences and devising new applications.

Shoben[28] defines theory as a generalized statement of something we know. Its usefulness is to provide understanding of many concrete cases through applying a general principle.

Hull[29] contends that the theoretical component of science is the logical systematization of ideas or interpretations of empirical observations. Its elements are (1) a set of definitions of critical terms employed, (2) a set of postulates concerning relationships among the phenomena to which the terms relate, and (3) a hierarchy of interlocking theorems logically derived by the postulates.

---

[27]Guthrie, op. cit., pp. 1-20.

[28]Shoben, op. cit., pp. 152-157.

[29]Hull, op. cit., pp. 218-233.

Finally, Marx[30] equates theory with general understanding which he says is the ultimate aim of science. Explanation means functional relationships between variables. A theory may be an objective as well as a tool if there is a high degree of confidence. Marx draws a line of demarcation between that which is scientific and that which is metaphysical; theories must be empirically tested.

It is interesting to note that Marx makes the point that theories are human constructs and have a degree of bias incorporated into them; yet, he insists that there is the metaphysical on one hand and the scientific on the other. By the standards that Marx has set up, i.e., empirical test, human biases (values) lie in the realm of metaphysics. One is made to wonder if he has not fallen into his own trap. To proclaim that there is a realm outside the inquiry of science, yet to incorporate this realm into scientific theory is illogical. Many authors are not as frank as Marx; they would contend that human values are not incorporated into this human endeavor (theorizing), thus naively assuming that they have ridded themselves of this perplexing problem.

Marx identifies the three major elements of theory construction as empirical propositions, hypothetical propositions, and theoretical propositions.

---

[30]Marx, op. cit., pp. 4-19.

It is quite obvious that no comprehensive agreement exists among these authors; yet, there are some common elements in their works.

1. They would agree that theory is an integral part of scientific endeavor. Further, comprehensive agreement with the explanation drawn from Dewey regarding science as an attitude and method is unlikely.[31]

2. They would agree that theory is a generalization about factual information. There are varying degrees of interpretation of the "hardness" of the facts. These interpretations range from Guthrie's "human agreement" criterion through Shoben's assertion of that which we "know" (with human limitations) to Marx's demand for ultimate empirical test.

3. They would agree that theories are constructs of the scientist. Here the agreement seems to end.

Thus, among the authors reviewed the extent of general agreement is severely limited. There is disagreement about the purpose of theory. Marx would restrict it to explanation, which limits its usefulness for mankind in his endeavors to attain goals. Shoben also emphasizes the purpose of theory as understanding; however, his thesis that this understanding is transferable from a given time and

---

[31]See pp. 36-38 for Dewey's discussion of science as an attitude and method.

situation to another time and situation gives theory a restricted predictive role. Guthrie suggests that theory is functional for communication to others, to provide assistance for collecting and dealing with new facts, to lead to controls over nature and events, and for making inferences. Here, theory has not only explanatory functions, but predictive functions for control of consequential factors. Hull does not elaborate on the purposes of scientific theory, however, he suggests that observations give rise to ideas (theoretical components of science) and these ideas give rise to other observations. Hall and Lindzey see the development of new knowledge as the aim of first importance.

There is a similar lack of unanimity of opinion expressed on the constructs of theory. Hall and Lindzey name two constructs of theory, a set of assumptions and empirically defined concepts. Perhaps Guthrie would suggest that the constructs are concepts, but there is no further elaboration. Hull is very specific in his listing of constructs; these are definitions, postulates and theorems. Marx's three types of propositions are empirical, hypothetical, and theoretical.

The Philosopher and Scientist

Without elaborating further at this point on the agreements and lack of agreements on the nature of theory by these

psychologists, a similar treatment of writings by philosophers of science is presented in the succeeding paragraphs. Perhaps all great scientists are also great philosophers of science: Einstein, Conant, Bridgman, Eddington, Russell, Whitehead, and Bronowski, to name only a few. It is true that all philosophers traditionally have not emphasized nor relied on the method of science. It is most unfortunate that so many scientists have pegged all philosophers into this lot. William James' analogy of the tender-minded and the strong-minded has, alas, been used to describe all philosophers and all scientists respectively. There is reason to believe that many of the scientists who would categorize themselves with the strong-minded empiricists would more properly fall with idealist-oriented philosophers. Those scientists who maintain that the realm of human values and purposes are alright but should not be confused with that which is scientific is an admission that these areas are outside the bounds of scientific inquiry. The insistence by many scientists that there is no conflict between the fundamental principles of theology as well as other manifestations of idealistic philosophy and the principles of science is also an admission that there is a realm beyond inquiry. Could these people be the strong minded? On the contrary, the strong minded would seem to be more appropriately the person who knows what his values are and respects the values of others. He is equally

willing to examine his own values, giving serious consideration to alternatives, as he is to insist that others do likewise. Only in this scientific atmosphere can two or more people work together for the attainment of common purposes. To do otherwise is to create a constant state of frustration trying to out guess one's "partners'" intentions. Jacob Bronowski properly poses the question, "Has science abandoned its own responsibility, because it has lost its moral judgment?"[32] One can come to no other conclusion regarding the scientists who naively assume for themselves the role of the man in the white coat who just manufactures a product, and places moral responsibilities for its use on the consumer. This thesis is elaborated more fully in Chapter III of this study, but was introduced here to properly define the philosopher and the scientist.

Discussions by Selected Philosophers of Science and Elaborations on Their Points of View

F. S. C. Northrop[33] has an excellent discussion of theory, the intermediate stages of scientific inquiry. He reviews the contentions of Francis Bacon, Rene Descartes,

---

[32]Jacob Bronowski, "A Moral for an Age of Plenty," Saturday Evening Post, CCXXXIII (November 12, 1960), 26.

[33]F. S. C. Northrop, Logic of the Sciences and the Humanities (New York: The Macmillan Company, 1947).

Morris Cohen and John Dewey; then he expresses his own point of view.

Bacon, he says, contends that the first thing to do when one initiates any inquiry is to put aside all preconceived ideas or "idols" and proceed purely inductively. Even formal logic is rejected since it tends to stabilize old errors.[34]

Descartes' method is one of pure rational deduction depending solely on mathematics. To initiate inquiry, one intellectually doubts everything possible and deduces from the minimum that is left.[35]

Cohen respects both the induction and deduction methods but he urges that hypotheses be formulated immediately to direct inquiry.[36]

According to Dewey, antecedent to any inquiry is an indeterminate situation--a problem. This indeterminate situation becomes problematic in the process of becoming determinate. For Dewey, inquiry does not begin with the collection of facts; it does not begin by rational deduction; nor does it begin by immediate formulation of an hypothesis. Inquiry begins with a problematic situation.[37]

---

[34] Ibid., p. 6.

[35] Ibid., p. 9.

[36] Ibid., p. 11

[37] Ibid., pp. 12-13.

Northrop insists that Dewey is correct about this first step in inquiry:

> Inquiry starts only when something is unsatisfactory, when traditional beliefs are inadequate or in question, when the facts necessary to resolve ones uncertainties are not known, when the likely relevant hypotheses are not even imagined. What one has at the beginning of inquiry is merely the problem.[38]

Some discussion is in order here regarding a point on which Northrop does not elaborate. This point is the matter of human purpose[39] which seems to logically fit into a discussion of the initiation of inquiry. Please remember the postulate that theory cannot be disassociated from theorizing. In like manner, neither can inquiry be disassociated from inquiring, nor investigation from investigating. It is important to remember that these are human processes, and to theorize, to inquire, or to investigate are progressive human processes. What happens when an individual has a problem--is suddenly faced with a problematic situation? Without elaborating here on the processes involved (i.e., reflection to inductive facts or immediate deduction), very soon a solution is required. The solution may be to minimize or to ignore the problem, which is

---

[38] Ibid., p. 17.

[39] Throughout this study, "purpose," "goal" and "objective" were used synonymously. The use of either of the three terms was determined by the customs of general usage.

nonetheless a solution. This negative solution probably means an altered purpose, or it could mean that the problem was not a valid one. A positive solution to a problem would be to alter the method of purpose attainment. In the positive approach theorizing is more forcefully utilized, although some theorizing is used in a negative solution; indeed, in some instances, all positive approaches may have been exhausted. So, our individual is confronted with a problem, and a solution--some solution--is inevitable. A pertinent question is, "How did it happen that he got himself mixed up with this perplexing problem?" The logical reply is that he was progressing through time and space, not aimlessly, else the problem would not have occurred; but, rather, he was progressing through time and space purposefully--toward determined objectives. With some degree of intelligence a method for approaching this objective had been worked out. Had there been no predetermined method of approach, there could be no objective. Under these circumstances, progression through time and space would be by sheer chance; an objective would be what "just happened" not what was sought after. Now, with the objective (purpose) being pursued within the confines of a pathway methodologically charted with a certain degree of intelligence, here looms before the individual a problem. The problem is an indeterminate situation simply because it hovers in this

progressive movement in time and space between the particular point where the individual is at the moment and the point where he is going--his objective, or his determinate situation. A word of caution is interjected here. Isolated purposes are meaningful only as subjects for investigation. Throughout life there are an infinite number of purposes, a hierarchy of subpurposes for attaining greater purposes.

It should be noted that the methodological procedure for attaining purposes, that is, a reduction of the threshold of chance, is the role attributed to theory in this study. However, that is not the major point intended in this immediate discussion. The major point of emphasis is: (1) If all scientific inquiry begins with a problem; (2) and since a problem is an obstruction in the path of a purpose; (3) then, all scientific inquiry is purposefully oriented.

This antecedent condition and the consequent conclusion are vigorously supported and promoted in this study.

Northrop agrees with Dewey regarding the initial step in inquiry, but he believes that Dewey hastens on too early toward formulating hypotheses. Northrop would place great emphasis on analyzing the problem. The method of solution would vary with the nature of the problem. Analysis of a problem entails reverting to the source of the problem as well as examining determinate elements of

it.[40] The source of the problem, any problem, is the set of assumptions underlying the particular goal being sought.

Galilei and his contemporaries noted by observing the motion of projectiles such as shells shot from a cannon that the projectiles did not act the way they should if Aristotelian physics were correct. In Aristotelian physics it was held that force is that which produces velocity. In the case of the cannon shots it was evident that the velocity continued after the force ceased.

The solution to this problem of determining what was wrong with the Aristotelian theory of the motion of a projectile was not obtained by gathering empirical data (induction). Deduction from a minimum of data after vigorous doubting would not be profitable. Nor would immediate formulation of hypotheses suffice. Galilei analyzed his problem. "This was accomplished by stating clearly what the problem was and then noting the traditional assumptions which generated it."[41] This analysis of the problem focused Galilei's attention on the theory of force, not on the motion of projectiles. The analysis led to gathering data from a simple observable phenomenon (dropping a ball from his hand down an inclined plank to the floor). From these observed data,

---

[40] Northrop, op cit., pp. 19-34.

[41] Ibid., p. 23.

three hypotheses were formulated. From each hypothesis deductions were made to determine what might follow if the hypothesis were true. The deduced consequence could then be put to empirical test. Thus, came a new definition of force which is the foundation of modern mechanics.[42]

Northrop's discussion of the experimentation of Galilei serves to point up a very vital ingredient of theory, the assumption. The idea is erroneous that scientific inquiry begins by empirically observing minute particles, then after making ample observations, generalizations of meaning are formulated. Rather, prior to any empirical investigation there are certain assumptions, many of which can never be verified by empirical induction. This point is elaborated more fully in Chapter V.

After the initial analytical stage of inquiry, Northrop introduces the second stage, that of induction.[43] This process involves observation, description and classification. Here it is important to take special note that for Northrop, induction is not dealing with pure empirical fact. Following the immediately apprehendable facts, which are non-functional, come concepts and described fact.

> It cannot be too strongly emphasized that if one wants pure fact, apart from all theory, then one

---

[42] Ibid., pp. 22-27.

[43] Ibid., pp. 35-58.

> must keep completely silent, never reporting, either verbally or in writing, one's observations to one's colleagues. For the moment one reports or describes what one has observed, one has described fact rather than merely observed, or immediately apprehended, fact. In short, one has observed fact brought under concepts and propositionized. And to have concepts and propositions is to have theory.[44]

The third stage of inquiry for Nothrop is that of deducing hypotheses, which is injected into the system of inquiry when the assumptions are by postulation, i.e., unobservable data. The method of test is from logically deduced hypotheses.

> The methods are well known. They involve the construction of a deductively formulated system. The basic assumptions or postulates of this system designate unambiguously what is proposed to exist. To this proposal or hypothesis, formal logic is then applied to deduce theorems or consequences. . . . The experiment designated by the theorem or theorems of the theory is then performed.[45]

It should be noted that logical deduction is required for theoretical systems whose assumptions consist of concepts by postulation (unobservable data). If the science were not advanced sufficiently beyond intuition (immediately observable data), then the induction stage would conclude the inquiry. It would be unnecessary to derive theorems from immediately observable data because the data itself constitutes the test. This is a very elementary kind of

---

[44]Ibid., p. 36.

[45]Ibid., pp. 60-61.

scientific inquiry. Status studies in education are an example of this kind of inquiry. Such studies are significant when they are used to predict consequences in a more advanced type of inquiry. However, even immediately observable fact, when it is communicated becomes interpreted fact, not pure fact. The scientist needs to be aware of this.

From an examination of Northrop's three introductory stages of inquiry the elements of assumptions (postulates) and hypotheses (theorems) can be pulled out. These two elements are associated by logical deduction--hypotheses from the assumptions, and they are themselves composed of concepts.

> The propositions of any empirical scientific theory fall into two groups, termed 'postulates' and 'theorems.' The propositions termed postulates are related to those termed theorems by the formal logical relation of formal implication. Given the postulates, the theorems can be derived by nothing but the rules of formal logic. . . .[46]

Northrop continues with this discussion and explains the roles of each of these two elements:

> The postulates of a deductively formulated theory are those propositions which are assumed in the theory in question as logically unprovable and which are sufficient to enable one to prove, i.e., to logically deduce the theorems. The theorems of a deductively formulated theory are all the empirical propositions in the theory

---

[46] Ibid., p. 140.

> other than the postulates. They have the additional essential property of being provable in terms of the postulates. Thus, if one assumes the postulates, formal logic requires one to accept the theorems. This is quite independent of the empirical, as opposed to the formal logical question of the truth or falsity of the postulates.
>
> A postulate or a theorem, i.e., any proposition in any empirical scientific theory, is a collection of concepts.[47]

With regard to the purposes of theory, Northrop is very specific in stating that its purposes are predictive.

> It is often said that the criterion of a scientific theory is its predictive power. Predictive power depends upon establishing connections between the present and the future. The more these connections between the present and the future can be shown to be necessary, the greater and the more unequivocal the predictive power.[48]

The above is a very pertinent statement by Northrop. Prediction, he points out, is the relationship between the present and the future. Predictive power increases accordingly as this relationship can be shown to be necessary.

It will be noted that this point of view is substantially different from that promoted by the positivists that science only deals with what <u>is</u> and avoids what <u>ought to be</u>. To establish relationships between the present (is) and the future (ought), the future must already be assumed to some extent.

---

[47] <u>Ibid</u>.

[48] <u>Ibid</u>., p. 115.

Northrop points out that a science which restricts itself to directly observable entities and relations loses its predictive power. It tends to be merely descriptive and accomplishes little more so far as prediction is concerned than to express hope that the sensed relations between the entities of the particular subject matter today will recur tomorrow.[49]

To suppose that science deals only with what is and yet has the capacity to predict is indeed, as Northrop points out, a very weak supposition that there will be a recurrence tomorrow of the relationship established today. This hardly does justice to the scientific endeavors that have resulted massive technological achievements! It perhaps could be argued that the predictive powers of science are unfocused. Indeed, such has been argued; however, it is outside the bounds of any logical understanding to suppose that a scientist repairs to the laboratory, starts experimenting, and opens the frontiers of knowledge! He does this no more than the target shooter closes his eyes, fires blindly and then searches to find what he hit. He fires at a target; so does the scientist. Accidental creations of the scientist are rare, and even then, these creations are intermediate to activities directed toward other purposes.

---

[49] Ibid.

Should the research terminate with these "accidental" creations, a change of purpose is indicated. The scientist is shooting at a target; his activities are purposeful. The predictive power of his activities are determined by the relationship of his "ises" and his "oughts." It should also be remembered that the "is" state is so interpreted because of past experiences and has within itself no validity except through interpretation.

Northrop's discussion of theory has been elaborated in great detail. This elaboration was deemed important because of the tremendously deep insights which he possesses.

Many of the interpretations were indeed extrapolations of what Northrop said, however no liberties were intended. From his point of view the interpretations and discussions seemed logical.

Some examination of other writers who are categorized as philosophers and/or philosophers of science follows in the subsequent paragraphs.

Norman R. Campbell[50] describes theory as follows:

> A theory is a connected set of propositions which are divided into two groups. One group consists of statements about some collection of ideas which are characteristic of the theory; the other group

---

[50]Norman R. Campbell, "The Structure of Theories," Readings in the Philosophy of Science, Herbert Feigl and May Brodbeck, editors (New York: Appleton-Century-Crofts, Inc., 1953), pp. 288-308.

> consists of statements of the relation between these ideas and some other ideas of a different nature. The first group will be termed collectively the 'hypothesis' of the theory; the second group the 'dictionary.'[51]

It should be noted that Campbell's use of terms are different from uses encountered thus far. The important thing is that this different use of terms be recognized so that the meaning of his discussions will not be distorted. He defines an hypothesis as ". . . a proposition which is put forward for consideration, and concerning the truth or falsity of which nothing is asserted until the consideration is completed."[52] He goes on to say that the word hypothesis necessarily implies doubt but it should be doubt of a positive nature, a suspense of judgment, rather than doubt of a negative nature, an inclination to disbelieve.

To interpret: Campbell has said that a theory is a connected set of propositions which are divided into two groups. One group, the hypothesis, consists of propositions about a collection of ideas characteristic of the theory. The other group, the dictionary, consists of propositions of the relation between ideas composing the hypothesis and other ideas of a different nature. He elaborates further on these two elements:

> The hypothesis is so called, in accordance with the sense that has just been stated (a suspense of

---

[51] Ibid., p. 290.

[52] Ibid.

> judgment), because the propositions composing it are incapable of proof or of disproof by themselves; they must be significant, but taken apart from the dictionary, they appear arbitrary assumptions. They may be considered accordingly as providing a definition by postulate of the ideas which are characteristic of the hypothesis.[53]

Campbell continues with a discussion of the element which he terms the dictionary:

> The ideas which are related by means of the dictionary to the ideas of the hypothesis are, on the other hand, such that something is known about them apart from the theory. . . . The dictionary relates some of these propositions of which the truth or falsity is known to certain propositions involving the hypothetical ideas by stating that if the first set of propositions is true then the second set is true and vice versa; this relation may be expressed by the statement that the first set implies the second.[54]

It is important to note that the role of the dictionary is to relate one set of ideas, those comprising the hypothesis with another set of ideas, which Campbell terms concepts. Here again is a special use of the term concept, which is defined: a ". . . collection of fundamental judgments; and the propositions involving these ideas, of which the truth or falsity is known, are always laws."[55]

To equate Campbell's ideas of theory with the ideas of Northrop may provide some clarity. Each of them are presenting structures that have considerable similarity. Campbell's hypotheses would be synonymous with Northrop's

---

[53] Ibid. [54] Ibid. [55] Ibid., p. 291.

assumption by postulation, i.e., a set of propositions incapable of proof or disproof by themselves. Campbell's concepts or laws, the ideas propositionally related to the hypotheses, would probably be synonymous with Northrop's hypothesis or theorem (Northrop uses hypothesis and theorem interchangeably). There may be a question of strict relationship here. Northrop's theorems were propositions to be tested, whereas, Campbell seems to be convinced of the solidarity of his laws. At any rate, the relationship would exist in the framework of the theoretical structure. Campbell's dictionary is a bit more difficult to relate to Northrop's structure. The dictionary is a set of propositions which explain the relationships between the hypotheses and the laws. These serve to explain relationships between the two. Northrop uses logical deduction to derive theorems from the assumptions. This is substantially different from just showing relationships. This difference is to be expected with the great stock which Campbell places in the rigidity of his laws. The laws exist independent of the hypothesis with the dictionary pointing our relationships. In Northrop's structure, the validity of the theorems was dependent on the validity of the assumptions from which they are deduced. Suffice it to say that positionally within the two structures Campbell's dictionary and Northrop's formal logic are synonymous, but they differ in function

because of the difference between the nature of the laws and the theorems of each respectively.

It is worth noting some of Campbell's assertions regarding frequent misrepresentations about the nature of theory. First of all he decries the tendency to contrast theory with practice. Although this separation is justified etymologically, the separation is useful for only discussion purposes to separate consideration by intellectual processes from manipulative details.

> For in this original sense of the word all propositions are necessarily theoretical, since they concern thought and not action; and in this sense all science, in so far as consists of propositions, is theoretical.[56]

> The idea that there are propositions 'true in theory, but false in practice' has its foundation only in the incompetence of the uninitiated to understand theory, and in their habit of applying propositions to circumstances entirely foreign to the theory. To those who have not the power to think, theory will always be dangerous.[57]

The above statement is in opposition to the desire of those whom Campbell refers to as half-educated persons to rely on practical conclusions rather than on the reasoning of the theorist.

> The views of 'practical men' are usually derived from assumptions and arguments no less complex than those on which theory is based; they are

---

[56] Ibid., p. 288.

[57] Ibid., p. 289.

> more and not less liable to error because they are less openly expressed.[58]

Other misrepresentations that Campbell takes issue with are (1) that theoretical propositions are contrasted from other types by the amount of thought required; (2) that propositions in science are termed theories because they are complicated; and (3) that the more theoretical is a proposition the less should be the conviction of its truth.[59] He states that theory is a question of degree and science becomes progressively more theoretical as it progresses from the elementary and fundamental judgments to the various ranks of propositions.[60]

J. W. N. Sullivan[61] in his excellent discussion of scientific ideas says that the aim of science is the construction of theories as opposed to the formulation of purely descriptive laws.

> Just as a law unifies a group of phenomena, so a theory unifies a group of laws. A theory is, as it were, a central principle, from which the various laws belonging to it can be deduced. The

---

[58] Ibid.

[59] Ibid., pp. 288-289.

[60] Ibid., p. 288.

[61] J. W. N. Sullivan, The Limitations of Science (New York: Mentor Books, The New American Library of World Literature, Inc., 1952).

> outstanding example of this is provided by the most celebrated of all scientific theories, Newton's theory of gravitation.[62]

Here, again, is an assertion of the priority of explanation as an aim of science. Of course, explanation is important in science. An understanding of the present is prerequisite for inferring relationships to a future state or activity. The predictive purpose of theory is, however, acknowledged by Sullivan.

Sullivan notes the changes brought about in scientific theory with the advent of Einstein's theory of relativity.[63] Whereas, under Newton's ideas of mathematical explanations from directly observable physical qualities, it became obvious that such things as force and potential energy are arbitrary creations. Many people had attempted manipulations and alterations of Newton's theory of gravitation to no avail. It remained for Einstein to completely sweep away the entire foundations of the theory and insert a new structure. This destroyed the solidity of structures founded directly on observable physical qualities. "There is in science," Sullivan concludes, "a certain amount of useful myth. But the myths are useful because they are, as it were, pegs on which the mathematical formulation can be hung."[64]

---

[62] Ibid., p. 45.

[63] Ibid., pp. 157-162.

[64] Ibid., p. 157.

> It is evident . . . that a true scientific theory merely means a successful working hypothesis. It is highly probable that all scientific theories are wrong. Those that we accept are verifiable within our present limits of observation. Truth, then, in science, is a pragmatic affair. A good scientific theory accounts for known facts and enables us to predict new ones which are then verified by observation.[65]

Sullivan's work is an historical chronology of scientific ideas, but his insights into theoretical formulations are helpful for our consideration. The outstanding thesis of Sullivan regarding theory is the indeterminate nature of all theoretical structures. They are unprovable, but are helpful for purposes of accounting for known facts and for enabling us to predict new ones. It should be noted that verifiability lies within the confines of our present limits of observation, which, it will be recalled, Northrop insisted are personal interpretations.

James Bryant Conant gives great prominence to theoretical structures in science.

> Science is an interconnected series of concepts and conceptual schemes that have developed as a result of experimentation and observation and are fruitful of further experimentation and observations.[66]

This view attributes to science a dynamic activity rather than a static state, and it makes of science an

---

[65] Ibid., p. 158.

[66] James B. Conant, Science and Common Sense (New Haven: Yale University Press, 1951), p. 25.

activity from a theoretical frame of reference. Conant suggests that one may consider science as an attempt to lower the degree of empiricism or conversely to extend the range of theory.[67] He defines empiricism as "The observation of facts apart from the principles which explain them, and which give the mind an intelligent mastery over them."[68] So, rather than science being an activity directed toward further empiricism (pure facts), science is directed toward lowering the threshold of empiricism.

Conant's "conceptual scheme," synonymous with what has heretofore been called "theoretical structure," is examined below. Activity based on a conceptual scheme is not limited to any particular scientific endeavor, but is typical of an intelligent way of life:

> Literally every step we take in life is determined by a series of interlocking concepts and conceptual schemes. Every goal we formulate for our actions, every decision we make, be it trivial or momentous, involves assumptions about the universe and about human beings.[69]

The above is a highly significant statement, and should serve as a topic for consideration by those who

---

[67] Ibid., p. 58.

[68] James B. Conant, Modern Science and Modern Man (Garden City: Doubleday Anchor Books, Doubleday and Company, Inc., 1952), p. 41.

[69] Ibid., pp. 135-136.

suppose that the realm of metaphysics is outside the realm of a conceptual scheme. It is always an enlightening exercise to analyze the bases of any act of behavior. Such an analysis always results in one of two conclusions; either the act of behavior is justified on the basis of assumptions about the nature of the universe and of mankind, or the individual concludes that the act of behavior was a very foolish one because of a lack of consistency with basic assumptions held. These assumptions of an instance of behavior, whether conscious or unconscious, are indeed providers of our frame of reference in acts of behavior. The conceptual schemes are evolutionary in their comprehensiveness and in their reliability. Citizens today take for granted things which their ancestors never dreamed possible. Our conceptual scheme must not only be composed of current knowledges but, as Conant has suggested, they must be "fruitful of further experimentation and observations."[70] Conant quotes from William James a passage describing man's construction of a conceptual order:

> The intellectual life of man consists almost wholly in his substitution of a conceptual order for the perceptual order in which his experience originally comes. . . . Every new book verbalizes some new concept, which becomes important in proportion to the use that can be made of it. Different universes of thought thus arise, with specific sorts of relation among their ingredients.

---

[70]Conant, Science and Common Sense, op. cit., p. 25.

> The world of common sense 'things'; the world of material tasks to be done; the mathematical world of pure form; the world of ethical propositions; the worlds of logic, of music, etc., all abstracted and generalized from long-forgotten perceptual instances, from which they have as it were flowed out, return and merge themselves again in the particulars of our present and future perception. . . . Percepts and concepts interpenetrate and melt together, impregnate and fertilize each other. Neither, taken alone, knows reality in completeness. We need them both as we need both our legs to walk with.[71]

Man must be constantly at work improving his conceptual order, thus lowering the threshold of empiricism.

> A conceptual scheme when first formulated may be considered a working hypothesis on a grand scale. From it one can deduce, however, many consequences, each of which can be the basis of chains of reasoning yielding deductions that can be tested by experiment. If these tests confirm the deductions in a number of instances, evidence accumulates tending to confirm the working hypothesis on a grand scale, which soon becomes accepted as a new conceptual scheme.[72]

A close correlation can be detected between Northrop's theoretical structure and that of Conant. Conant's working hypothesis on a grand scale would correspond with Northrop's postulations. Both authors depend on deductive reasoning as the next step, and both require experimentation to verify the deductions. Conant identifies three elements in modern science: (1) speculative general ideas, (2) deductive

---

[71] Ibid., p. 32, citing William James, The Philosophy of William James, Drawn from His Own Works. Introduction by H. M. Kallen (New York: The Modern Library, 1925).

[72] Ibid., p. 47.

reasoning, and (3) experimentation.[73] It will be recalled that Northrop's three stages of scientific inquiry were: (1) analysis of problematic situation, which involves checking the assumptions; (2) induction; and (3) logical deduction of theorems for testing.

Discussions by Selected Authors in Educational Administration and Elaborations on Their Points of View

The preceding discussion by psychologists and philosophers of science regarding the nature of theory gives rise to a pertinent question: "What does this have to do with educational administration?" This section of the chapter is devoted to reviewing and interpreting selected writers in administration who have concentrated on the problem of administrative theory.

In Chapter I of this study, mention was made of the work at SSCPEA in administrative theory. This work was first reported in Better Teaching in School Administration,[74] which was followed by Professors Graff and Street's comprehensive treatment of the theory of administrative competence

---

[73] Ibid., p. 49.

[74] Southern States Cooperative Program in Educational Administration, Better Teaching in School Administration (Southern States Cooperative Program in Educational Administration, 1956).

in Improving Competence in Educational Administration.[75] The final report of the nine-year program, A Profession in Transition,[76] discusses activities of the group, including their efforts with theory.

Those working in the SSCPEA program concluded that a theory of educational administration is essential for competent task performance and that a major role of a training program for educational administrators is to provide opportunity for the student to develop a sound theory. They proposed some guides for a preparation program that may provide this opportunity for theory development.[77]

> It is obvious that one does not get a theory simply by memorizing principles of educational administration. He must internalize important concepts about individuals and groups, democracy as a way of life, education, and administration. These concepts become values and beliefs by which he lives and works. They indicate what is important and how he should act as an administrator.[78]

The above statement is a forceful endorsement of the importance of theory and its importance to the administrator.

---

[75] Orin B. Graff and Calvin M. Street, Improving Competence in Educational Administration (New York: Harper and Brothers, 1956.

[76] Truman M. Pierce and A. D. Albright, A Profession in Transition (Southern States Cooperative Program in Educational Administration and Its Successor, Associated Programs in Educational Administration, 1960).

[77] Southern States Cooperative Program in Educational Administration, Better Teaching in School Administration, op. cit., pp. 178-194.

[78] Ibid., p. 178.

It is contended that "theory houses the fundamental logic or justification behind all administrative actions."[79] The composition of a theory of educational administration is discussed in the following quotation:

> A theory of educational administration is, broadly speaking, a collection of concepts or principles that define what educational administration is and that give directions to an individual attempting to be an educational administrator. It is conceivable that a theory of educational administration would include concepts relating to the nature of individual and group life, the major tenets of American democracy, the purposes of public education, the nature of the administrative process, and the functions of educational administration.[80]

It will be apparent that the use of the term "theory" by the SSCPEA work groups corresponds with Conant's "working hypothesis on a grand scale" or Northrop's "postulations." This element of any theoretical structure is the framework for deducing hypotheses. Although "theory" as used by SSCPEA does not include the entire conceptual scheme, it does, in fact, include the theoretical element of the scheme. That is, this use of theory does not include the element of logical deductive relationships from the assumptions to the hypotheses, or theorems, or the element of hypothesis or theorem. However, since it is synonymous to the assumptions or postulates of a scheme, it is that element which provides

---

[79] Ibid., p. 51.

[80] Ibid., p. 47.

the base for interpretation of phenomena; in brief, it is the theoretical element. As has already been pointed out the validity of any hypothesis or theorem (or law, for those who insist on this stronger term) is proportional to the validity of the assumptions from which it was deduced. Conant called to our attention that every act of human behavior involves assumptions about the universe and about man. Rather than be content with unexamined assumptions, the SSCPEA group proposed that these assumptions which direct our behavior be subjects for investigation and improvement. It appears to be a valid expectation that preparation programs would be concerned with behavioral determinants. To concentrate on the administrative acts without concern for the framework from which the particular situation was interpreted, and the particular act selected, is to concentrate on the symptoms and ignore the causes.

There are those who would be offended by introducing metaphysical elements into a discussion of theory. Wolfgang Kohler in discussing the tendency of behavioristic psychology to maintain that human thinking as an experience is irrelevant because science, to be objective is only concerned with facts observable from the outside, poses a question which is pertinent to the discussion here: "Is it not the business

of science to destroy evidence?"[81] One gets the impression that the attitude is, "Let's ignore it and maybe it will go away." The question is clear. Shall metaphysical assumptions be honestly stated and subjected to examination, or shall they be furtively and/or reluctantly avowed with the naive insistence that these directors of behavior make no difference.[82]

In discussing the foundations of the competency pattern, Professors Graff and Street assert that:

> Since competence is so completely bound up in living and acting in the 'right' way, clearly that 'right' way will depend upon a particular point of view, which will provide an entree into one of the important problems of competent behavior (philosophical assumptions) and will establish a referential basis for further examinations regarding competence.[83]

This use of the term "theory" by those individuals working in SSCPEA to refer only to the set of assumptions of a conceptual scheme does not mean that they were unconcerned about the other elements of the scheme. The competency pattern is itself a comprehensive theoretical structure with

---

[81]Wolfgang Kohler, "Gestalt Psychology Today," The American Psychologist, XIV (December, 1959), 732.

[82]For the complete statement of the postulations undergirding the competency pattern, see: Southern States Cooperative program in Educational Administration, Better Teaching in School Administration, op. cit., pp. 117-124.

[83]Graff and Street, op. cit., p. 103.

(1) assumptions--the theory element, (2) logical inferences, and (3) working theorems--tasks and skills. Major emphases were placed on the set of assumptions which directed the selection of consistent job tasks and the concomitant skills required for their execution.

Since the purpose of this study does not require the examination of particular theories, but rather the examination of theoretical structures, no further explanations of the competency pattern need be elaborated.

The following discussions are concentrated on ideas expressed by contributors to the seminar devoted to administrative theory sponsored by UCEA and the Midwest Administration Center, held at the University of Chicago, November 11, 12, and 13, 1957.[84] Professor Halpin introduced the discussion of theory by making the following observations regarding its construction:

> The construction of a theory demands an act of creative imagination. This is a tough assignment, and not many of us are equal to it, nor can we get help from a 'how-to-do-it' manual. Theories can not be produced on demand; they evolve, and they evolve in many shapes and in many different degrees of precision. The building blocks of which they are composed--the constructs, the postulates, the assumptions--may be molar or molecular. . . . A theory may be broad and eclectic in its range, or narrow and specific. . . . The components of

---

[84]Proceedings were published in: Andrew W. Halpin (ed.), Administrative Theory in Education (Chicago: The Midwest Administration Center, 1958).

> a theory may also differ in the ease with which testable hypotheses can be adduced from the postulated model.[85]

Although theory possesses all of these characteristics of flexibility, Halpin is disturbed with the wide uses of the term, theory. It is his opinion that this condition is especially complicated in educational administration because some writers tend to use the term in the sense of value-theory, i.e., how administrators ought to behave rather than how they do behave. He says that there is a need for normative standards, but they cannot be secured through the methods used for constructing scientific theory.

> In short, the description of events and their evaluation must be kept distinct. To state the issue: the immediate purpose of research is to enable us to make more accurate predictions of events, not to prescribe preferential courses of human action.[86]

Another problem in developing a theory of educational administration is the tendency to be preoccupied with taxonomic methods. A third problem is the molar-molecular problem which particularly means the difference between the comprehension of administration qua administration or a restriction to educational administration.[87]

---

[85]Andrew W. Halpin, "The Development of Theory in Educational Administration," in Halpin, op. cit., p. 5.

[86]Ibid., pp. 6-7.

[87]Ibid., pp. 9-10.

James D. Thompson, in his discussion of modern approaches to the theory[88] sets up a set of criteria for a usable theory. These criteria are listed below with abridged explanations.

1. The variables and constants for such a theory will be selected for their logical and operational properties rather than for their congruence with common sense.

Common sense terms should be used in systematic theory only if they possess the precision and clarity for ordering experience, otherwise new terms must be invented or adopted.

2. An adequate theory will be generalizable, hence abstract.

A theory is more powerful as the range of events which it explains become broader. A theory should encompass all aspects of administration.

An adequate theory cannot be limited by time or place. It would be equally applicable in any country at any time.

3. The values capable of being attached to education and to administration will not be incorporated into the theoretical system itself; instead, the system will treat such values as variables.

---

[88]James D. Thompson, "Modern Approaches to Theory in Administration," Halpin, op. cit., pp. 20-39.

An adequate theory should be applicable equally in countries which prize democracy and those which prize other political ideals. Similar application would be made to profit-oriented administration and nonprofit-oriented administration. The value factors would be treated as variables instead of being incorporated in the theory.

4. An adequate theory of administration will be rooted in the basic social and behavioral sciences.

The subject matter of the fields of social and behavioral sciences have manifestations in administration.

5. The focus of an adequate theory will be on processes rather than on correlations.

Correlations within performance are inadequate unless there is an explanation of how the relationship occurs.[89]

In their discussions of the development of a theory of educational administration, Halpin and Thompson share some common fears. They are both troubled with the matter of human values, and they are insistent that these values be kept out of the structure itself. They are both concerned about the generality of a theory. Thompson urges that the more general the theory the better.

One is led to inquire about human purposes in a theory

---

[89]Ibid., pp. 29-33.

of univeral applicability. The development of a theory applicable in any political ideology and at any time would be quite a feat! This would be the theory to end all theorizing. Can all the aims, aspirations, purposes, and goals of mankind be universalized into a common denominator? This would hardly fit into our ideal of the "potential worth and dignity of every individual." But, then, this is an ideology that must not be included in the theoretical scheme, except as a variable. What then could be included in the scheme? We are faced with the thorny task of developing a theoretical scheme for explaining and predicting human behavior, and people have a unique way of behaving in a manner that will contribute to the achievement of purposes. But here again is an element of purpose that mustn't be included in the theory. Another thorny problem is that any theory, including educational administration is a human construction--a human who, incidentally, has a purpose. What is left for a theory of educational administration? It makes the chore a bit easier to symbolize the theory, e.g., if "A," then "B." But when the transposition of "A" and "B" is made to human processes, then the problem recurs. Either it will be necessary to remove theory construction from human handicraft and its application from human processes (or perhaps, it would be possible to assume that people act irresponsive to purposes), or take an alternative course of

action and admit human purpose as the core of any such theoretical scheme. If this alternative course of action is adopted--and it is strongly recommended in this study--it will be unnecessary to assert "that's my theory; it's not to be believed in, just to be used." A more acceptable admission would be that any theoretical scheme is based on certain assumptions. It could have been based on alternative assumptions, but the ones used were selected because of personal values. To use the theory fruitfully will require that similar assumptions be held by the user; otherwise the scheme must be remodeled. Similar hypotheses necessary for use in educational administration processes can never be logically deduced from conflicting assumptions. So the theorist must assume equal responsibility with every practitioner for the results derived from the scheme. This makes it mandatory that an adequate theory of educational administration or any other theory have the assumptions clearly defined rather than maintain that they are not a part of the theory, thus being most unscientific.

These remarks which take issue with Halpin and Thompson, it should be noted, are logical derivations from the postulations outlined in Chapter I of this study.

Daniel E. Griffiths[90] discussed the structure of

---

[90]Daniel E. Griffiths, "Administration as Decision-Making," Halpin, op. cit., pp. 119-149.

theory at the seminar, but his ideas are elaborated more fully in his book, Administrative Theory[91] which is discussed in the following paragraphs.

Griffiths clears the negative slate by explaining what theory is not:

1. Theory is not a personal affair. "It is apparently believed by many that theory is a rather personal matter--that each person works out for himself a theory of administration."[92] The administrator should not suppose he has developed a theory when he forms opinions about what will work as he faces his problems.

2. Theory is not a dream, a flight of fancy, or a daydream.

3. Theory is not a philosophy. Here, Griffiths supports the development of a philosophy but would place it outside of his theory.

> It can be seen easily that when one develops a set of values he necessarily involves the other areas of philosophy. . . . As imperative as is a sound philosophy, theory is something else again. Just how does philosophy differ from theory? This is commonly discussed as the 'is-ought' dichotomy.[93]

This line of reasoning, Griffiths suggests, has its origin in logical positivism, a philosophy which is discussed

---

[91]Daniel E. Griffiths, Administrative Theory (New York: Appleton-Century-Crofts, Inc., 1959).

[92]Ibid., p. 14.

[93]Ibid., p. 15.

in detail in Chapter III of this study.

4. Theory is not a taxonomy. Here again, Griffiths acknowledges the values of a taxonomy and states that ". . . One could probably make a very good arguement to support the contention that any science begins with a taxonomy."[94] He labels the competency pattern as a taxonomy.[95]

Griffiths, before discussing the nature of theory, appropriately considers some characteristics of science. Science seeks to accomplish three things: description, explanation, and prediction. The characteristics proposed are: objectivity, reliability, operational definitions, coherence or systematic structure, and comprehensiveness.[96]

Objectivity, we are told, means not only that the science must be free from bias and prejudice but it must be capable of testing by any intelligent person who has the necessary technical equipment for making the observations.

Reliability is concerned with confirmation by others working on the same problem.

Operational definitions are discussed as follows: "The concepts which are used in a science must be defined

---

[94] Ibid., p. 17.

[95] Ibid., pp. 13-19.

[96] Ibid., pp. 21-24.

by a series of operations which permit the perception and identification of the phenomena referred to by the concepts."[97]

Coherence or systematic structure means: "Not a mere collection of miscellaneous items of information, but a well-connected account of the facts is what we seek in science."[98]

Comprehensiveness is a plea for abstract concepts.[99]

Next, Griffiths proposes a set of criteria for a theory of administration.[100] The first criterion is, "Theory as a guide to action."[101]

> Unless a theory can provide guidance for the administrator when he needs to act, it is a poor theory indeed. The help which an administrator gets from theory is not in terms of what he 'ought' to do. Guidance in this area comes from his value system. The help he gets from theory is in terms of what will happen if he does a certain thing. In other words, theory deals with the consequences of action. 'If the administrator does this, then this will happen' is, in brief, theory in action.[102]

The second criterion is, "Theory as a guide to the collection of facts."[103] Theory provides a relationship of facts one to another, and, thus, is useful for insuring that

---

[97] Ibid., p. 23.

[98] Ibid., p. 23.

[99] Ibid., pp. 21-24.

[100] Ibid., pp. 24-27.

[101] Ibid., p. 25.

[102] Ibid.

[103] Ibid.

only related facts are gathered. In building a theory, facts are sought which bear upon the concepts devised, and once the theory has been written, facts are sought which are suggested by the theory or are needed for its validation.

"Theory as a guide to new knowledge"[104] is the third criterion. Theory guides the researcher to new knowledge by testable hypotheses which it suggests.

Finally, "theory to explain the nature of administration," is suggested as a criterion. A theory of administration should help in understanding what administration is.

In summary, a theory of administration must provide guides for action, for collecting facts, for suggesting new knowledge and for explaining the nature of administration.

Griffiths recommends that Feigl's definition of theory be adopted:

> In order to provide for a terminology which will not constantly involve us in a tangle of confusions, I propose to define a 'theory' as a set of assumptions from which can be derived by purely logico-mathematical procedures a larger set of empirical laws. . . .[105]

Theory, in this sense, is essentially a set of assumptions from which empirical laws can be deduced by logico-mathematics.

---

[104] Ibid., p. 26.

[105] Ibid., p. 28, citing Herbert Feigl, "Principles and Problems of Theory Construction in Psychology," Current Trends in Psychological Theory (Pittsburgh: University of Pittsburgh Press, 1951), p. 182.

In building a theory it is suggested that the observational approach be used for describing human behavior in organizations. "All theory building starts with observations of some sort or other."[106] These observations are to be reported in the form of facts. They should be collected by someone not involved in the event reported, and they must be reported in detail in clear, understandable language.

The first and major task in constructing a theory is the development of a set of concepts to describe the administrative situation. Any theory is based on a set of concepts relevant to the theme of the theory.

> A concept is simply a term to which a particular meaning has been attached. Once the meaning has been attached to the term, the term should always be used with this particular meaning; and, conversely, whenever a particular meaning is intended, the same term should be used.[107]

The recommended approach to be used in proper concept formation is operationism. Operationism means that concepts are given their meaning by the methods of observation or investigation employed to arrive at them and concepts have no meanings apart from these operations.[108]

Griffiths' point of view about theory development outlined in the foregoing paragraphs is briefly elaborated on

---

[106] Ibid., p. 36.

[107] Ibid., pp. 38-39.

[108] Ibid., pp. 40-42.

here. His works were referred to frequently throughout other sections of the study.

First of all, Griffiths delimits the activity of theorizing to a small minority of people. The administrator is only an applier of theory developed by administrative researchers.[109] Theory is further delimited by divorcing it from philosophy and human values,[110] and the insistence that theory is not a personal matter.[111] Furthermore, all concepts of a theory must adhere to operational definitions.[112] Even though theory is defined as being a set of assumptions, it is still maintained that all theory building starts with observations which are reported in the form of facts.[113] The similarity of this beginning of theory by observations to Bacon's "inductive" process described earlier will be noted.

The thesis promoted by Griffiths is a good example of the position maintained by the logical positivists regarding the nature of science and scientific theory. Differences between this and other philosophies appear to set forth the genesis of fundamental differences regarding the nature of theory.

---

[109] Ibid., p. 24.

[110] Ibid., pp. 14-17.

[111] Ibid., p. 14.

[112] Ibid., pp. 38-42.

[113] Ibid., p. 36.

E. THE BASIC CONSTRUCTS OF THEORY

From the various discussions of the nature of theory, a common set of constructs could not be drawn. The discussions have, however, given general descriptions of the structure of theory that have been most useful in the development of constructs proposed for analysis. The constructs proposed are: (1) assumptions, (2) logical deductions, and (3) hypotheses.

Assumptions are a generally recognized ingredient of any theory; however, there are disagreements about what constitutes an acceptable set of assumptions, or what takes place in the process of assuming. The development of an appropriate set of assumptions would for some be free creations, while others would insist on a statistical average of observable facts.

Logical deductions are also quite generally attributed a place in any theoretical structure, but here again the process may be one of mathematics or one of many less formal (but not necessarily less logical) methods.

Hypotheses are not always included in a theoretical structure. They sometimes are placed outside the structure as being derivations from the structure itself; that is, it is held by some that hypotheses begin where the theory leaves off. It is maintained here, however, that hypotheses are vital ingredients of the structure. They are essentially the

link between the idea and the act. That is, an hypothesis, derived logically from a set of assumptions, is an expectation of the consequent. It is a projected look into the future. "If I perform this act, then, on the basis of my assumptions, the purpose which I am seeking to achieve will probably be accomplished."

These constructs are analyzed and described in detail in Chapter V of this study.

Some mention should be made of other constructs often attributed to theory. These are propositions and concepts. All theories should be subject to verbalization and description. When this is done, the structure is formulated into propositions. The propositions are compilations of concepts. These two elements, propositions and concepts, were discussed in the analytical section of the study.

F. THE PURPOSES OF THEORY IN EDUCATIONAL ADMINISTRATION

The purposes of theory in educational administration are no different from the purposes of any theory except for differences in the nature and purposes of the particular process or activity to which theory is applied. To be more specific, the fundamental purpose of any theory is to make accurate predictions. But it should be remembered that predictions are the drawing of relationships between the present

state or activity and a future state or activity. This means that the future state has already been identified and is thus synonymous with a purpose. Purposes are always future-oriented. However, the very fact that they are identifiable means that they are important (of value) to the individual. This sense of importance has developed from the individual's experiences. Thus, in the process of theorizing there is a consideration of past experiences for explanation of the present and delineation of possibilities for the future.

All other purposes which can be attributed to theory, such as description, explanation, delimitation of facts, understanding, et cetera, are all by-products of or preparation for the fundamental aim of attaining purposes (prediction).

This means that efforts to categorize educational administration with the administration of other organizations is an unfruitful venture. First of all the purposes of educational administration must be specified. These purposes will always be dependent on assumptions held about the nature of man, the nature of society, the nature of education, and the nature of educational administration. Only after the purposes have been clearly formulated can the processes and activities be defined and the characteristics of the administrator be specified. After this has been done, then, and

only then can comparisons with the administration of other organizations be made. Of course, there will be many common elements. Preparation programs for educational administrators should take advantage of experiences of preparation programs for other administrators to avoid unnecessary duplication of efforts. But to adopt the experiences of another program without first delineating purposes is an invitation for frustration and despair.

G. MAJOR CONTROVERSIAL ISSUES AMONG THEORISTS

There are many differences of opinion about the nature of theory, the purposes of theory, the constructs of theory, and the several techniques and processes of formulating theory. Such differences of opinion are more likely when dealing with abstractions such as theoretical structures than when dealing with routine matters. They are not necessarily a serious detriment. As a matter of fact, they are oftentimes responsible for progress that could not be possible with old ways of doing the job.

On the other hand, differences are not always healthy; they can be exceedingly detrimental to progress and they can defer new developments indefinitely. It is the opinion expressed here that some controversies among theorists fall in this latter category. These are basic differences of serious import. It has been erroneously supposed by some that the

faculty members in a preparation program should be representative of different philosophic systems so that the students will not develop a philosophic bias. This is a grave error. It is founded on premises incompatible with what is known about teaching and learning experiences. The student must be motivated in a problematic atmosphere to consider alternatives and develop his own beliefs after carefully considering others. This differs from the premise that the student is the object of the wares peddled by the professors and he must get a balanced diet of idealism, realism, and pragmatism. Understanding can never be the ultimate aim of scientific endeavor. All of the understandings possible cannot insure intelligent behavior. Rather, the ultimate aim of scientific endeavor must be to point the way toward new and exciting experiences in the future so that man may be able more and more to control his destiny. "United we stand, divided we fall" is a truism of history and was never more important than it is now. It is not proposed here that there be commonality of opinion regarding the several administrative processes and methods of operation. The plea is made, however, that there be unification of opinion about the purposes of educational administration.

It has already been stated that most of the major controversial issues among theorists have roots in different philosophic beliefs. It is for this reason that Chapter III

is devoted to an examination of these beliefs.

Some major controversies about theory which have potentially serious import are stated below in the form of questions. It will be noted that many of these controversies have already been aired in the preceding sections of this study and a firm stand expressed. No apologies are offered for this. The major postulations of this study were expressed at the beginning so that there could be no question about the point of view held. This is the plea made for all theorists in educational administration, that they open the linen closet of beliefs and opinions and place them on the table for inspection. Since these assumptions and beliefs direct acts of behavior, everyone in the profession has a right to know what they are. Otherwise, we are constantly engaged in a game of "hide and seek." The issues listed below are re-examined in Chapter VI in the light of findings in the analytic and synthetic sections of the study.

1. Are theoretical structures free of human values?

It should be emphasized that this question has reference to the structure itself and is not restricted to variables. This encompasses a similar question regarding whether theory is a public or private matter.

2. Are theoretical assumptions necessarily generalizations of inductive facts?

This question could be stated, "Are assumptions always

empirically testable?" There are some who insist that the tails at both ends are anchored to empirical facts. One wonders about the fruitfulness of a structure that is tied to the ground at both ends.

3. Are all concepts necessarily empirically definable?

This controversy is closely related to number two. This question could be phrased, "Are operational definitions possible for all concepts in a theoretical structure, when operational definitions are restricted to relationships with empirical reality.

Griffiths indicts the formulators of the competency pattern with misuse of the terms "operational" and "theory."[114] As has already been discussed, whether or not "theory" is misused depends on what theorists one has been reading. There are indications that Sullivan, Conant, Einstein, and Northrop would not consider it a misuse. As for the term "operational," the reference of misuse probably refers to Bridgman's founding of the school of thought known as operationism. After reading Bridgman's more recent work, Reflection of a Physicist,[115] the accusation of misuse may more properly be made of the positivists. The question becomes one of identifying

---

[114]Griffiths, op. cit., p. 53.

[115]P. W. Bridgman, Reflections of a Physicist (New York: Philosophical Library, 1955).

the reality for anchoring the operational relationship. If the anchor is sought in empirical observations and physical matter, then Griffiths' indictment is correct. However, if the operational relationship is anchored in human values, then the indictment is most incorrect. The formulators of the competency pattern used the term for identifying operational beliefs, one aspect of "know-how."[116]

4. Is the usefulness of theoretical structures restricted to explanations of what is?

This is a challenge of the traditional "is-ought" dichotomy. It is likewise a challenge of the premise that the fundamental purpose of theory is to increase understanding.

H. CHAPTER SUMMARY

The purpose of this chapter was to investigate the nature of theory, to define some basic constructs of theory, to determine the fundamental purposes of theory and to point out major items of controversy among theorists.

The focus of attention on theory in educational administration became increasingly more intense as efforts were accelerated to make educational administration more professional and to label the profession as a science. Controversies

---

[116]Southern States Cooperative Program in Educational Administration, Better Teaching in School Administration, op. cit., pp. 124-177.

about theoretical structures became apparent as efforts were made to divorce scientific theory from philosophic theory.

The point was stressed in the chapter that the philosopher, the scientist, the administrator, and the man in the street all theorize as they perform daily acts of behavior. It may be poor theory, but is is nonetheless, theory. Theorizing is contextually oriented to a scientific attitude.

Expressions about theory by behavioral scientists, philosophers of science, and authors in educational administration were reviewed and discussed. From the premises of postulations stated in this study, many points made by authors were challenged, many were endorsed, and extrapolations were made from some. The element of purpose in theorizing was vigorously stressed.

Characteristics of the philosopher and the scientist were discussed in some detail.

The basic constructs of theory were identified as assumptions, logical deductions and hypotheses. Elementary elements of these constructs were identified as propositions and concepts.

The ultimate purpose attributed to theory was "prediction." Prediction was described as the relationship between the present state or activity and a future state or activity. Other purposes of theory are either by-products

of, or preparation for, this fundamental purpose.

Equating educational administration with administration of other organizations can only be accomplished after purposes have been clearly defined.

The major controversial issues regarding theory are philosophically grounded. These major issues were identified around the questions of (1) the place of human values in a theoretical structure, (2) the free creative or the restrictive aspects of assumptions, (3) the empirical definition of all concepts, and (4) the validity of the "is-ought" dichotomy.

CHAPTER III

THEORY FOUNDATIONS IN PHILOSOPHIC AND SCIENTIFIC SYSTEMS OF INQUIRY

A. INTRODUCTION

Theory has traditionally been associated with inquiry. A thesis of this study is that this association is correct, and discussions of theory, to be meaningful, must clarify this association. The prevalent lay notion that theorizing is an activity in which impractical men engage themselves stems from the association of theory with rationalistic philosophy. On the other hand, efforts to restrict theory to a context of inductive science is another association with a system of inquiry as well as an attempt to break the prior association with rationalism.

Because of these associations, major differences about the nature of theory are fundamentally differences about the system of inquiry with which the theory is associated. There may be minor differences about mechanical or technical aspects of theory, but fundamental controversies, such as those listed in Chapter II of this study, surpass controversies about theory per se; they are more basic controversies about the nature of the system of inquiry.

Perhaps some explanation is in order about what is meant by "systems of inquiry." The systems have specific

reference to science and philosophy. Any search for new knowledge or for truth is necessarily an examination into what is beyond that which is now known, thus inferring a future state. It may be contended, and indeed has been, that philosophy is not oriented toward inquiry. It is a contention here that from the most rationalistic form of idealism to the most inductive form of empiricism, these systems are primarily ones of futuristic inquiry. The level of inquiry, certainly, will always vary with the quality of the investigation and the loftiness of the purposes sought. It has already been noted that many behavioral scientists with positivistic orientation insist that the fundamental purpose of science is explanation. The same thing has been said about rationalism, only the soundness of the methodology has been questioned--and very appropriately so. A position already stated is emphasized here; i.e., explanation is meaningless unless the phenomena being explained have predictive significance. When man searches for deeper understandings and more comprehensive explanations he does so in order that control may be exhibited on a future consequential act. "Why" questions either encompass or point toward questions "of what significance." As Jacob Bronowski puts it: "All living things act to anticipate the future. This is what

chiefly distinguishes them from lifeless things."[1]

The purpose of this chapter is to briefly outline the historical evolvement of modern science. It will be shown that major controversies about theory are specific indications of differences among theorists about the nature of scientific inquiry. Major attention is paid to science as it is perceived in a context of determinism and as it is perceived in a context of relativism.

B. A DETERMINISTIC PHILOSOPHY OF SCIENCE

A deterministic philosophy is one that presupposes a fixity beyond the capacity of man to give it resilience. Gerard De Gré, in expressing his own assumptions of science gave what appears to be the general tenets of determinism:

> . . . (1) that a real world exists independently of our knowledge of it; (2) that this real world is to an extent knowable through a process of approximation; and (3) that knowledge is true to the degree to which it approximates or is isomorphic to the structure of reality.[2]

These tenets were held by the early realists, and there is no evidence of their abdication by modern

---

[1] Jacob Bronowski, "Science as Foresight," What is Science, James R. Newman, editor (New York: Simon and Schuster, 1955), p. 427.

[2] Gerard De Gré, Science as a Social Institution, Short Studies in Sociology (Garden City: Doubleday and Company, Inc., 1955), p. 37.

empiricists, the logical positivists. An attempt has been made to create an anchor of absolute objectivity for all thought and activity.

The physical scientists first adopted the idea of absolute objectivity, perhaps as a revolt against dictates by the church hierarchy and proponents of Aristotelian dogma.

Frederic Lilge points out that this course of science began in the German universities about 1820 as a revolt against forms of idealistic philosophy:

> Since idealism in its various forms was all the philosophy German scientists had known, the rift was indeed inevitable. Yet it was unfortunate. Scientists might honestly think that philosophy was irrelevant to their work, an idea which continued concentration on the foreground of fact and experiment gradually turned into a fixed belief. But actually science rested on certain assumptions and employed conceptions which it never proved, and these constituted nothing less than a metaphysics. . . .[3]

Regardless of the cause, the reliance on induction for the formulation of scientific theory is still widely maintained. "Gathering the facts" is a phrase used with pride by many scientists, apparently without recognition that the human being has been reduced to a technician who collects and sorts facts.

The vast majority of social and behavioral scientists

---

[3]Frederick Lilge, The Abuse of Learning (New York: The Macmillan Company, 1948), pp. 62-63.

have utilized deterministic concepts of science for their own work. Prescott Lecky tells us that

> The fallacy of objective valuation in psychology is an over-simplifying tendency similar in many respects to statutory law. In both cases the attempt is made to eliminate the question of motive by declaring it to be of no consequence.[4]

Without further generalizations on the deterministic philosophy of science, logical positivism, the modern-day expression of determinism is examined.

Logical Positivism

Just as it would be impossible to define any particular philosophic or theological point of view to the liking of all who pay allegiance to it, so is it equally impossible to define a particular point of view about science, such as logical positivism, to the liking of all its proponents. It is, however, possible to point to some generally held tenets of this idea. More important, it is possible to look at some consequential products of the promotion of and adherence to this philosophy.[5] Modern positivism has developed from a union of many specific ideas such as operationism,

---

[4]Prescott Lecky, Self-Consistency, A Theory of Personality (New York: Island Press, 1945), pp. 10-11.

[5]"Philosophy" is used throughout this study to refer to broad points of view. It is not used as an antonym of "science." When references are made to rationalistic brands of philosophy, these particular philosophic systems are referred to by name or more generally as rationalism.

physicalism, scientific empiricism, psychological behaviorism, reductionism, and analytic philosophy. Some of these have been pursued more vigorously than others and have retained their identity; however, positivism borrows from all and has subsumed most of them.

Logical positivism as it is now known was formally organized in 1928 by an impressive group of scientists known as the Vienna Circle.

The principle aims were to provide a secure foundation for the sciences and to demonstrate the meaninglessness of all metaphysics. The method utilized to attain these aims were the logical analyses of all concepts and propositions.[6]

The two most fundamental doctrines of logical positivism according to Weinberg are: "(1) That propositions of existential import have an exclusively empirical reference, and (2) that this empirical reference can be conclusively shown by logical analysis."[7] The meaning of every proposition is reduced to atomic facts. It should be noted that although the propositions are said to have empirical referents, the methodology (logical analysis) does not have an

---

[6]J. R. Weinbert, An Examination of Logical Positivism (Paterson, New Jersey: Littlefield, Adams and Company, 1960), p. 1.

[7]Ibid.

empirical anchor. This is explained away by the assertion that the method is only used to connect meanings, not infer them.

Levi summarizes positivism into six doctrinal theses:

> 1. The function of philosophy is logical analysis.
>
> 2. All cognitively significant (meaningful) discourse is divisible without remainder into analytic or synthetic propositions.
>
> 3. Any proposition that purports to be factual or empirical has meaning only if it is possible in principle to describe a method for its verification.
>
> 4. All metaphysical assertions, being neither analytic nor synthetic proposition, are meaningless.
>
> 5. There is a single language for all science; it is similar in form to the language of physics, and all synthetic propositions are reducible to elementary experiences expressible in this language.
>
> 6. All normative assertions, whether positing moral, aesthetic or religious values, are scientifically unverifiable, and are therefore to be classified a forms of non-cognitive discourse.[8]

An examination of the above theses makes possible some very interesting generalizations. First of all, philosophy has been stripped of all functions save that of analysis.

> . . . It should analyze all pretensions to knowledge so as to clarify the meaning of terms and the logical relationships between ideas. In the end this will mean that philosophy has become

---

[8]Albert William Levi, Philosophy and the Modern World (Bloomington: Indiana University Press, 1959), pp. 343-345.

> the logical analysis of science through the syntactical analysis of scientific language.[9]

This, of course, is a very narrow concept of philosophy. It is used as a formal deduction for transposing meaning. The value world of mankind for the application of meaning has been omitted from positivism.

Meaning is not vested in the individual, but rather it rests in empirical referents and relationships. All "meaningful" discourse is either analytical or synthetic. The formal sentences of logic and pure mathematics, without empirical referents, can be used to stipulate definitions, rules or syntax. The synthetic discourse is termed the factual language of science where propositions can be judged for truth and falsity. Since, it is held, metaphysical assertions do not fall in the two categories of analysis and synthesis, then they are meaningless. The contention is that metaphysical assertions have supposed existential import, yet they are non-empirical. They are not reducible to elementary propositions verified in experience.

With the emphases given to language, many inadequacies were found in the multitude of different ways of expressing similar meanings. So, a single language was found to be

---

[9] Ibid., p. 344.

necessary. Levi defines this necessity as follows:

> Any empirical science should rest on a base of sensory perception and should be intersubjectively verifiable. To meet these requirements and to unify the various special sciences requires the formation of a universal language of science in which propositions from the most various sciences might be combined in a single body. Such a language would be a thing-language consisting of definite quantity-quality descriptions for definite space-time values.[10]

A new language was the topic of investigation by Rudolph Carnap; he was primarily responsible for refinements in positivism, known as physicalism (sometimes called radical physicalism).[11]

The last thesis mentioned by Levi, that all normative assertions are forms of non-cognitive discourse, puts the role of human purpose outside the realms of a positivistic science. It is contended that an analysis of normative assertions

> . . . will always reveal them to be either sociological descriptions of moral phenomena, psychological descriptions of moral beliefs, emotion-laden expressions of moral sentiment or imperative statements seeking to compel activity.[12]

A point of view about meaning on which the positivists have leaned heavily is operationism. The tenets of

---

[10]Ibid., p. 345.

[11]For example, see: Rudolph Carnap, The Logical Syntax of Language (London: Routledge and Kegan Paul; New York: Humanities Press, 1937).

[12]Levi, op. cit., p. 345.

operationism are explored in the subsequent section.

Operationism

Operationism (sometimes called operationalism) is an attempt to establish a criterion for meaning. Accurate reporting has always been important in science. The work of one scientist, to be meaningful to another for further experimentation, must be accurately reported. In describing one's experimentation, the choice of terminology is important. What does one mean when he uses a particular term? Professor Percy W. Bridgman has been credited with originating operationism.[13] He described his thesis as follows: "In general, we mean by any concept nothing more than a set of operations; the concept is synonymous with the corresponding set of operations."[14] To Bridgman, a physicist, concepts were defined in the set of operations that necessitated their use. Hempel outlines the basic tenets of operationism:

> 1. 'Meanings are operational.' To understand the meaning of a term, we must know the operational criterions of its application, and every meaningful scientific term must therefore permit of an operational definition. Such definition may refer to certain symbolic operations and it must ultimately make reference to some instrumental operation.

---

[13]Percy W. Bridgman, The Logic of Modern Physics (New York: The Macmillan Company, 1928).

[14]Ibid., p. 5.

> 2. To avoid ambiguity every scientific term should be defined by means of one unique operational criterion. . . .
>
> 3. The insistence that scientific terms should have unambiguous, specifiable, operational meanings serves to insure the possibility of an objective test for the hypotheses formulated by means of those terms. Hypotheses incapable of operational test or, rather, questions involving untestable formulations are rejected as meaningless.[15]

The above explanation of meaning is obviously an effort toward the elimination of ambiguity through anchoring the meaning of concepts to observable operations; meaning is anchored to physical empiricism. To what extent Bridgman intended that this criterion be applicable to sciences other than physics is not clear. Whether it was intended or not, psychologists adopted it en masse to give some stature to their budding science. The behaviorists found rich support for their point of view.

For the empiricists, here was an explanation of meaning to rid themselves for good of the perplexing problem of metaphysics.

To say that Bridgman was displeased with the interpretations given to his book is quite an understatement. In 1953, at the American Association for the Advancement of

---

[15]Carl G. Hempel, "A Logical Appraisal of Operationism," The Validation of Scientific Theories, Phillipp G. Frank, editor (Boston: Beacon Press, 1956, copyrighted by American Association for the Advancement of Science), pp. 53-54.

Science symposium, while reviewing the current state of operationism he was prompted to state:

> . . . I feel that I have created a Frankenstein which has certainly got away from me. I abhor the word operationalism or operationism, which seems to imply a dogma, or at least a thesis of some kind. The thing I have envisaged is too simple to be dignified by so pretentious a name; rather, it is an attitude or point of view generated by continued practice of operational analysis. So far as any dogma is involved here at all, it is merely the conviction that it is better, because it takes us further, to analyze into doings or happenings rather than into objects or entities.[16]

To those who perceived here the ultimate in empiricism, Bridgman clarifies his position very clearly:

> In general, I think, that there need be no qualms that the operational point of view will ever place the slightest restriction on the freedom of the theoretical physicist to explore the consequences of any free mental construction that he is ingenious enough to make. It must be remembered that the operational point of view suggested itself from observation of physicists in action.[17]

After Bridgman clarified his position in lectures and publications subsequent to his original book on the subject, the more empirical-minded advocates of some of the other sciences were content to judge him (Bridgman) as a physicist. The psychologists were especially disturbed by his acknowledgment of the scientist as a personality who freely creates

---

[16]Percy W. Bridgman, Reflections of a Physicist (New York: Philosophical Library, 1955), p. 160.

[17]Ibid., p. 166.

and influence his research.[18]

In positivism and its chief supporting ideology, operationism, it is apparent that the role of science is reduced to explanation. This stems from traditional realist notions dating at least as far back as Francis Bacon. The universe, it is assumed, has a fixity that lends itself to discovery. When applied to human behavior, this same rigidity of habit is assumed.

There is an alternative to positivism which is explored in the following section.

C. A RELATIVISTIC PHILOSOPHY OF SCIENCE

It seemed important to examine an alternative point of view about scientific investigation. The discussion here was correlated with points discussed regarding determinism to show clearly both sides of the philosophical issues. No doubt, many scientists and philosophers with positivistic orientations will resent the implication that positivism is a deterministic philosophy of science. The break from rationalism was an effort to get from under the supernatural universal laws. The contention by the positivists that science is seeking not for truth or falsity, but usefulness or lack of usefulness is commendable. But such strides

---

[18]S. S. Stevens, "Psychology and the Science of Science," Psychological Theory, Melvin H. Marx, editor (New York: The Macmillan Company, 1951), p. 25.

toward relativism are belied by the insistence upon empirical referents for meaning. So long as this insistence is maintained, words about relativism by the positivists have a hollow ring.

There are two general areas in which relativism has had revolutionary effects. These areas are physical matter and physical measurement. These, of course, originated in the natural sciences; however, like determinism there are basic applications in the social sciences.

Quantum Theory

The advances in quantum mechanics during this century are staggering to the imagination. The early Greeks speculated that matter was composed of small particles which they called atoms to suggest their basic, individual nature. "Today, based not on speculation but on ingenious, indirect experiments we know that atoms exist; we even know their sizes and shapes with accuracy, although they are invisibly small."[19] The only similarity between the atom speculated by the Greeks and the atom as we now know it, is that the name "atom" has been retained. The atom itself is not a mass, but the nucleus of the atom is thought to contain mass.

---

[19]Donald S. Hughes, "The Elusive Neutron," Adventures of the Mind Series, The Saturday Evening Post, CCXXXIV (February 4, 1961), 22.

The minuteness of the dimensions of an atom amazes the non-scientist. It would take at least one million atoms to cross a very fine line, one-tenth of a millimetre wide. Inside the atom, which may be considered as a zone, electrons rotate. In the center of the atom is one nucleus which is so small that there would be room for a billion in one atom.[20] Wuesthoff illustrates the minuteness of the mass as follows:

> Just imagine an iron cube 30 feet high by 30 feet wide by 30 feet deep. This would be a block of iron about the size of a small house. If it were possible to squeeze together all the atomic nuclei, that is to say all the points at which the mass is concentrated, then all the atomic nuclei from these 27,000 cubic feet of solid iron would only occupy the space of a pin head.[21]

Scientists have made the nucleus a subject for investigation, and of its two parts, the neutron which is not electrically charged and the positively charged proton, the neutron has been singled out for investigation. Inside the neutron, rapidly moving mesons have been found, and it is conjectured that there may be other smaller particles.[22]

Hughes poses the question for us:

> . . . Are there fundamental particles? Will we ever find the ultimate particle? With the

---

[20]Freda Wuesthoff, "Atomic Energy and Peace," Lecture given at the First Meeting of the Stuttgart Peace Circle, March 22, 1947. Printed by the Society for the Scientific Study of Peace, Geneva, 1957.

[21]Ibid., pp. 12-13.

[22]Hughes, op. cit., pp. 22-23; 75-77.

> enormous accelerators now building or in the planning stage will we be able to split the meson only to find new submesonic members of our family of 'elementary' particles? At the present time no scientist or philosopher has a valid basis for answering this question.[23]

This discussion of quantum mechanics was intended to point out how unrealistic it may be to lean for support on physical reality.

In addition to the minuteness of the subatomic realm, the shape of these particles and the rate of motion are also factors which amaze even the physicists. These subatomic particles simultaneously behave as waves, such as ripples on a pond, and as particles such as rolling marbles. Also, at variance with common sense is the speed of these particles, which is not uncommon at about the speed of light, 186,000 miles per second. And, as the speed increases, so does the weight of the particle, which accounts for the equivalence of matter to energy.[24]

Wuesthoff suggests that these new developments in physics pose some real responsibilities:

> Any physicist who looks out on the world today and views with open eyes the present position of the natural sciences cannot but feel an overpowering sense of responsibility. He knows that the developments which have taken place very recently in the field of physics have set in

---

[23] Ibid., p. 77.

[24] Ibid., p. 75.

> motion revolutionary changes of a most far-reaching character, which will descend like avalanches on all fields of human activity.[25]

Physicists found themselves in a quandry trying to conduct experimentation when there were evidences that physical systems behave like particles and like waves. Northrop describes the method of escaping this predicament as follows:

> When exactly described, it [the method] may be called the method of acting as if one does not know what one does know. For the benefit of those who insist upon an abstract and more dignified title we shall call it the method of simulated ignorance.[26]

This method, described by Northrop, appears to be an appropriate one not only for physicists but for all who seek intelligent behavior. It is a way of subjecting our own values and beliefs to scientific scrutiny.

It seems that these new knowledges have implications for challenging traditional reliance on physical matter in a theory of knowledge. Levi suggests that, "A type of physical theory which would be congruent with both cosmological and subatomic measurements seems, therefore, to require a reinterpretation of the categories of time, space, substance, and causality."[27]

---

[25]Wuesthoff, op. cit., p. 9.

[26]F. S. C. Northrop, The Logic of the Sciences and the Humanities (New York: The Macmillan Company, 1947), p. 202.

[27]Levi, op. cit., p. 247.

The situation has been summed up well by J. H. Faurot:

> . . . The axioms of mathematics were at one time thought to be self-evident; and until fairly recently, the laws of Galilean physics, although not considered self-evident, were believed to be an exact transcription of the structure of nature. Today among advanced scholars, the view is practically universal that these truths are not absolute. We approach some subjects in terms of postulates, assuming what is never capable of being proved. Other subjects, we approach in terms of hypotheses, subject to varying degrees of probability. And most of our knowledge is viewed in the context of function: a given proposition is true for certain purposes, and no proposition is true except these purposes be understood.
>
> Our problem is to live with this new understanding of knowledge. . . .[28]

Experimentalism

John Dewey is largely responsible for promoting the philosophic system of experimentalism which is not in conflict, but rather complements these new knowledges. As a matter of fact this philosophy preceded many of these new scientific developments. Two fundamental elements of this philosophy are intertwined. These are: (1) the individual is the focal point of all activity and behavior, and (2) the meaning of an idea is dependent on its consequential results.

These tenets have a number of important implications.

---

[28] J. H. Faurot, "Truth and Responsibility," The Journal of Higher Education, XXX (January, 1960), 3.

In the first place, responsibility is removed from the laps of the gods and from the inherent nature of the "facts." Each individual has responsibilities for his own behavior and exercises control over his environment. This makes it mandatory that people, from the international level to the smallest groups, work together for mutual benefit. Every individual must be assured of freedom for his own self development, but inherent in every guarantee of freedom is the expectation that responsibility will be assumed necessary to guarantee the freedom of others. The realization that man is responsible for his own behavior and for his own development within a social frame of reference is comforting to some but horrifying to others. Our educational programs have a major role for assisting each individual in his own development so that he will not be seeking ways of shifting responsibility.

The tenet that meaning rests with consequential results is closely allied with the notion of individual freedom and responsibility. This tenet is also basic to the notion of theory that has been advanced in this study. It was maintained that the purpose of theory is primarily that of prediction--associating the present with the future with past experience interpreting both. When a problem is encountered, an intelligent person will analyze his assumptions and project possible problem solutions. Whether or

not a projected solution will work cannot be finally known until it is tested. However, knowing that responsibility for the results of this proposed solution rests in the soundness of the assumptions, an individual is forced toward intelligent behavior.

These remarks about individual behavior throw open the whole issue of morals and values for investigation. The matters can be thrown out of science so long as reliance for confirmation of meaning is placed in physical reality. But when the individual assumes responsibility himself, these things must be examined. So long as it is contended that there is a realm of science and there is a realm of philosophy, and "never the twain shall meet," except possibly on a very limited scale for analyses, then it is comforting for man to justify a dual life. Dewey saw an imperative need for unification:

> When the consciousness of science is fully impregnated with the consciousness of human value, the greatest dualism which now weighs humanity down, the split between the material, the mechanical, the scientific and the moral and ideal will be destroyed. Human forces that now waver because of this division will be unified and reinforced. As long as ends are not thought of as individualized according to specific needs and opportunities, the mind will be content with abstractions, and the adequate stimulus to the moral or social use of natural science and historical data will be lacking. But when attention is concentrated upon the diversified concretes, recourse to all intellectual materials needed to clear up the special cases will be imperative. At the same time that morals are made to focus in intelligence, things intellectual

> are moralized. The vexatious and wasteful conflict between naturalism and humanism is terminated.[29]

Dewey suggests four considerations necessary to do away with this dualism. "First; inquiry, discovery take the same place in morals that they have come to occupy in sciences of nature."[30] This eliminates complete reliance on past decisions and old principles for justifying a course of action. Also, a purpose in a definite case is not final, but is held as a working hypothesis until results confirm its rightness.

> Mistakes are no longer either mere unavoidable accidents to be mourned or moral sins to be expiated and forgiven. They are lessons in wrong methods of using intelligence and instructions as to a better course in the future. They are indications of the need of revision, development, readjustment. Ends grow, standards of judgment are improved. Man is under just as much obligation to develop his most advanced standards and ideals as to use conscientiously those which he already possesses.[31]

The second consideration advanced is summarized by Dewey as follows:

> Anything that in a given situation is an end and good at all is of equal worth, rank and dignity with

---

[29]John Dewey, "Reconstruction in Moral Conceptions," The Structure of Scientific Thought, Edward H. Madden, editor (Boston: Houghton Mifflin Company, 1960), pp. 353-354.

[30]Ibid., p. 354.

[31]Ibid.

> every other good of any other situation and deserves the same intelligent attention.[32]

The third consideration has to do with the removal of fixed moral standards for everyone.

> The good man is the man who no matter how morally unworthy he has been is moving to become better. Such a conception makes one severe in judging himself and humane in judging others.[33]

Finally, ". . . the process of growth of improvement and progress, rather than the static outcome and result, becomes the significant thing."[34]

D. PHILOSOPHY OF SCIENCE AND THEORY OF EDUCATIONAL ADMINISTRATION

It was suggested at the beginning of this chapter that fundamental points of view about theory are imbedded in points of view about systems of inquiry. The major controversial issues identified in Chapter II were centered around the questions of (1) the place of human values in a theoretical structure, (2) the free creative or the restrictive aspects of assumptions, (3) the empirical definition of all concepts, and (4) the validity of the "is-ought" dichotomy. It is quite apparent that these issues are fundamental ones

---

[32] Ibid.

[33] Ibid., pp. 354-355.

[34] Ibid., p. 355.

in the larger philosophical considerations explored in this chapter. Those who adhere to a deterministic interpretation of the universe and human behavior obviously must look upon theory from a significantly different vantage point than those scientists who do not perceive their roles as map-makers[35] but as creators with human strengths and weaknesses.

Dwight Waldo, in his excellent discussion of public administration in The Study of Public Administration,[36] summarizes the possible effects of logical positivism when applied to public administration. His discussion, which is pertinent to educational administration, is abridged in the following paragraphs preceded by an abridgment of his analysis of the value problem in public administration.

Until the 1930's a separation between politics and public administration was acknowledged, with politics identified primarily with the legislative body and administration with the departments and chief executive. So long as the separatism was accepted, the value problem did not appear, since value was assigned to politics in deciding a course of

---

[35]James B. Conant says that science is not an exploration of the universe. "To my mind, the analogy between the mapmaker and the scientist is false. A scientific theory is not even the first approximation to a map; it is not a creed; it is a policy. . . ." James B. Conant, Modern Science and Modern Man (Garden City: Doubleday Anchor Books, Doubleday and Company, Inc., 1952), p. 97.

[36]Dwight Waldo, The Study of Public Administration (New York: Random House, 1955).

action directed toward a goal, and administration was only a means for realizing the goal in the most efficient and economical way.

In a broader perspective the value problem is a philosophic one. Perhaps the most important philosophic movement of the twentieth century in Western countries has been toward separating the categories of fact and value, of the "is" and the "ought." This movement is associated with logical positivism, however, some idealist philosophers in reaction to the materialist ethos in modern science have promoted this movement by contending that attention to the "is" of facts cannot determine the good or right.

The positivists maintain that values are unverifiable and do not belong in the realm of science. Some arguments against positivism are as follows:

1. Logical positivism equates distinctions in logic with distinctions in life.

2. What is presented as an instrument of analysis becomes a program of action with unfortunate results.

(a) The separation of fact and value, often identified with logical distinctions between fact and preference statements, encourages the divorce of means and ends. Ends are taken for granted; the organization is absorbed into a technological context, and leadership is dispensable. If leadership assumes no creative role in formulating ends when the

situation requires it, then leadership will fail leaving behind a history of uncontrolled opportunistic adaptation.[37]

(b) Logical positivists may be naive about their own value premises. Values have entered in the back door, since what the positivists are researching is valued or it would not be researched.

(c) Research by the positivists lends itself to the bias or uses of elitism since positivism is value blind. That is, the positivists have value systems but they are accidental since they are unrecognized.

3. The value neutrality of means asserted by the positivists is false.

4. Even though positivism has a firm commitment to the ideal of science, the effect may be to retard actual scientific advance because of eliminating a wide realm of experience.

5. Positivism is a present-day extension of rationalism which affords aid and comfort to the mystic. The philosophy is usually associated with agnosticism but some religious people find it congenial since their faith can be fitted comfortably in the area of nonverifiable values.[38]

---

[37] Ibid., pp. 63-64, citing Philip Selznick, "Administration and Institutional Leadership." (Unpublished manuscript.)

[38] Ibid., pp. 60-66.

In educational administration, theorists have encountered the same problems as Waldo defines above in his discussion of public administration. The question is largely one of values which are ignored in a deterministic philosophy of science. Also, there is the question of means and ends, the resolution of which depends again on the philosophic point of view. The determinist would virtually ignore ends and purposes, while the relativist would gauge all behavior by them. An example of the tendency to ignore ends can be seen in educational administration. There are many who contend that administration is the same wherever it is found regardless of the organizational purposes.

It would appear that progress in the profession of educational administration demands that every member of the profession shoulder his share of responsibility. This challenge is appropriate especially to those who propose theoretical structures, since their structures shape the direction of research by others.

E. CHAPTER SUMMARY

This chapter attempted to show that controversial issues in theory are fundamentally issues in larger philosophic points of view.

A deterministic philosophy of science was reviewed with special investigations into modern expressions of

determinism--logical positivism and operationism. The tenets of a relativistic philosophy of science were also examined. Special examples were cited and described in quantum mechanics and experimentalism.

All of the controversial issues in theory were found to be fundamental issues in the two alternative philosophies of science.

Determinism seems to be of questionable validity in the light of new scientific knowledges; a more tenable position seems to be one that insists on individual responsibility. Progress in the profession of educational administration is dependent on the assumption of responsibility by all members of the profession.

CHAPTER IV

PSYCHOLOGICAL BASES OF THEORY

A. INTRODUCTION

The discussions thus far have been largely from a philosophic frame of reference, noting scientific developments in support of the thesis advanced. It is the purpose of this chapter to take a look at developments in psychology that have special significance for intelligent theorizing. Theorizing has been discussed as a human intellectual process, which makes it especially pertinent to examine the psychological bases of theorizing--not in addition to, but in conjunction with the philosophical and scientific context.

The specific investigations of psychology must be interpreted within the context of a larger problem with which psychologists and philosophers have struggled since the beginning of recorded history, the mind-body problem.

Early philosophers regarded the mind and body as two different substances. This is no longer assumed; however, the perplexities have not subsided. These perplexities of differentiating the physical from the mental, such as private-public, quality-quantity, purposive-mechanical, have caused many behavioral scientists to concentrate on the physical, assuming the mental as non- or extra-scientific. The argumentation of specific points about the mind-body can be

detected in the several theories of perception presented in this chapter.

Psychology has undergone a metamorphosis within this century. The trend has gone from a concept of the "empty" organism to a "cognizing" organism."[1] Cognition has advanced from the early Gestalt idea of closure to the notion of a very active organism which structures its stimuli and environment.

> Indeed, the time honored adage 'to see is to believe' seemed frequently better restated 'to believe is to see.' Learning seemed to be not only a connective and cognitive, but an effective--an emotional--process. The model of the 'empty organism' that had been transformed into a model of the 'cognizing organism' was transformed yet again--this time into a 'dynamic' or 'personalistic' organism.[2]

This newer concept of the organism is of concern to perceptual psychologists. Boring[3] gives an historical chronology of perception from early sensationism to later perceptual theories. His remarks are abridged in the subsequent paragraphs.

---

[1]Jacob W. Getzels, "Theory and Practice in Educational Administration: An Old Question Revisited," Administrative Theory as a Guide to Action, Roald F. Campbell and James M. Lipham, editors (Chicago: Midwest Administration Center, 1960), pp. 37-58.

[2]Ibid., p. 50.

[3]Edwin G. Boring, Sensation and Perception in the History of Experimental Psychology (New York: Appleton-Century-Crofts, Inc., 1942), pp. 3-45.

B. THE HISTORICAL EVOLVEMENT OF PERCEPTUAL THEORY

He believes that the concept of sensation became important in human thought by way of philosophical empiricism: knowledge comes to the mind by way of the senses. This is an old doctrine that at least dates back to the fifth century B.C. Heraclitos said that knowledge comes to man through the door of the senses, and Protogoras maintained that the entire psychic life consists only of sensations. Other early Greeks also had a theory of perception that still haunts the present. It was supposed that objects give off from their surfaces or pores effluvia (an invisible emanation), which act upon the senses to transmit knowledge of the outer world. Democritos (ca. 460-ca. 370 B.C.) and Epicuros (ca. 341 - 270 B.C.) described these projections as faint images of the objects which, through conduction give the mind acquaintance with the objects which they represent.

Empiricism came into prominence in the seventeenth century with Thomas Hobbes who wrote that all conceptions in man's mind were at first, totally or by parts, begotten upon the organs of sense. After Hobbes came John Locke who depicted the mind as a piece of white paper upon which experience writes. The mental element was the idea, which comes from experience by sensation or reflection. It was the aspect of reflection, the belief that the mind knows what it is doing, that tended to prevent empiricists from

becoming full-fledged sensationists, from assuming that all knowledge comes from the outside.

> For Locke, ideas were such entities as whiteness, motion, elephant, army, sheep, murder, gratitude; and of these, whiteness is a simple idea, whereas sheep and gratitude are compound, formed, as Locke presently put it, by the association of simple ideas. Such a psychology is an empiricism, an associationism and also a partial sensationism. Sensation is in it the primary source of knowledge.[4]

Thomas Reid, who founded the Scottish school of faculty psychology, helped to establish the primacy of sensation in psychology, even though he was principally concerned with preserving the God-given perceptual faculties from reduction to mere sensation. Psychological sensationism for the next 150 years may well be said to have begun with Reid, even though its materialist nature echoed the defeat of his fundamental purpose.

Through the work of Charles Bell in 1811, Magendie in 1822, Müller in 1826, and others, physiologists became actively engaged in sensationism because of the dichotomy of nervous action into sensory and motor. About the middle of the nineteenth century the sense-physiology of the physiologists and the sensationistic psychology of the philosophers were ready for synthesis.

Regarding the question of what has become of sensation in modern psychology, Boring points out that for some

---

[4]Ibid., p. 5.

psychologists it disintegrated into attributes (i.e., an associationistic sensationism). For Gestalt psychologists it was absorbed into perception. But for others it was translated into discriminative behavior which became the psychology of behaviorism invented by John Watson in 1913 through his experimentation with animals. In his work with animals, Watson grew tired of asking after each experiment was finished: "What sensations and other mental processes must this animal have if he makes these discriminations, if he behaves as he does?" The facts of discrimination seemed to him enough.

It is important to this discussion to pay special attention to what Boring has to say about what became of behaviorism.

> Behaviorism ultimately disappeared, in part because in the 1930's it got to be accepted as psychology, and in part because modern positivism became the sophisticated substitute for it. The older positivism of Mack and Karl Pearson--the view that the basic data of science are the immediate observations and not the entities (light, electricity, sensation, attention) inferentially derived from them--was superseded in the 1930's by the positivism of the Vienna circle under Schlick--the view that an entity derives its meaning from an understanding of the operations by which it is observed and any term its meaning by analysis of the language which gives it significance. The doctrine was called logical positivism in 1931 and is founded on the faith that meaning is secured for a concept by its reduction to simpler, more fundamental, common terms. Before 1931, however, the physicist Bridgman had undertaken (in 1928) to resolve the dilemmas of modern relativity theory by insisting that physical entities, like space, can be understood only in terms of the operations for observing them.

> All this was good gospel to the behaviorists, once they learned about the movement. Tolmon, the behaviorist, now became an operational behaviorist. Others, not Bridgman, coined the term operationism and used it in psychology. . . . Sensation became nothing more than the operation by which it is got, that is, to say, discrimination. . . . Gestalt psychology, of course, wanted to keep immediate experience in psychology, whereas, the operationists wanted to reduce immediate experience to behavior. The logical positivists recognized this principle when they coined the word behavioristics.[5]

Boring says that this controversy represents a fundamental temperamental difference in scientific values and is not yet cool enough to be handled in an historical text such as his own. It is interesting to note that the history of sensationism had fruition in the psychology of behaviorism and is ultimately embraced by logical positivism. The positivist, faced with explaining sensation, simply translates it into discrimination.

This leads to a consideration of perception in a larger, perhaps more meaningful context. Thomas Reid first insisted upon the distinction between sensation and perception. Perception, he said, although it depends upon sensation, is nevertheless much more than sensation, for it includes both a conception of the object perceived and also an immediate and irresistible conviction of the object's present status. Boring reports that this idea evolved into

---

[5] Ibid., pp. 12-13.

John Stuart Mill's enlightened notions of the subject in 1856.

> Accepting the evanescent and changing sensations as the immediate data of mind, he was trying to explain how our belief in an external world and in permanent objects arises. An object is, after all, subjective, a creation of the mind. John Mill laid down as his premise the principle that the mind is capable of expectation. Then he pointed out that though sensations may disappear, their possibilities remain present to the mind. If one sees, he said, a piece of white paper on the table and then goes into another room, the sensations disappear, but their possibility remains, as is evidenced by their recurrence if one returns to the room to look again at the table. Sensations are figurative and transitory, but the 'permanent possibilities of sensations' are enduring. That is why the physical objects of the external world are stable, even though generated from changing sensations. They are simply the Permanent Possibilities of Sensations.[6]

The next event of importance was Titchener's context theory in 1909. He maintained that there were two stages to perception. A new perception must be supported by appropriate imagery (i.e., a new face to be recognized must be supported by a name or some other addition to the context of the visual core).

Such a thesis leads into field psychology which suggests that perception has loosed the bonds of synonymity with sensation. With this historical background, some contemporary ideas about perception are reviewed.

---

[6] Ibid., p. 15.

C. PERCEPTUAL THEORIES

Allport[7] reviewed thirteen theories and proceeded to formulate another of his own. O'Neil[8] categorizes the important views into three groups, discrimination theories, phenomenalist theories, and judgmental theories.

Discrimination will be recognized as the camp of the behaviorists and positivists. O'Neil does not limit this category to these theorists, however. Those placed here are ordinarily realists (i.e., the stimulus is real, not phenomenal). "There is a marked tendency to pack as much as possible into the stimulus which is scarcely distinguished conceptually from the cause of the response."[9]

The attractions of this type of theory are many:

> Foremost amongst these is the scope provided by rigorous theorizing and rigorous experimentation. Another, of less certain value, is the avoidance of the bothersome problem of introspection. As the aim of perceptual experiment within this theoretical context is the testing of limits of discrimination and the seeking of invariant relations between stimuli and discriminative responses, it does not matter what the responses be. . . .[10]

---

[7]Floyd Allport, Theories of Perception and the Concept of Structure (New York: John Wiley and Sons, 1955).

[8]W. M. O'Neil, "Basic Issues in Perceptual Theory," Psychological Review, LXV (November, 1958), 348-361.

[9]Ibid., p. 352.

[10]Ibid., p. 353.

O'Neil reports the drastic shift from discrimination to phenomenalist theories. He tells us that a psychological history of phenomenalism would begin with Muller's doctrine of the specific energies of the sensory nerves which stated that we are aware not of the external objects, but of the states they produce in our sensory nerves. His explanation of phenomenalism is important in that it provides a frame of reference for the evolvement of modern perceptual notions.

> Within this doctrine a veridical (real) knowledge of external objects would be attained to the extent that there is some parallelism or isomorphism between the external objects and the states they produce. When that parallelism breaks down we have error or illusory perception. But how anything about parallelism or its absence can be discovered is a puzzle.[11]

Boring[12] attributed to the Gestaltists the essence of phenomenalism. This, no doubt, is justified with respect to the early Gestaltists, Koffka, Kohler, et al. One is led to speculate, however, if this phenomenalist trend was not a rebellion against the sensationists of that era. Hamlyn said that Gestalt theory itself was a reaction against the sensationalist and associationist theories of the nineteenth century.[13]

---

[11] Ibid., p. 354.

[12] Boring, op. cit., pp. 3-45.

[13] D. W. Hamlyn, The Psychology of Perception (New York: The Humanities Press, Inc., 1957), p. 37.

Regarding the judgmental theories, O'Neil asserts that they have been propounded most often by the philosophically minded. However, in his discussion of the issues in perceptual theory, he tells us:

> . . . Some of the issues are epistemological but, as the psychologists attempt to shelve such issues as non-psychological have proved unavailing, it is better to face them without too much apology.[14]

Judgmental theorists seek to provide balance to the continuum of the realist's contention that the perceived object has absolute reality within itself, and the phenomenalist's point of view that neural processes produce a unit in the phenomenal field.

> Such a theory (judgmental) can accommodate some distinction of the sort attempted in the contrast between the real and the phenomenal, and at the same time preserve some of the advantages of objective reference attained by discrimination theories; it may well be the type of theory the psychologist will find best adapted to his needs.[15]

Functionalism

O'Neil's conclusion introduces a whole new era of perceptual psychology known as functionalism which focuses attention on the perceiver in the perceptual process. Hamlyn very appropriately points out that "the psychological theories of perception of today all have their roots, in

---

[14] O'Neil, op. cit., p. 348.

[15] Ibid., p. 355.

one way or another, in Gestalt theory."[16] This fact will become obvious as these theories are examined. The functionalists find no contentment in the notion that perception is a passive process wherein something is done to the observer; rather they maintain that the perceiver has a very active role in his perceptions. It is not intended to imply that all contemporary perceptual research is functionalist; however, this definitely appears to be a positive trend. Bruner and Postman[17] made this observation in 1949:

> The study of perception during the past decade has been moving along two converging paths. . . .
>
> One approach (formalist) to perception is primarily concerned with perception in and of itself, without primary regard for the manner in which perception is imbedded in the other, ongoing activities of the perceiver. There is relatively little concern with the role of perception in the adjustment of the organism. The functional relations between the dimensions of the stimulus and the attributes of experience and the determination of these relations by sensory mechanisms concern some exponents of this approach. Others stress the intrinsic laws of perceptual organization (e.g., the law of Pragnanz).[18]

In research involving the first approach the formal laboratory techniques are utilized, since it is crucial to control and hold constant the learnings, maturations, and other

---

[16]Hamlyn, op. cit., p. 3.

[17]Jerome S. Bruner and Leo Postman, "Perception, Cognition, and Behavior," Journal of Personality, 18 (September, 1949), 14-31.

[18]Ibid., p. 14.

personal attributes of the subject.

> . . . He [the subject] is assumed to have a basically neutral attitude toward the stimulus, wishing neither to eat, destroy, caress, nor in any manner to use the stimulus presented to him. It is merely a something to be seen, heard, touched, smelled, or sensed.[19]

On the other hand:

> The second approach (functionalist) attempts to treat perception in a broader behavioral context. For its primary concern is with the manner in which perceptual functioning is imbedded in and interacts with other forms of psychological functioning. Perception is viewed as instrumental activity. Those who take this approach to perception hope to add to and to go beyond the variables and relationships discovered in the formal study of perception. . . . For a full understanding of the perceptual process it is necessary to vary not only the physical stimulus and the sensory state of the organism but also those central conditions--motives, predispositions, past learnings--which have largely remained outside the formal limits of the perceptual system.[20]

Here are two patterns in perceptual research; each pattern, perhaps to the dismay of the behaviorists and positivists, is concerned with factors which are central to the subject. As an introduction to the examination of these central factors, another look should be taken at the stimulus, or the perceived object. "What is it that we see?" is a very important question in perceptual psychology.

Whitehead warns us that "we must not slip into the fallacy of assuming that we are comparing a given world with

---

[19] Ibid.

[20] Ibid., pp. 14-15.

given perceptions of it. The physical world is in some general sense of the term, a deduced concept."[21] It is important to note that contemporary perceptual research has almost completely advanced beyond the historical sensationism of the behaviorists and positivists, and has adopted a more sophisticated approach than the historical neural phenomenologists. This is to say that the importance of the intellectual capacity of the perceiver has come into prominence.

Earl C. Kelley[22] commenting on the Hanover Institute experiments in perception points out that the reality of an object is what the perceiver attributes to it.

> It [a book] only has reality and validity as you and I assign them, and its only importance lies in what we make of it. . . .
>
> . . . I call it a book because I have book experience. If I had no book experience, I would not call it a book. So whatever we have that is real in the whole situation comes from each of us (our past as experiencing organisms), and varies with each of us.[23]

Robert E. Bills, in the bulletin, "About People and Teaching,"[24] sets out his use of the term "reality":

---

[21]Alfred North Whithead, The Aims of Education (New York: Mentor Books, 1949), p. 166.

[22]Earl C. Kelley, Education for What is Real (New York: Harper and Brothers, 1947).

[23]Ibid., pp. 36-37.

[24]Robert E. Bills, "About People and Teaching," Bulletin of University of Kentucky Bureau of School Services, XXVIII (December, 1955), 2.

> The term 'reality' will be used throughout the bulletin to designate the perceptions most people seem to hold in common. That there is such an overlapping of perceptual fields of different people is seen in our ability to communicate with them. Without overlapping, communication would be impossible. But we should keep in mind that a major portion of this overlapping exists by agreement. For instance, we agree on certain names for objects and our numbering system which was not discovered, only agreed upon. The difficulties in communication which come about when we use a different system of naming or language are apparent.[25]

Of course, Bills is commenting on perception in social psychology, but it has significance for the individual perceiver. Kelley comments on the overlap of perceptual fields as follows:

> Our perceptions do not come simply from the objects around us, but from our past experience as functioning purposive organisms. We take a large number of clues, none of which is reliable, add them together, and make what we can of them. All that this gives us is an estimate of our surroundings. It is never exactly right. It is never the same for different individuals. It is like a statistical average, a useful device for making a prognosis, but always wrong in any particular instance.[26]

This is not to say that an object of perception does not exist. "There would be no perception but for the object. . . . What it is functionally, however, comes from us, and does not reside in the object itself.[27]

---

[25] Ibid., p. 13.

[26] Kelley, op. cit., p. 34.

[27] Ibid., p. 40.

D. PERCEPTUAL DETERMINANTS

Enough has been said regarding the physical object of perception to point out that apart from meaning given by the observer it has no functional significance, and even along with the perceiver it has relative significance postulated on the central factors within the organism.

What are some of these central factors that are continuously at work in the continuous process of perception? Bills names six important perceptual determinants: beliefs, values, needs, attitudes, self-experience, and threat.[28] Kelley, after reviewing perceptual experimentation of the Hanover Institute gives evidence to support that we select what we choose to see.

> We do some interesting things with the perceptions which come to us. To begin with, we do not pay attention to all of them, or even a good fraction of them. We select the coincidences in nature which we choose to register. Given the same scene or nearly so, no two people pay attention to the same factors in it.[29]

Bills calls attention to two very important factors that cause us to be selective, past experience and purpose.

---

[28]Robert E. Bills, "Believing and Behaving: Perception and Learning," Learning More about Learning, Alexander Frazier, editor (Washington: ASCD, National Education Association, 1959), pp. 57-62.

[29]Kelley, op. cit., p. 45.

> Now you may want to raise the question as to why a person selects what he does to pay attention to out of his surroundings, and why he classifies them in his own way. It is easy to show that no two persons do this alike. We have said that we bring our past experience to bear upon it but this does not seem to be adequate to account for the whole performance. In any ordinary scene, we have past experience with practically everything in it, but we do not pay attention to everything. Our selection, therefore, must be based on something in addition to experience.
>
> It apparently is a combination of past experience and what we call purpose. The human being is a purposive creature. The drives necessary to survival, food, sex, etc., are fairly simple. But they seem to be only part of the purpose of the total organism, which has value at the core of it.[30]

Postman, Bruner, and McGinnies[31] report that perceptual selection is dependent not only upon primary determinants of attention but it is also a servant of one's interests, needs, and values.

> Can one lean on the slender reed of 'limited span of attention' and its primary determinants to explain the selectivity of perception? That there is a limited span can hardly be denied. But to invoke it in an explanation of itself leaves unexplained the differences in the perceptions of individuals faced with the same stimuli and all hampered by a 'limited span of attention' and governed by common primary determinants.[32]

---

[30] Ibid., pp. 46-47.

[31] Leo Postman, Jerome S. Bruner and Elliott McGinnies, "Personal Values as Selective Factors in Perception," Journal of Abnormal and Social Psychology, XLIII (April, 1948), 142-154.

[32] Ibid., p. 142.

Ross Stagner also calls attention to some ways in which the organism contributes to the nature of the external object as perceived: sensory modalities, sensory deficiencies, past experience, expectancies, group influences, and inner needs. He concludes that all perception is ultimately purposive in character.[33]

It is readily admitted that many of the central determinants overlap and some may be synonymous. Without attempting to categorize or further differentiate among these factors, to further support this discussion two factors are selected for further examination. These are "values" and "purposes."

Values as Perceptual Determinants

The positive role of values as perceptual determinants was demonstrated in a study conducted by Postman, Bruner, and McGinnies in 1948 which they report under the title of "Values as Selective Factors in Perception."[34] The hypothesis of the study was that personal values are demonstrable determinants of what the individual selects perceptually from his environment.

---

[33]Ross Stagner, Psychology of Industrial Conflict (New York: John Wiley and Sons, Inc., 1956), pp. 20-29.

[34]Postman, Bruner, and McGinnies, loc. cit.

Twenty-five subjects, students at Harvard and Radcliffe, were shown thirty-six words, one at a time in a tachitoscope. The words were unanimously chosen by judges to represent the six values measured by the Allport-Vernon Study of Values--theoretical, economic, aesthetic, social, political, and religious. The final list, comprising six words for each value was balanced for length of words, and insofar as possible, an attempt was made to select words of equal familiarity. The thirty-six words were shown to the subjects in random order with each word exposed three times for .01 second, .02 second, .03 second, etc., until recognition occurred. A full record was kept of all the subjects' recognition responses.

To obtain an independent measure of personal value orientation, the Allport-Vernon Study of Values was administered individually to each subject either some weeks in advance of the perceptual experiment or after the experiment.

The finding of the study was that certainly visual inspection indicates that, for the sample as a whole, time of recognition varies as a function of the value. The findings were statistically significant. These psychologists concluded their findings as follows:

> The experimental evidence leads us to the formulation of three mechanisms to account for the interrelationship of these phenomena in perceptual behavior. Value orientation makes for <u>perceptual sensitization</u> to valued stimuli, leads to <u>perceptual</u>

> defense against inimical stimuli, and gives rise to a process of value resonance which keeps the person responding in terms of objects valuable to him even when such objects are absent from his immediate environment. These processes of selectivity must be considered in any perceptual theory which lays claim to comprehensiveness.[35]

Related research has supported the above findings.[36, 37]

Purposes as Perceptual Determinants

Kelley reminds us that valueful purpose is not easy to demonstrate in the laboratory.

> But it can be conclusively demonstrated . . . that the selective nature of perception cannot be accounted for in any other way. This is common and respectable scientific proof. No one has ever seen an electron, but the characteristics of matter under certain conditions cannot be accounted for in any other way, so we accept their existence. In fact, no one questions their existence any more than he does those things which he can see.[38]

It seems logical to conclude that if reliance for perceptual selectivity rests solely on past experience, then we would be in a static state dwelling in the past. With the

---

[35]Ibid., p. 154.

[36]J. Bruner and C. Goodman, "Value and Need as Organizing Factors in Perception," Journal of Abnormal and Social Psychology, XLII (1947), 33-44.

[37]R. Levine, I. Chein, and G. Murphy, "The Relation of the Intensity of a Need to the Amount of Perceptual Distortion: A Preliminary Report," Journal of Psychology, XIII (1942), 283-293.

[38]Kelley, op. cit., p. 47.

factor of purpose interjected into the process, our past experiences tend to point the way toward reconstructing and improving perceptual selectivity. This, if acceptable, gives perception the primary role in our growth and learning. This is another way of saying that the primary perceptual determinant is purpose. This point of view constitutes a new aspect of perceptual psychology. It is an attempt, through recognition of the purposeful organism, to integrate fragments of psychology--i.e., perceptual theory, personality theory, learning theory, motivation theory, etc.--into a general theory of behavior.

E. EFFORTS TOWARD AN INTEGRATED THEORY OF PERCEPTION

Hochberg and Gleitman[39] review the experimentation of those engaged in pointing out the relationship between motivation and perception. The experimental conditions of the psychological laboratory, they said, are seldom if ever encountered in the ordinary life of an organism. They suggested that the fundamental law of Pragnanz, the closure of incomplete circles, continuation of figures, etc., points toward a much larger equilibration process. Disequilibria

---

[39]Julian E. Hochberg and Henry Gleitman, "Perception--Motivation Dichotomy," Journal of Personality, XVIII (December, 1949), 180-191.

occurring between isomorphic representations of objects or stimulus configuration in the perceptual field is comparable to the organism moving about in the environment until perceptual equilibration (i.e., goal attainment) is brought about.

> Within the Gestalt theoretical framework here adopted, this type of equilibration corresponds to what is generally called goal-directed behavior. From such a point of view, the 'motivation' is neither superimposed from above nor injected in from below, but is an attribute of the total field situation.[40]

Bruner and Postman voice similar pleas for an integrated psychology. They propose the following objectives as tasks for the future:

> . . . (1) To select central, nonperceptual variables, changes in which can be shown to bring about systematic changes in perceptual functioning; (2) to select these variables from various theoretical systems--learning theories, motivational theories, theories of personality--so that these theories may be made continuous within the body of perceptual theory; (3) to postulate and then study those intervening mechanisms which account for the changes in perception which occur when we change the central state of the organism; and (4) finally, to emerge with a unified theory of behavior which treats the organism as an organized whole and which contains laws stating the manner in which perceiving is an instrument of adjustive activity.[41]

---

[40] Ibid., pp. 186-187.

[41] Bruner and Postman, op. cit., p. 16.

Other psychologists have been concerned with the development of an integrated psychology. Lecky,[42] Bills,[43] and Combs,[44] all propose psychological theories of self-organization founded on the purposive nature of the individual perceiver.

The Perceptual Theory of Transactionalism

There is one theory of perception that deserves special attention: (1) because of its comprehensiveness, and (2) because of its significance to this study. This is the theory of transactionalism. Many characteristics of transactionalism have been incorporated into prior discussions, however, full attention is directed to those characteristics here. Hamlyn said that the view which has been called "transactionalism" is derived chiefly from the work of Adelbert Ames, Jr. (although its philosophy stems from Dewey) and work by Kilpatrick.[45] Let us examine some characteristics

---

[42]Prescott Lecky, Self Consistency: A Theory of Personality (New York: Island Press, 1945).

[43]Bills, "About People and Teaching," loc. cit.

[44]Donald Snygg and Arthur W. Combs, Individual Behavior (New York: Harper and Brothers, 1949).

[45]Hamlyn, op. cit., p. 102.

of this theory of perception discussed by Ittelson and Cantril.[46]

> There are three features of perception which deserve special attention with regard to human perception. First, the facts of perception always present themselves through concrete individuals dealing with concrete situations. They can be studied only in terms of the transactions in which they can be observed. Second, within such transactions, perceiving is always done by a particular person from his own unique position in space and time and with his own combination of experiences and needs. Perception always enters into the transaction from the unique personal behavioral center of the perceiving individual. And, third, within the particular transaction and operating from his own personal behavioral center, each of us, through perceiving, creates for himself his own psychological environment by attributing certain aspects of his experience to an environment which he believes exists independent of the experience. This characteristic of perception we can label externalization.[47]

The problem of perception is defined as follows:

> The major problem of perception has been formulated as the study of the process by which we achieve correspondence, or lack of correspondence, between the significances which we experience as existing apart from us and the significances which we experience as a consequence of action--that is, between what we externalize and what we encounter.[48]

In the section of the booklet dealing with the development of perception, the important classes of significances

---

[46]William H. Ittelson and Hadley Cantril, Perception, A Transactional Approach (Garden City: Doubleday and Company, Inc., 1954).

[47]Ibid., p. 2.

[48]Ibid., p. 9.

are identified. Following are the classes of significances with abridged explanations:

1. "Thing" significances. This term refers to the world of objects and people in so far as we experience them as entities apart from ourselves possessing their own characteristics and spatial-temporal locations.

2. Sequential significances. The world of objects does not exist passively and statically for our observation. Very rarely, if ever, do we contemplate a completely unchanging world where all sights, all sounds, all touches, tastes, and smells are static, frozen, and fixed. Rather, events of one kind or another are constantly occurring around us, new events following the previous in a never-ending series of sequences.

3. Action significances. Although we all do occasionally passively observe sequential events from the outside, more frequently we enter into the sequence at some point as active participants.

4. Evaluative significances. As a rule, in any concrete situation into which we enter as active participants, each of us is constantly faced with alternative courses of action. Evaluation among these alternatives is made on the basis of the relative probability that each possible course of action will lead to the desired sequences, will produce

the desired results.[49]

Earlier, "values" and "purposes" were isolated as being central factors in the perceptual process that are especially relevant to this study. Ittelson and Cantril specifically note these factors. Under the category of evaluative significances they say:

> There are two main categories of this kind of evaluation which can be separated for descriptive purposes although in concrete experience they are completely interwoven and almost never encountered independently. (1) What-for evaluations involve selection among alternative goals on the basis of which goal offers the greater probability of providing us with the value satisfactions we seek out of life. This kind of value judgment . . . enters at least implicitly into every perception. . . . (2) How-to-do evaluations enter more explicitly into the perceptual process. They involve the selection among alternative courses of action once the immediate goal has been decided upon.[50]

The final section of the booklet is devoted to a discussion of purposes.

> We have discussed perception so far primarily as a present experience with its roots in the past. This time-orientation is in accord both with naive observation and with the traditional approach of psychology. Perception certainly seems to be of the world as it is right now, or perhaps, as it was a few minutes ago. Indeed the definition of perception frequently appears in psychology texts as 'The awareness of immediately present objects.' But again naive observation and tradition are both inadequate. . . .
>
> If we were to close the study of perception where we left it at the end of the last section, we would

---

[49] Ibid., pp. 19-22.

[50] Ibid., pp. 21-22.

> then have missed at least half of the problem, or more correctly, the problem would still be distorted in such a way that it could not be solved. For just as past perceptions were once present perceptions, so every present perception is in a sense the anticipated future of a past experience. The process by which the present becomes the past of the future is basic to perception. As Laotz said, 'What is is the was of what shall be.'[51] (italics mine)

Ittelson and Cantril conclude:

> The human being as all living organisms, ceaselessly attempts to create an environment within which to carry out his purposes. And in every occasion of living, perception-in-operation is a never-ending process of prediction in the face of uncertainty for action on the basis of faith.[52]

F. PERCEPTION AND AMINISTRATIVE THEORY

In Chapter III, controversial issues regarding theory of educational administration were received in the light of discussions about science and philosophy. The examination of perceptual theory seemed to substantiate further the postulations of this study. These new knowledges in psychology shed additional light on the controversial issues. These issues are re-examined with additional clarification from psychological and philosophical frames of reference.

Valuation in Theorizing

The first issue, questioning the inclusion of human values in theoretical structures, is especially clarified

---

[51] Ibid., p. 27.

[52] Ibid., p. 31.

from the preceding discussions. Research in perceptual psychology has taught us that the perceiving organism interprets his perceptual field in a context of all that he is at the time--his values, his purposes, the sum total of his experiences. Even the scientist cannot rid himself of this fact in the rigors of his laboratory experimentation. Theory must be predicated on what the theorist perceives to be important. The significance of personal points of view in theory construction has ironically troubled perceptual theorists who interestingly enough have sought objectivity in the study of subjective perception. Bakan tells us that

> . . . clearly the beliefs entertained by the investigator can determine the complexion of a theoretical formulation. These beliefs determine what the scientist regards as the events requiring explanation, what he regards as stimulus, and what he regards as response.[53]

In his discussion of the importance of beliefs of the scientist in determining the stimulus, Bakan continues:

> The scientist should, therefore, recognize the limitations inherent in a theoretical system in which the stimulus is an important concept and in which it must be defined, either implicitly or explicitly. For the definition of the stimulus in any theoretical context is influenced by certain assumptions made by the theorist concerning what aspect of a total situation is the stimulus. The scientist constitutes a conceptual stimulus with which he hopes to approximate a 'real stimulus.'

---

[53]Paul Bakan, "Current Theoretical Approaches to Perception," Present-Day Psychology, A. A. Roback, editor (New York: Philosophical Library, 1955), p. 73.

> But his stimulus is a construct and not an entity.[54]

Northrop vividly points up the fallacy of depending on the facts to speak for themselves.

> . . . The only way to get pure facts, independent of all concepts and theory, is merely to look at them forthwith to remain perpetually dumb, never uttering a word or describing what one sees, after the manner of a calf looking at the moon. For the moment one reports what one observes, at a meeting of historians or in a book written for sociologists, at that moment one has not pure facts but facts brought under concepts, and hence theory. Thus, the social scientist's or the historian's aim at pure fact is a snare and a delusion. What one gets are not facts, but facts brought under some often uncritically examined, unconscious, theoretical assumptions of the sociologist or historian in question.[55]

The valuation exhibited by the scientist is unavoidable. Man is a valuing creature. Reichenbach states the matter very clearly:

> In some sense, every human activity serves the pursuit of a goal. . . . In all such activities, however, there are moments when a choice is to be made; it is here that behavior exhibits valuation. The valuation need not be explicitly stated, nor achieved through reflection and comparison; it may be performed in the spontaneous impulse. . . . But in the decisions made we express our preferences and thus indicate through our behavior the valuational order which contributed the background of our actions.[56]

---

[54] Ibid.

[55] F. S. C. Northrop, The Logic of the Sciences and The Humanities (New York: The Macmillan Company, 1947), pp. 317-318.

[56] Hans Reichenbach, The Rise of Scientific Philosophy (Berkeley: University of California Press, 1951), pp. 313-14.

It appears that the efforts toward eliminating values from administrative theory result only in substituting one value for another.

Assumptions, Concepts, and Induction

The second issue, questioning the empirical bases of assumptions, is also further clarified. An organism that interprets and gives meaning to his environment is not one that anchors every act of imagination on empirical reality.

Closely allied is the question of concept definition. Operationism and functionalism are quite incompatible. Since these questions are elaborated in Chapter V, they are not belabored here.

The "Is-Ought" Dichotomy

To get an understanding of this problem, it will be helpful to refer to an elaboration of the issue by the late, great historian, Carl Becker.[57] In pointing up the fallacy of assuming man knows only the present to the exclusion of the past and future, he has the following to say:

> We are apt to think of the past as dead, the future as nonexistent, the present alone as real; and prematurely wise or disillusioned counselors have urged us to burn always with a 'hard, gem-like flame' in order to give 'the highest quality to the moment's sake.' This no doubt is what the glowworm does; but I think that man, who alone is

---

[57]Carl Becker, "Everyman His Own Historian," in Edward H. Madden, The Structure of Scientific Thought (Boston: Hougton Mifflin Company, 1960), 176-187.

> properly aware that the present moment passes, can for that very reason make no good use of the present moment simply for its own sake. Strictly speaking, the present doesn't exist for us, or is at best no more than an infinitesimal point in time, gone before we note it as present. Nevertheless, we must have a present; and so we create one by robbing the past, by holding on to the most recent events and pretending that they all belong to our immediate perceptions.[58] (italics mine)

Using the philosophical terminology of "specious present" to describe this past, present, future orientation, Becker makes clear that the past is not the only contributor to interpreting the present.

> The extent to which the specious present may thus be enlarged and enriched will depend upon knowledge, the artificial extension of memory, the memory of things said and done in the past and distant places. But not upon knowledge alone; rather upon knowledge directed by purpose.[59] (italics mine)

The individual who insists on sticking with the present as the only meaningful experience is the kind of unintellectual individual that we hope to avoid through improving man's capacity for theorizing. This whole problem is placed in perspective by Graff:

> We probably cannot successfully cope with the 'was-is-ought' trichotomy without assuming that all behavior is moving through a time continuum. This is precisely what the modern physicist does assume with respect to the behavior of matter; and it is also an assumption of modern perceptual theory re the behavior of human beings. In the

---

[58] Ibid., pp. 179-180.

[59] Ibid., p. 180.

> case of people, however, there is the tremendously complicating factor of purpose. If this factor of purpose were the same for all individuals, it would constitute no problem. But it isn't. For each person it is a control on his interpretation of the past (the 'was'), a selector of present stimuli (the 'is'), and a proposed re-direction of behavior moving through time (the 'ought'). Thus human values, in the form of human purpose, are always present in the 'was,' and 'is,' and the 'ought.'
>
> It should be noted that the control of purpose over human behavior seems directly proportional to the amount of intellectual effort involved. Since the act of theory building is a highly intellectual affair, it seems obvious that purpose is a main consideration. The notion that theory has a quality of 'oughtness' about it seems unavoidable to me.[60]

Research in perceptual theory can leave little doubt about the untenable position of those who would insist that administrative theory, or any theory, must confine itself to what <u>is</u> and avoid what <u>ought to be.</u> Normative considerations are what man sets for his own pursuits that determine whether he behaves intelligently or in the manner of Becker's glow-worm.

G. CHAPTER SUMMARY

This chapter was an investigation into the psychological foundations of theorizing. Since theorizing has been described as a human process, psychological research has a special significance for explaining this process.

---

[60]Orin B. Graff, "Administrative Theory and Human Values," Address at the National Conference of Professors of Educational Administration, Macomb, Illinois, August 24, 1960, pp. 21-22. (Mimeographed.)

Efforts to solve the perplexing mind-body problem seem to encompass specific research efforts and to give some meaning to controversial issues in theory.

The historical evolvement of modern theories of perceptual psychology was traced from early Greek sensationism which gained significance through philosophical empiricism. Sensationism was embraced by behaviorism and reached fruition in logical positivism.

Perceptual theories of today are grounded in Gestalt psychology. The evolution from sensationism--which has become known as discrimination theory--has progressed through recognizing the individual as a cognitive organism to recognizing the individual as an organism which structures the stimuli and environment.

Functionalist theories of perception are concerned with the central factors of the organism--needs, purposes, values, etc.--which act as perceptual determinants. Values and purposes of the individual have been demonstrated through research to be active determinants of what the individual wishes to perceive and how he interprets what he sees.

Much progress may be possible toward formulating an integrated theory of personality by perceptual research.

The perceptual theory of transactionalism seems to be of special importance for theorists to examine. The role

of the individual as a creator of his environment in carrying out his purposes are portrayed in this theory.

The controversial issues regarding theory in educational administration were re-examined in the light of perceptual research findings with further discussion of the philosophic issues.

Research in perception seems to discount such notions as "theory is value-free," and "theory is confined to the is at the exclusion of the ought."

CHAPTER V

THE ANALYSIS AND SYNTHESIS OF THEORY CONSTRUCTS

A. INTRODUCTION

The constructs of theory identified in Chapter II of this study were assumptions, logical deductions and hypotheses. Although different terms have been used to describe these elements of a theoretical structure, there is general agreement among writers who have dealt with the subject that these three constructs do constitute the vital elements of a theoretical structure. There are wide differences of opinion, however, on the nature of these three constructs. Because of these differences, an analytical examination of the constructs is highly significant.

Not only are there wide differences of opinion about the nature of theory constructs, but there is lack of agreement on the meaning of analysis and synthesis. In the discussion of logical positivism in Chapter III, analysis was described as the method of showing relationships, and synthesis was the method of inferring meaning through reduction to atomistic elements of experience. Obviously, the positivist's use of these terms is different from uses of the terms in this study. Analysis, as it is used in this study, is the scientific process of breaking down a complex

structure into simpler units. The purpose of this method as described by Bronowski is "to shift our gaze from the thing or event to its structure."[1] Bronowski goes on to say that, "We understand a process, we explain it, when we lay bare in it a structure which is like one which we have met elsewhere."[2]

The analytic section of this chapter treats each of the three constructs individually. Since theorizing has been described as a human process, the individual constructs are therefore parts of this process. It is helpful to think of the three constructs, not as assumptions, logical deductions, and hypotheses, but rather as assuming, logically deducing, and hypothesizing. Such a consideration makes them more vividly a part of the process of theorizing.

The synthetic section of the chapter relates the three constructs to each other. The total structure is then shown to be meaningful, not through reduction to atomistic elements of experience, but through its capacity for insuring intelligent behavior, including scientific experimentation.

---

[1]Jacob Bronowski, "Science as Foresight," What Is Science, James R. Newman, editor (New York: Simon and Schuster, 1955), p. 429.

[2]Ibid.

B. THE ANALYSIS

The breaking down of complex structures into simpler units can be very dangerous. The danger lies in the distortions which may arise when viewing any unit out of its usual context. Even though the theoretical constructs are examined individually in this study, their function in the total structure should be kept in mind. Contrary to a deterministic philosophy of science, knowledge is not gained by progression from atomistic elements to more universal relationships. Rather, progression is from universal assumptions to atomistic elements for testing, and, thus, to more refined universal assumptions. The question then arises about the method of formulating universal assumptions. This problem is dealt with in the examination of the first theory construct, a set of assumptions.

The Nature of Assumptions

The elements of theory generally termed the assumptions are frequently known by other names. Northrop preferred to call them postulations[3]; Campbell called them hypotheses.[4] No doubt, Sullivan was referring to these

---

[3]F. S. C. Northrop, Logic of the Sciences and the Humanities (New York: The Macmillan Company, 1947), p. 140.

[4]Norman R. Campbell, "The Structure of Theories," Readings in the Philosophy of Science, Herbert Feigl and May Brodbeck, editors (New York: Appleton-Century-Crofts, Inc., 1953), p. 290.

elements when he said that science has a certain amount of useful myth on which mathematical formulations can be hung.[5] Assumptions are synonymous with Conant's working hypotheses on a grand scale.[6] Many writers, including Graff and Street[7] refer to this collective construct as the theory.

Most theoretical structures have many assumptions. Since they must be internally consistent and logically related they are generally referred to collectively as a set of assumptions and as a single theory construct. The number of assumptions would decrease as the theory became more abstract and general. Conversely, the number of assumptions would increase as the theory became more specific and concrete.

This examination of assumptions is concerned with (1) determining the function of assumptions in a theoretical structure, and (2) to investigate methods for formulating assumptions.

---

[5]J. W. N. Sullivan, The Limitations of Science (New York: Mentor Books, The New American Library of World Literature, Inc., 1952), p. 157.

[6]James B. Conant, Science and Common Sense (New Haven: Yale University Press, 1951), p. 47.

[7]Orin B. Graff and Calvin M. Street, Improving Competence in Educational Administration (New York: Harper and Brothers, 1956.

Ennis describes four different uses of assumptions: (1) deprecatory use, (2) concluding use, (3) premise use, and (4) presupposition use.[8] The deprecatory use encompasses the charge that very little or no evidence is available. An example of such usage is, "Oh, you are only assuming; you don't really know." The concluding use also suggests some weakness in the evidence. An example would be, "I assume that you are going out, since you have on your dark blue cap."[9] In the premise use, a conclusion or point of view is justified in terms of the assumption which stands as a premise. The presupposition use means that the assumption must be true before an utterance can be considered to be correct. An example would be, "The present Oakwood Latin teacher is a graduate of Illinois."[10] The statement presupposes that there is a Latin teacher at Oakwood.

Assumptions in a theoretical structure most nearly approximate premise-type assumptions. In a theoretical structure there is a set of assumptions and there is a set of hypotheses which is logically deduced from the assumptions.

---

[8]Robert H. Ennis, "Assumption-Finding," Language and Concepts in Education, B. Othanel Smith and Robert H. Ennis, editors (Chicago: Rand McNally and Company, 1961), pp. 161-178.

[9]Ibid., p. 163.

[10]Ibid., p. 164.

The reasonableness of the hypotheses is premised on the reasonableness of the assumptions. Of course, the hypotheses are subject to rigorous testing; however, no amount of testing can verify an hypothesis independent of the assumptions from which it was deduced.

It is difficult to choose which theory construct is most important, since all are vital. However, assumptions are preliminary to any investigation or act of behavior. To this extent, they are of most importance. Also, assumptions give more trouble to the theorist--and everyone is to some extent a theorist--than any of the other constructs.

Northrop maintains that assumptions are the underlying source of all problems subjected to examination.[11] Campbell describes this element of theory as being a set of propositions setting forth a collection of ideas characteristic of the theory.[12] Sullivan would use this element as pegs on which he would hang mathematical formulations.[13] For Conant, this element would be the basis for deducing consequences for experimentation.[14]

---

[11]Northrop, op. cit., pp. 19-34.

[12]Campbell, op. cit., p. 290.

[13]Sullivan, loc. cit.

[14]Conant, loc. cit.

It has been maintained throughout this study that every act of intelligent behavior and scientific experimentation presupposes a theory. It is further maintained that the fundamental presupposition is a set of assumptions which gives rise to hypotheses.

There are implicit assumptions as well as explicit ones. The explicit assumptions offer little difficulty since they can be readily investigated for logical internal relatedness and consistency. Also, the fact that they are explicit makes it likely that they have been carefully scrutinized. The implicit assumptions, however, are unusually problematic since they frequently have not been intellectualized. The rise of a deterministic philosophy of science has contributed to the failure of many people to examine implicit assumptions or even to admit that they exist. The advocacy of a kind of science intended only to explain what <u>is</u> and of a kind of theory purported to be free from human values perpetuates encouragement for ignoring implicit assumptions. Many people become furious and highly defensive when implicit assumptions are suggested in explanation of some statement they have made or some act of behavior they have exhibited. Such a reaction is typical of those who prefer to compartmentalize their lives into the scientific realm and the metaphysical realm. These individuals would likely insist that it is nobody's business what they

believe.

Wrapped up in the notion of implicit assumptions are individual beliefs, values and purposes. For example, an assumption about administrative behavior in education presupposes assumptions about education, assumptions about a society which would promote particular kinds of educational opportunities, and assumptions about man, the individual unit of society--his nature, his purposes. Also, there are implicit cosmological assumptions.

It is not advocated here that implicit assumptions always be stated in a scientific theory, but that they be understood. It is advocated, however, that every individual be constantly engaged at defining his own implicit assumptions. A well-ordered life demands that a person know what he believes. The alternative would result in an inconsistent, frequently manipulative and opportunistic individual. This argument does not imply that a person's beliefs never change. It is possible constantly to evaluate beliefs and revise them only when they are identifiable. A scientific venture limited to an examination of what <u>is</u> can result only in a massive accumulation of meaningless data. Whitehead once said:

> . . . No science can be more secure than the unconscious metaphysics which tacitly it presupposes. The individual thing is necessarily a modification

> of its environment, and cannot be understood in disjunction. All reasoning, apart from metaphysical reference, is viscous.[15]

How, then, are assumptions formulated? Ideas about the nature of assumptions would influence points of view about their formulation. Griffiths, in taking issue with the normative nature of assumptions, describes his own ideas about how assumptions are formulated.

> We can say . . . that a theory is essentially a set of assumptions from which a set of empirical principles may be derived. Since the principles are empirical they must be statements of verifiable fact. Since it is logically impossible to derive empirical statements from value assumptions, the assumptions of a theory must be restricted to factual or empirically verifiable statements. The assumption of a theory of administration cannot be value statements.[16]

Griffiths insists that assumptions must be restricted to factual or empirically verifiable statements. This method of formulating assumptions would depend on induction--gathering the facts. An alternative method for formulating assumptions in the science of physics was expressed by Albert Einstein:

---

[15]Alfred North Whitehead, Adventures of Ideas (New York: Mentor Books, The New American Library of World Literature, Inc., 1958), p. 158.

[16]Daniel E. Griffiths, "The Nature and Meaning of Theory" (Paper read at the National Conference of Professors of Educational Administration, Macomb, Illinois, August 24, 1960).

> There is no inductive method which could lead to the fundamental concepts of physics. Failure to understand this fact constituted the basic philosophical error of so many investigators of the nineteenth century.
>
> . . . . . .
>
> Physics constitutes a logical system of thought which is in a state of evolution, and whose basis cannot be obtained through distillation by any inductive method from the experiences lived through, but which can only be attained by free invention.[17]

Perhaps this fundamental question of whether assumptions are generalizations of accumulated facts or whether they are free creations of the mind constitutes a basic focal point of fundamental controversies regarding theory. Around this question hinges the "is-ought" dichotomy, the philosophy-science conflict, and the question of human values in theoretical structures.

The position advanced here is that there are assumptions which can never be empirically tested. An assumption which is made a subject of investigation may be tested; however, the validity of the test rests on other assumptions which are not empirically verifiable. In other words, the foundations of science rest on free creations of the human intellect.

Popper points up the logical fallacy of relying on induction:

---

[17]Albert Einstein, Out of My Later Years (New York: Philosophical Library, 1950), pp. 78, 96.

> Now it is far from obvious, from a logical point of view, that we are justified in inferring universal statements from singular ones, no matter how numerous; for any conclusion drawn in this way may always turn out to be false: no matter how many instances of white swans we may have observed, this does not justify the conclusion that all swans are white.[18]

Continuing his argument, Popper uses the principle of induction to disprove itself:

> For the principle of induction must be a universal statement in its turn. Thus if we try to regard its truth as known from experience, then the very same problems which occasioned its introduction will arise all over again. To justify it, we should have to employ inductive inferences; and to justify these we should have to assume an inductive principle of a higher order; and so on. Thus the attempt to base the principle of induction on experience breaks down, since it must lead to an infinite regress.[19]

Efforts to tie all assumptions to the "facts" not only are illogical, but research in perceptual psychology disproves the validity of such contentions. The individual interprets his environment. As Northrop so ably put the matter:

> . . . The social scientist's or the historian's aim at pure fact is a snare and a delusion. What one gets are not facts, but facts brought under some often uncritically examined, unconscious, theoretical assumptions of the sociologist or historian in question.[20]

---

[18]Karl R. Popper, The Logic of Scientific Discovery (London: Hutchinson and Company, Ltd., 1959), p. 27.

[19]Ibid., p. 29.

[20]Northrop, op. cit., pp. 317-318.

Northrop defines the problem regarding formulation of assumptions, in promoting his thesis that once facts are communicated, they are interpreted facts, not pure facts.

> . . . In fact, metaphysics, when unambiguously defined, is the thesis that there are concepts by postulation [interpretation] as well as concepts by intuition [immediately apprehendable facts]; positivism, conversely, is the thesis that there are only concepts by intuition. . . .[21]

No matter how vigorously man tries to define his responsibilities out of existence by reliance on the "facts," in the final analysis, the facts are of his own making, and the responsibility is his. As Professor Bridgman described it, more revolutionary than the discoveries of Galileo, Newton, or Darwin is the realization by scientists that it is impossible to transcend the human reference point.[22]

Logical Deductions

The second construct of theory has been identified as the process of logical deduction. Logical deduction is the process of inferring relationships, primarily between the set of assumptions and the set of hypotheses, but also internal relationships among the assumptions and among the hypotheses. That is, the assumptions and the hypotheses

---

[21] Ibid., p. 87.

[22] James B. Conant, Modern Science and Modern Man (Garden City: Doubleday and Company, Inc., 1952), pp. 86-87, citing P. W. Bridgman, "Philosophical Implications of Physics," American Academy of Arts and Sciences Bulletin, III, No. 5 (February, 1950).

must be logically related and internally consistent. As a theory construct, however, the chief concern in this investigation was to treat the process of logical deduction as the connecting link between the set of assumptions and the set of hypotheses. Even though the process is isolated for examination, its relationship to the other constructs must be kept in mind.

Hull refers to this theory construct as a set of definitions of critical terms employed.[23] Marx would probably equate logical deduction with his theoretical propositions--generalized statements concerning functional relations among variables.[24] Hall and Lindzey's empirically defined concepts, which they maintain bring the theory into contact with reality, are similar to this construct.[25] Northrop's third stage in initiating inquiry was to logically deduce hypotheses.[26] His terminology is the same as that used in the study and the process is identical. Campbell refers to this construct as the dictionary of the

---

[23]Clark L. Hull, "The Hypothetico-Deductive Method," Psychological Theory, Melvin H. Marx, editor (New York: The Macmillan Company, 1951), p. 219.

[24]Melvin H. Marx, "The General Nature of Theory Construction," Psychological Theory, Melvin H. Marx, editor (New York: The Macmillan Company, 1951), p. 7.

[25]Calvin S. Hall and Gardner Lindzey, Theories of Personality (New York: John Wiley and Sons, Inc., 1957), p. 12.

[26]Northrop, op. cit., pp. 60-61.

theory.[27] Griffiths would accomplish the logical deduction task through operational concepts.[28]

It is frequently said that, "This is logical, or that is illogical." What is meant by such assertions? What the theorist is trying to do is to attain correspondence between the assumptions and the hypotheses. What every individual in every act of behavior is trying to do is to attain correspondence between his value framework and the objective world which he believes exists independent of himself. Lecky explains this predicament of the individual as follows:

> Immersed in an environment which he does not and cannot understand, the individual is forced to create a substitute world which he can understand and in which he puts his faith. He acts in consistency with that conception, derives his standards of values from it, and undertakes to alter it only when convinced by further experience that it fails to serve the goal of unity. Since this self-made scheme of life is his only guarantee of security, its preservation soon becomes a goal in itself. He seeks the type of experience which confirms and supports the unified attitude, and rejects experiences which seem to promise a disturbance of this attitude.[29]

The above explanation is not unlike Dewey's conception of logic as being the transformation of an indeterminate

---

[27]Campbell, op. cit., p. 290.

[28]Daniel E. Griffiths, Administrative Theory (New York: Appleton-Century-Crofts, Inc., 1959), pp. 38-42.

[29]Prescott Lecky, Self-Consistency A Theory of Personality (New York: Island Press, 1945), p. 50.

situation into a determinate situation,[30] or Ittelson and Cantril's theory of transactionalism whereby

> . . . each of us, through perceiving, creates for himself his own psychological environment by attributing certain aspects of his experience to an environment which he believes exists independent of the experience. . . .[31]

Logic, then, for the individual is the attainment of correspondence between his own interpretations of his environment (from his value frame of reference) and the environment as he experiences it. Proponents of this point of view have been criticized for denying the existence of an external world; this criticism is unwarranted. It is readily admitted that there does exist <u>something</u>, but the <u>it</u> of external reality has no functional significance except as significance is given to <u>it</u> by the interpreting individual. As Whitehead so vividly put it:

> . . . Philosophers have known for centuries that our senses are no reliable testimony to the existence of the outside world. . . . There was absolutely no reason to infer the existence of external reality from any evidence brought in to us by our senses. It is all subjective. The outer world may not be there at all. And yet, as a matter of fact, the only human beings who do not assume the existence of that outer world as a reality are in the lunatic asylums. . . .[32]

---

[30]John Dewey, Logic, <u>The Theory of Inquiry</u> (New York: Henry Holt and Company, 1938), pp. 104-105.

[31]William H. Ittelson and Hadley Cantril, <u>Perception, A Transactional Approach</u> (Garden City: Doubleday and Company, Inc., 1954), p. 2.

[32]Lucien Price, <u>Dialogues of Alfred North Whitehead</u>

The individual who behaves intelligently is one whose correspondence between his interpretations and the world which he supposes is external of him are closely correlated. The external world does not provide meaning; the individual infers meaning. The only public meaning is through common agreement on private meanings.

The variance of the point of view herein expressed from the point of view of deterministic philosophers of science is quite apparent. Reliance of the positivists on operational definitions and common concepts is an effort to confine meaning to operations and empirical matter outside the individual's own capacity to bestow meaning. Such ambitious efforts are noteworthy, but unfruitful. Northrop exposes the impossibility of attempting to operationally define all concepts in theory:

> There is no justification, from an analysis of scientific method itself, nor is there any other reason, for supposing that it is necessary to reduce every concept in one's deductively formulated scientific theory to the type of meaning which only those who think merely with their hands can understand. In the case of most scientific theories only some of the theoretical concepts by postulation have operational meanings and denotatively given epistemic correlates.[33]

(New York: Mentor Books, The New American Library of World Literature, Inc., 1954), p. 297.

[33]Northrop, op. cit., p. 124.

There must, however, be some way of insuring a degree of common understanding among scientists who are pursuing similar experimentation. One convenient way for doing this is operationally defining some of the concepts. We should not be deluded into thinking, however, that meaning in such operations is anything more than personal meaning attributed by each scientist; the meaning becomes public only through common agreement of the scientists.

It is at the stage of logical deduction that mathematics has been relied on heavily and the use of machines for this operation has been invaluable to the researcher. However, neither mathematics nor machines can ever replace the ingenuity of the scientist. So long as science can be confined to induction (gathering the facts) and to manipulating the facts, then machines are far superior for these operations than is man. These devices are only tools for the scientist to make his busy-work lighter. The prime function of science, that of prediction--anticipating and controlling the future--rests with the scientist who must assume full responsibility for his explorations. The caution of the great mathematician, Norbert Wiener, is especially appropriate for those who would reduce all science to machine-like manipulations:

> If we use, to achieve our purposes, a mechanical agency with whose operations we cannot efficiently interfere once we have started it, because the

> action is so fast and irrevocable that we have not the data to intervene before the action is complete, then we had better be quite sure that the purpose put into the machine is the purpose which we really desire and not merely a colorful imitation of it.[34]

The factor of human purpose is ever-present, and the scientist can no more absolve himself of responsibility than can the consumer of scientific technology.

There is one further aspect of logical deduction that requires examination. It has been asserted that logical deduction as a theory construct is the corresponding link between the set of assumptions and the set of hypotheses. Implicit assumptions have been equated with normative considerations--that is human purposes and values. On the other hand, hypotheses are deduced for empirical testing. (The nature of hypotheses is discussed more fully in the next section of this chapter.) The question arises about the method of logically relating normative considerations with empirical considerations. That is, how are metaphysical propositions connected with empirical propositions, or the <u>ought</u> with the <u>is</u>?

Northrop defined the process of joining an unobserved component (anything designated by a concept by postulation) to its directly inspected component (anything

---

[34]Norbert Wiener, "Some Moral and Technical Consequences of Automation," <u>Science</u>, CXXXI (May 6, 1960), 1358.

designated by a concept by intuition) as epistemic correlations. ". . . An epistemic correlation joins a thing known in the one way to what is in some sense that same thing known in a different way."[35] An example in physics is cloud-chamber experimentation whereby the principle of ionization is epistemically correlated with the inspected paths of the electrons as they collide with gas molecules.

> The task of the deductive scientist . . . is to begin with the postulated entities and relations of his deductively formulated theory and to find directly inspected data with which certain of his postulated entities can be epistemically correlated, so that the existence of the latter entities can be put to an experimental test.[36]

The joining of untestable propositions with testable propositions does not prove the truth or falsity of the untestable propositions. Only the relationship of the two is shown. For example, if A and B represent the assumptions and hypotheses respectively, then the argument would be: if A, then B. B is the case. Therefore, A is the case.[37] It is quite obvious that the argumentation is illogical. The existence of B does not logically prove the existence of A. The propositions by postulation (assumptions) are still unverified. Through the process of inferring relationships,

---

[35]Northrop, op. cit., p. 119.

[36]Ibid., p. 121.

[37]Ibid., p. 108.

however, the reasonableness of the assumptions becomes more firmly fixed. For example, a democratic way of life has not proven to be superior to other ideologies. We firmly believe it is superior, but its superiority is still an assumption. A classroom atmosphere where the individual students are given some freedom to plan certain phases of their educational program and are expected to assume responsibility for the results of such planning is logically related to the democratic ideology. Such classroom practices tend to make our allegiance to the democratic ideal more firmly fixed; however, it still is not proven to be superior. Even if it is conclusively proven that students learn better in such an atmosphere, while our ideal becomes more firmly fixed, it is still an assumption. Its propagation and advancement rests with the value frame of reference of all. Parenthetically, to degrade implicit assumptions by asserting that they are only assumptions, is to degrade the fundamental directive of all intelligent human behavior.

Hypotheses

Some examination of the nature of hypotheses was necessary in the prior discussions of assumptions and logical deductions. However, they are more fully examined in this section. A set of hypotheses is that construct of theory which is deduced from a set of assumptions. Hypotheses differ from assumptions in that they have the additional

characteristic of being testable in terms of the assumptions. They also tend to be much more specific and concrete than are assumptions. Hypotheses have not been given a place in the theoretical structure by some theorists. In such cases, it is maintained that a good theory must be productive of testable hypotheses. It is true that the number of hypotheses possible from a highly general set of assumptions is unlimited. The testing of one hypothesis may give rise to many others. However, a theoretical structure is incomplete without the inclusion of some hypotheses. Such will become apparent as the nature of hypotheses is investigated.

Hull's hierarchy of interlocking theorems ultimately derived from the postulates is similar to the construct which has been delineated as a set of hypotheses.[38] Northrop likewise used theorems synonymously with hypotheses. He also referred to them as consequences.[39] Marx calls them empirical propositions--statements of fact of what has been observed.[40] This construct of theory for Campbell would be concepts or laws, the truth or falsity of which would always be known.[41] Conant, like Northrop, equated this construct

---

[38]Hull, loc. cit.

[39]Northrop, op. cit., p. 140.

[40]Marx, loc. cit.

[41]Campbell, op. cit., p. 291.

with consequences which are subject to testing.[42]

Perhaps the nature of hypotheses can be understood better by examining the simulated problem situation posed earlier in the study. A problematic situation for the individual is an obstruction blocking his way as he progresses through time and space toward the attainment of a specific goal. The method of attaining the goal had been pre-planned from the same value frame of reference that had formulated the goal. The problem which has disrupted the plan for attaining the goal must be dealt with. Here is an indeterminate situation which the individual endeavors to make determinate. The first step in the solution is to analyze the assumptions which engendered the goal and made it seem worth pursuing. Let us suppose that an examination of the assumptions reinforced the worthwhileness of the goal. Projections are then made for solutions to the problem--possibilities for attaining the goal. These projections are hypotheses. Any one of several hypotheses may accomplish the purpose; on the other hand, any one of them may fail as did the original one.

In deducing the hypotheses, they must be logical derivatives from the assumptions. This is especially important, else the battle may be won at the expense of all we hold dear! Whether or not an hypothesis will work must be

---

[42]Conant, Science and Common Sense, loc. cit.

determined by testing it--that is, anticipating the consequent. The acid test for the hypothesis which was chosen is whether or not the goal was attained. In a sense, an hypothesis undergoes a double check, first its consistency with the set of assumptions and then, its fruitfulness in attaining the goal.

It can easily be seen, by examining the above situation, how hypotheses are used synonymously with theorems and consequences. In a theoretical structure, whether for a scientific experiment or an intelligent act of behavior, the three constructs--a set of assumptions, logical deductions and a set of hypotheses--are mandatory. The absence of either renders the theory invalid. In the absence of a set of assumptions, there is no recognizable problem; in the absence of logical deduction, there is no direction for problem solutions; in the absence of hypotheses, there can be no active involvement in problem solving. It is maintained far too frequently that the method of science is the testing of hypotheses. Actually this process takes place in the last stages of scientific method.

The explanation of hypotheses as being an anticipation of the consequent is not unlike the tenet of experimentalism that the meaning of an idea rests with its consequential results. Charles S. Peirce put it thus:

> Consider what effects, that might conceivably have practical bearings, we conceive the object of our

> conception to have. Then, our conception of these effects is the whole of our conception of the object.[43]

It is imperative that we never lose sight of the fundamental anchorage of hypotheses in the assumptions. They are testable only in terms of the assumptions. The central focal point remains the value frame of reference of the individual who must assume full responsibility for his theory or theories.

C. THE SYNTHESIS

An effort was made throughout the analytic examination of the theory constructs to maintain the relationship of each of the three constructs to the other two. This maintenance of relationships seemed to be the only way of communicating their significance. The task of synthesizing is simplified by the nature of the prior discussions. The synthesis of the three theory constructs may be effected best by examining an old problem in terms of a unified theory. This problem is the traditional means-ends controversy.

It has been charged that relativistic philosophy is oriented toward ends at the expense of the means. The pragmatic justification, it has been said, is "Was the mission

---

[43]Philip P. Wiener (ed.), Values in a Universe of Chance, Selected Writings of Charles S. Peirce (1839-1914) Garden City: Doubleday and Company, Inc., 1958), p. 181.

accomplished?" On the other hand, it has been charged that the positivists concentrate on the means at the exclusion of ends. This is a charge which the positivists freely acknowledge. The experimentalists vigorously deny--which they have every justification for doing--that they neglect means. As a matter of fact, the means are wrapped up in the ends, a necessity when the individual is the focal point of all behavior and activity.

This entire question is part of a basic question raised in the analytic section of this chapter. It is: "Are all acts of behavior, including scientific experimentation, founded on and directed by normative considerations, or must all normative considerations be eliminated from science?"

Professor Raup, while emphasizing his own position in the matter, states the case for both sides admirably:

> . . . When a denoted goal is shown in its connection with the conditions which lead to it, this relationship is one that must be normatively established. The goal is a construction in human choice and preference. The conditions which lead toward the realization of this goal are also formulations of choice and preference. . . .
>
> For many minds, the principal obstacle to this normative approach to nature is imbedded in a prevailing and erroneous assumption regarding empirical science that its 'facts' identify natural objects as they exist independently of our thinking; that since the method of establishing facts achieves this independence, this is the only

dependable method of achieving knowledge of nature.[44]

Those who prefer the latter view expressed by Raup whereby the "facts speak for themselves" would insist that assumptions are generalizations of singular facts. Hypotheses would also have empirical referents independent of the assumptions. The chief tools for the scientist with this orientation would be machines for manipulating the data, testing variables, etc. There seems to be some illogic in a theoretical structure where both the assumptions and the hypotheses have empirical referents. It is difficult to envision a need for deducing hypotheses if the assumptions stand alone grounded in external reality. Induction is a very important part of science as is the correlation of variables, but such hardly seems to accomplish the aims of science, that of prediction and creation of new knowledges. There is no apparent direction to such a science. It can only be concluded that the scientist's unexpressed values direct the science, a practice that has very serious implications.

The relativistic premises advanced throughout this study as they are reflected in theory construction are: (1) assumptions are free creations of the human intellect

---

[44]R. B. Raup, "The Community Criterion in Judgmental Practice," Studies in Philosophy and Education, I (September, 1960), 31.

molded by his value frame of reference, and (2) hypotheses are testable only in relation to the assumptions.

Since individuals' percepts and values are influenced by past experiences it could be, and indeed has been, maintained that free creative assumptions are still generalizations from past atomistic experiences. There is, however, the additional element of purpose that removes implicit assumptions from the confines of a cause and effect science. It does not remove their formulation from the confines of science! Rather, assumptions are never subjected to scientific scrutiny until they are honestly admitted as a part of scientific investigation. The dogma of the deterministic philosophers of science that there is a realm of fact (scientific) and a realm of human values (metaphysics) condones opportunistic manipulations and irresponsibility.

Bronowski defines our current situation as a dangerous one brought about by irresponsibility:

> The civilized world is indeed, threatened with destruction by the physical impact of science on our lives, and it is characteristic that we are threatened as much, for example, by overpopulation as by radioactive death. For what threatens us in both cases is not the scientific discovery, but our own failure to weigh all the consequences honestly and without compromises. We are threatened by overpopulation because we refuse to face honestly--that is, to face actively--the need to control human reproduction. And we are threatened by atomic bombs because we refuse to face the necessity for a new age of trust among nations. Somehow we think it remote

> from morality to face the facts; somehow we think it possible to be good without being wise.[45] (italics mine)

Bronowski sums up his expose of our false sense of morals:

> We live in a technical age of plenty and are frightened because we try to control this abundance by a morality which shuts its eyes to the consequences of our acts.[46]

When ends, or normative purposes, are eliminated from scientific scrutiny, then means are without direction. A haven is provided for the mystic and an excuse for the scientist who has not the inclination nor courage to state his views. Rampsberger defines the first role of the philosopher of science as an exposer of hidden assumptions.

> The first task for the philosopher of science is to examine the actual historical development of science to discover what philosophical assumptions have been taken for granted. What views as to the nature of reality and our means of knowing it has been tacitly or explicitly presupposed?[47]

A synthesized theory is one whereby implicit assumptions are made explicit. The assumptions must be logically interrelated and mutually supporting. Hypotheses must also

---

[45]Jacob Bronowski, "A Moral for An Age of Plenty," Adventures of the Mind Series, Saturday Evening Post, CCXXXIII (November 12, 1960), 72.

[46]Ibid.

[47]Albert G. Rampsberger, Philosophy of Science (New York: F. S. Crofts and Company, 1942), p. 3.

be logically interrelated and mutually supporting as well as have a logical and consistent relationship to the assumptions. The testing of hypotheses is impossible except in relationship to the assumptions; the relationship of hypotheses to empirical reality does not stand alone. In every act of intelligent behavior, we are literally testing hypotheses which were formulated as an anticipation of the consequent. The consequences of pursuing the act of behavior must be borne by the individual himself who projected the hypothesis from his own set of implicit normative assumptions. Such is equally true of the scientist; he cannot avoid his private responsibilities by declaring science a public responsibility. As Bridgman put it, "Science does not begin until my activities begin."[48]

> The process that I want to call scientific is a process that involves the continual apprehension of meaning, the constant appraisal of significance, accompanied by a running act of checking to be sure that I am doing what I want to do, and of judging correctness or incorrectness. This checking and judging and accepting, that together constitute understanding, are done by me and can be done for me by no one else. They are as private as my toothache, and without them science is dead.
>
> . . . . . .
>
> . . . Always beyond the public level, waiting for a deeper analysis, is the private level. It is on the private level that I realize my

---

[48]P. W. Bridgman, Reflections of A Physicist (New York: Philosophical Library, 1955), p. 50.

> essential isolation; here is my awful freedom that I can hardly face.[49]

Obviously this awful freedom which Bridgman found difficult to face has proven impossible for many scientists and lay citizens to face. A synthesized theory, whether it be a theory of physics, chemistry, medicine, educational administration or the daily problems of mankind in mutual coexistence, has at the core of it private normative values. The burden, and it is a burden, is for each of us to assume responsibility for exposing our values so that we may collectively examine them intelligently (scientifically). We can no longer afford to hide behind the cloak of scientific immunity.

Reiser sums up the problem as follows:

> . . . There is much said about science being more suited to the determination of means rather than ends, to the study of facts rather than values, to the description of what is rather than what ought to be. It is surprising to find religionists and Logical Positivists agreeing with this conclusion, even though the motivations in each case are very different.
>
> Contrary to this view that 'facts' and 'values' are mutually exclusive, I hold that the realm of facts and the kingdom of values are ruled by a common sovereignty: we must learn to think compassionately and feel intelligently. That is

---

[49]Ibid., pp. 50, 75.

to say, science is committed to a value-system.[50]

A society, such as ours, that stakes its existence on an educated, intelligent citizenry has cause for being ill-at-ease when theories of educational leadership purport to be divorced from the society's value-system.

D. CHAPTER SUMMARY

In this chapter the three constructs of theory, a set of assumptions, logical deductions, and a set of hypotheses, were analysed individually to determine their nature and their role in the process of theorizing. The three constructs were then synthesized to show their composite function in intelligent behavior and responsible scientific investigation.

Theoretical assumptions are free creations of the human intellect. They are implicit premises for every act of behavior and for every experiment of science. All assumptions are founded on metaphysical, normative considerations. At the core of them is the value frame of reference of each individual. These normative assumptions can become public only when individuals honestly make explicit that which is implicit, and subject them to intelligent (scientific) scrutiny. Assumptions do not necessarily have empirical

---

[50] Oliver L. Reiser, The Integration of Human Knowledge (Boston: Porter Sargent, 1958), pp. 61-62.

referents; the facts do not speak for themselves. Communicated facts are not pure facts but they are interpreted facts. The individual cannot absolve himself of responsibility for his own assumptions.

Logical deduction is the process of inferring relationships primarily between the set of assumptions and the set of hypotheses, but also interrelationships among assumptions and among hypotheses. Relationships between normative assumptions and testable hypotheses are effected by epistemic correlation; that is, the hypotheses are testable in terms of the assumptions. Operational definitions of all terms in a theoretical structure is impossible. There must be concepts by postulation. Logical deductions are a part of each individual's intelligent behavior when he seeks to attain correspondence between his conception of the environment and the environment as he experiences it. Intelligent behavior requires rising above being a naive realist, a condition which Wolfgang Kohler said comes from childhood and persists with us most of the time.[51] Rather, we are interpreters from our value frame of reference. Logical deductions are always anchored in human purpose.

Hypotheses are logical deductions from the set of

---

[51]Wolfgang Kohler, "The Mind-Body Problem," Dimensions of Mind, Sidney Hook, editor (New York: New York University Press, 1960), p. 9.

assumptions. They have the additional characteristic of being testable in terms of the assumptions. Hypotheses are conjectured solutions to problems which obstruct goal-attainment. They are anticipations of the consequent. Since hypotheses are deduced from normative assumptions, whether explicit or implicit, they must be tested in terms of the assumptions. Hypotheses are projections from the individual's value frame of reference; their consequential results are his responsibility.

A synthesized theory would not be concerned with either means or ends at the exclusion of the other. The means would be part and parcel of the ends. A goal worth pursuing would be pursued with the same integrity as was used in selecting the goal for pursuit. The survival of mankind is dependent on moral standards critically examined and utilized for insuring mutual coexistence. It is impossible to be good without being wise.

CHAPTER VI

AXIOMATIC BASES FOR THEORIZING IN EDUCATIONAL ADMINISTRATION

A. INTRODUCTION

The purpose of this study, as designated in Chapter I, was: to offer a logical explanation of the process of theory construction in educational administration so that wide differences of opinion regarding administrative theory may be reduced. The existence of controversial issues among members of the profession concerned with the development of a theory or theories of educational administration constituted the problem of the study.

In the study, efforts were made to determine the nature of and the purposes for theory. The fundamental controversial issues among those who have investigated the structure of theories were identified. Philosophic and psychological bases of theory were examined, and the basic constructs of theory were identified, analyzed and synthesized.

It is the purpose of this final chapter to (1) pull together the points of view advanced in the study as they tend to offer resolutions to the controversial issues, and (2) to advance some axiomatic bases for theorizing, especially in educational administration.

The major controversial issues were identified around the questions of (1) the place of human values in a theoretical structure, (2) the free creative or the restrictive aspects of assumptions, (3) the definition of concepts, and (4) the validity of the "is-ought" dichotomy. Each of these questions is reviewed below in the light of argumentation advanced throughout the study. All of the issues basically are philosophical differences. Those who are oriented to a deterministic philosophy would be sharply divided from those with relativistic orientations. These points of view were examined in the study noting the supporting research and logic of each. These points of view are reviewed prior to consideration of the individual issues.

It is maintained by deterministic philosophers of science that there exists an external world independent of man's knowledge of it. Man's knowledge of this external world is true only as it approximates the external structure of reality. Logical positivism, a current instrument of determinism, advocates a separation of the world of value from the world of fact, the ought from the is, the ends from the means. Values, ends, purposes and all normative considerations are said to be in the realm of metaphysics, and are, thus, unscientific. Such a philosophy makes it possible for man to compartmentalize his life, and, also, an escape from shouldering personal responsibility is furnished. It

is convenient to take the position, "Don't ask me, I just work here. Check the facts." Proponents of this point of view (determinism) insist that man's values are to be divorced from all scientific investigation. Efforts are made to eliminate all metaphysics from science.

On the other hand, relativistic philosophers of science maintain that the external world is meaningful only through human interpretation. Modern research in quantum mechanics would seem to offer a deterrent to those who still think of matter as the solid stuff of reality. Research in perceptual psychology seems to be conclusive that the individual chooses from his perceptual field those things to which he ascribes value. Meaning attributed to perceptual objects varies with the perceiver's past experiences, values and purposes.

Man, then, as a purposeful creature selects his goals and adapts his methods for goal attainment to the goals themselves. Both the goals and the methods are anchored in man's individual value frame of reference. According to the relativist, the above described procedure is equally applicable to the scientist in the laboratory as to the lay person in any act of intelligent behavior.

In determinism, meaning is vested in external reality. The individual becomes an observer and a reporter. Whereas, in relativism, meaning is vested in the values of the individual. He is the formulator of goals and he must assume

full responsibility for their attainment.

The position stated at the beginning of this study and advanced throughout was one of relativism. Research and logic seem to support overwhelmingly the relativistic position. Resolution of the controversial issues in theory necessitate an understanding of their philosophical genesis.

B. EFFORTS TOWARD RESOLUTION OF CONTROVERSIAL ISSUES

1. Are theoretical structures free of human values?

In the light of the above discussions, it is obvious that those people with deterministic orientations would insist that theoretical structures, to be valid, must be free of human values. A theory of administration, they would say, must be usable equally by any administrator, in any organization, at any time, and in any social setting or political ideology. Some would concede that values may be used as variables, but they are not a part of the theoretical structure.

To the relativist, the validity of the theoretical structure would depend on the validity of the normative system which supports the theory.

Since theories are man-made they inevitably encompass human values, either explicitly or implicitly. Such, at least, was the thesis advanced in this study and which an

examination of the process of theorizing seemed to support.

2. Are assumptions generalizations of inductive facts?

This issue could be phrased, "Are all assumptions empirically testable?" The determinist would answer the question in the affirmative, while the relativist would vehemently decry such an assertion. The position of the determinist on this issue would be obvious. With his faith in external reality and his aversion of metaphysics, he would have no recourse but to insist that assumptions are propositions built up from singular propositions with empirical referents.

The relativist, on the other hand, would maintain that assumptions are free creations of the human intellect anchored in normative considerations.

Assumptions, it appears, may be tested if subjected to examination, but the test is based on more general assumptions which are not testable. In the final analysis, assumptions rest with the individual's set of values, and he is responsible for them. It is urged that implicit assumptions be made explicit and subjected to rigorous examination.

3. Are all concepts empirically definable?

If it is conceded that there are implicit assumptions by postulation, then the propositions of these assumptions must be made up of concepts by postulation. Operational

concepts would be impossible for an unobserved entity; and efforts to use only operational concepts in a theory would result in (1) an infinite regress, (2) a theory which would omit implicit assumptions (and their relevance would be denied), or (3) an unintelligent set of propositions based on the immediately apprehendable, with the theorist naively assuming he has made no interpretations.

4. How valid is the "is-ought" dichotomy?

Man, progressing through space and time, interprets the present from the past and he projects into the future from both. Actually, the present is only the link between the past and the future. Man's specious present consists of the <u>was</u>, the <u>is</u>, and the <u>ought</u>.

Perceptual research seems to shatter the validity of any is-ought dichotomy. Man interprets his environment (the "is") in terms of his purposes (the "ought").

It appears that man would be a victim of his environment if he were restricted to <u>what is</u>. For the scientist in the laboratory, the purpose for his experimental work gives meaning to that which he is investigating. A theory of social behavior including educational administration must factor in the oughts of the subjects as well as those of the investigator.

In summary, the tenets of a deterministic philosophy of science would be: (1) theories are value-free;

(2) assumptions are composite singular empirical facts; (3) all concepts must be operationally, or empirically, definable; and (4) what is must be separated from what ought to be. Whereas, the tenets of a relativistic philosophy of science would be quite opposite.

It does no good to say that one camp would have one view, and the other camp another view. It does make a difference what you believe! To assume otherwise, would be to suppose that a man's beliefs make no difference in his social behavior.

What difference does it make to the profession of educational administration whether its members are adherents of determinism or relativism?

Strict adherence to determinism would result in ignoring the purposes of educational administration, the purposes of education, and the purposes of man as a social being. Research in educational administration would consist of the researcher making observations within a school or school system and recording what he finds. He would never know or care what constituted an educational program adequate for attaining purposes of education (whatever they may be); nor would he know or care if the administrator was doing an effective or ineffective job. Research would become a job for technicians and their data frequently would be trivia.

Progress in the profession of educational administration, it seems, is dependent on the extent to which educational administrators contribute to the attainment of educational purposes. Educational purposes are, in the final analysis, individual purposes of the members of society. Each member of the profession--social scientist, practitioner, professor, student--can afford to do no less than display maximum integrity in stating his assumptions and shouldering responsibility for improving the profession. Such efforts require transcending the threshold of empiricism in research, preparation programs, and in administrative functions.

C. AXIOMATIC BASES

It has been contended throughout this study that the solid base of reality is man's value frame of reference. Axioms have traditionally been equated with that which is self-evident, such as the axioms of Euclidean geometry. It may appear that the use of axioms in a relativistic context is inconsistent. Such would, indeed, be the case if the traditional definition of axioms were held. Research and thoughtful investigations by scientists and philosophers alike, which were cited in this study, invalidate any claims for self-evident truths. Axiomatic bases are no more than axiological bases--that is, bases with value referents. However, there are no bases more solid than well-formulated

values.

In conjunction with the reasoning advanced throughout this study, the statements below are advanced with equal fervor. The statements are intended to provide, to some extent, direction for those (1) concerned with the structure of theory; (2) those concerned with constructing and/or using theories for research purposes, especially in educational administration; and (3) those concerned with improving the profession of educational administration. There are implications also for those concerned with intelligent daily living. Had different assumptions been held, these statements would have been different. That is, the validity of the statements rests on the validity of the assumptions (postulations) of the study and the logic of the argumentation. It will be noted that some of the statements are restatements of the postulations of the study. The postulations were not proven to be true or false, however their soundness was reinforced substantially by the research.

1. Theory cannot be disassociated from the human process of theorizing. Any theory, whether for scientific investigation or for intelligent daily behavior, is the product of a human intellectual process.

2. Everyone who behaves intelligently theorizes. The normal drives, such as hunger, sex, self-preservation, etc., are inadequate to insure intelligent behavior. It is

erroneous to assume that only scientists theorize. Theorizing is required of all who anticipate the future.

3. Theorizing begins from the individual's private frame of reference--his values and his purposes. The personal reference point of the theorist cannot be transcended. Theory becomes a public matter through mutual agreement on private values. No science can be stronger than the integrity of the scientists who are willing to expose for examination their private values.

4. Theorizing involves utilizing what was (the past) for associating what is (the present) with what ought to be (the future). Stated another way, the purpose of theory is prediction--projection into the future. The accumulation of new knowledges can come about in no other manner.

5. All theorizing is premised on normative assumptions, either explicitly or implicitly. The more general assumptions cannot be empirically tested; rather, they are reinforced through the testing of logically derived hypotheses, if the testing has positive results.

6. The testing of hypotheses is always premised on the soundness of the untested assumptions from which the hypotheses were deduced.

7. All of the concepts of a theoretical structure cannot be operationally defined. Assumptions by postulation necessitate concepts by postulation. Concepts by postulation

(unobserved entities) and concepts by intuition (the immediately apprehendable) must be epistemically correlated. The validity of the operational concepts rests on the validity of the concepts by postulation.

8. The research theorist in educational administration is called upon to make explicit those implicit assumptions which undergird his theory. There should be no doubt, in the minds of those who would use a particular theory, about its consistency with sound social norms.

9. Professors in preparation programs for educational administrators will do well to gear their programs toward improving the theorizing competencies of practicing and/or potential educational administrators. Such a program will demand of every participant an examination and refinement of his value frame of reference. The perpetuation of our society demands educational programs with leadership whose integrity is above reproach.

10. Everyone who theorizes must assume full responsibility for the consequences of his theory or theories. The facts do not speak for themselves; communicated facts are always facts which have been interpreted and conceptualized by the communicator.

BIBLIOGRAPHY

BIBLIOGRAPHY

A. BOOKS

Allport, Floyd. Theories of Perception and the Concept of Structure. New York: John Wiley and Sons, 1955.

American Association of School Administrators. Professional Administrators for America's Schools. Thirty-Eighth Yearbook. Washington, D. C.: American Association of School Administrators, 1960.

_____. You and AASA Going Places Together. Washington, D. C.: American Association of School Administrators, 1958.

Bayles, Ernest E. Democratic Education Theory. New York: Harper and Brothers, 1960.

Bills, Robert E. About People and Teaching. University of Kentucky School Services Bulletin, Volume 28, No. 2. Lexington: University of Kentucky, Bureau of School Services, 1955.

Boring, Edwin G. Sensation and Perception in the History of Experimental Psychology. New York: Appleton-Century-Crofts, Inc., 1942.

Bridgman, P. W. Reflections of a Physicist. New York: Philosophical Library, 1955.

_____. The Logic of Modern Physics. New York: The Macmillan Company, 1928.

Campbell, Roald F., and Russell T. Gregg (eds.). Administrative Behavior in Education. Sponsored by the National Conference of Professors of Educational Administration. New York: Harper and Brothers, 1957.

Campbell, Roald F., and James M. Lipham (eds.). Administrative Theory as A Guide to Action. Chicago: Midwest Administration Center, University of Chicago, 1960.

Carnap, Rudolf. The Logical Syntax of Lanugage. London: Routledge and Kegan Paul; New York: Humanities Press, 1937.

Coladarci, Arthur P. and Jacob W. Getzels. The Use of Theory in Educational Administration. Educational Administration Monograph No. 5. Stanford: Stanford University, School of Education, 1955.

Conant, James B. Modern Science and Modern Man. Garden City: Doubleday Anchor Books, Doubleday and Company, Inc., 1952.

_____. Science and Common Sense. New Haven: Yale University Press, 1951.

De Gré, Gerard. Science as a Social Institution. Short Studies in Sociology. Garden City: Doubleday and Company, Inc., 1955.

Dewey, John. Logic, The Theory of Inquiry. New York: Henry Holt and Company, 1938.

Einstein, Albert. Out of My Later Years. New York: Philosophical Library, 1950.

Flescher, William R., and A. L. Knoblaugh. A Decade of Development in Educational Leadership. The National Conference of Professors of Educational Administration, 1957.

Graff, Orin B., and Calvin M. Street. Improving Competence in Educational Administration. New York: Harper and Brothers, 1956.

Griffiths, Daniel E. Administrative Theory. New York: Appleton-Century-Crofts, Inc., 1959.

_____. Research in Educational Administration, An Appraisal and A Plan. New York: Teachers College, Columbia University, Bureau of Publications, 1959.

Hall, Calvin S., and Gardner Lindzey. Theories of Personality. New York: John Wiley and Sons, Inc., 1957.

Halpin, Andrew (ed.). Administrative Theory in Education. Chicago: Midwest Administration Center, 1958.

Hamlyn, D. W. The Psychology of Perception. New York: The Humanities Press, Inc., 1957.

Ittelson, William H., and Hadley Cantril. Perception: A Transactional Approach. Garden City: Doubleday and Company, Inc., 1954.

James, William. The Philosophy of William James, Drawn from His Own Works. Introduction by H. M. Kallen. New York: The Modern Library, 1925.

Kelley, Earl C. Education for What is Real. New York: Harper and Brothers, 1947.

Lecky, Prescott. Self-Consistency, A Theory of Personality. New York: Island Press, 1945.

Levi, Albert William. Philosophy and the Modern World. Bloomington: Indiana University Press, 1959.

Lilge, Frederick. The Abuse of Learning. New York: The Macmillan Company, 1948.

Moore, Hollis A., Jr. Studies in School Administration. Washington: American Association of School Administrators, 1957.

Northrop, F. S. C. Logic of the Sciences and the Humanities. New York: The Macmillan Company, 1947.

Pierce, Truman M., and A. D. Albright. A Profession in Transition. The Southern States Cooperative Program in Educational Administration and The Associated Program in Educational Administration, 1960.

Popper, Karl R. The Logic of Scientific Discovery. London: Hutchinson and Company, Ltd., 1959.

Price, Lucien. Dialogues of Alfred North Whitehead. New York: Mentor Books, The New American Library of World Literature, Inc., 1954.

Rampsberger, Albert G. Philosophy of Science. New York: F. S. Crofts and Company, 1942.

Reichenbach, Hans. The Rise of Scientific Philosophy. Berkeley: University of California Press, 1951.

Reiser, Oliver L. The Integration of Human Knowledge. Boston: Porter Sargent, 1958.

Southern States Cooperative Program in Educational Administration. Better Teaching in School Administration. Southern States Cooperative Program in Educational Administration, 1956.

Stagner, Ross. Psychology of Industrial Conflict. New York: John Wiley and Sons, Inc., 1956.

Sullivan, J. W. N. The Limitations of Science. New York: Mentor Books, The New American Library of World Literature, Inc., 1952.

Syngg, Donald, and Arthur W. Combs. Individual Behavior. New York: Harper and Brothers, 1949.

Ulich, Robert. On the Reform of Educational Research. Occasional Pamphlet No. 2. Cambridge: Harvard University, Graduate School of Education, 1947.

Waldo, Dwight. The Study of Public Administration. New York: Random House, 1955.

Weinberg, J. R. An Examination of Logical Positivism. Paterson, New Jersey: Littlefield Adams and Company, 1960.

Whitehead, Alfred North. Adventures of Ideas. New York: Mentor Books, The New American Library of World Literature, Inc., 1958.

_____. The Aims of Education. New York: Mentor Books, The New American Library of World Literature, Inc., 1958.

Wiener, Philip P. (ed.). Values in a Universe of Chance, Selected Writings of Charles S. Peirce (1839-1914). Garden City: Doubleday and Company, Inc., 1958.

B. ESSAYS AND ARTICLES IN COLLECTIONS

Bakan, Paul. "Current Theoretical Approaches to Perception," Present-Day Psychology, A. A. Roback, editor. New York: Philosophical Library, 1955. Pp. 57-75.

Becker, Carl. "Everyman His Own Historian," The Structure of Scientific Thought, Edward H. Madden, editor. Boston: Houghton Mifflin Company, 1960. Pp. 176-187.

Bills, Robert E. "Believing and Behaving: Perception and Learning," Learning More About Learning, Alexander Frazier, editor. Washington: ASCD, National Education Association, 1959. Pp. 55-73.

Bronowski, Jacob. "Science As Foresight," What Is Science, James R. Newman, editor. New York: Simon and Schuster, 1955. Pp. 381-436.

Campbell, Norman R. "The Structure of Theories," Readings in the Philosophy of Science, Herbert Feigl and May Brodbeck, editors. New York: Appleton-Century-Crofts, 1953. Pp. 288-308.

Campbell, Roald F., W. W. Charters, Jr., and William L. Cragg. "Improving Administrative Theory and Practice: Three Essential Roles" (Introduction by Roald F. Campbell), Administrative Theory in Action, Roald F. Campbell and James W. Lipham, editors. Chicago: Midwest Administration Center, University of Chicago, 1960. Pp. 171-189.

Dewey, John. "Reconstruction in Moral Conceptions," The Structure of Scientific Thought, Edward H. Madden, editor. Boston: Houghton Mifflin Company, 1960. Pp. 349-358.

_____. "Unity of Science as A Social Problem," International Encyclopedia of Unified Science, Volume 1, Nos. 1-5, Otto Neurath, Rudolf Carnap and Charles Morris, editors. Chicago: The University of Chicago Press, 1955. Pp. 29-35.

Ennis, Robert H. "Assumption-Finding," Language and Concepts in Education, B. Othanel Smith and Robert H. Ennis, editors. Chicago: Rand McNally and Company, 1961. Pp. 161-178.

Feigl, Herbert. "Principles and Problems of Theory Construction in Psychology," Current Trends in Psychological Theory. Pittsburgh: University of Pittsburgh Press,

Getzels, Jacob W. "Theory and Practice in Educational Administration: An Old Question Revisted," Administrative Theory as A Guide to Action," Roald F. Campbell and James M. Lipham, editors. Chicago: Midwest Administration Center, The University of Chicago, 1960. Pp. 37-58.

Griffiths, Daniel E. "Administration as Decision-Making," Administrative Theory in Education, Andrew W. Halpin, editor. Chicago: Midwest Administration Center, University of Chicago Press, 1958. Pp. 119-149.

Halpin, Andrew W. "The Development of Theory in Educational Administration," Administrative Theory in Education, Andrew W. Halpin, editor. Chicago: Midwest Administration Center, University of Chicago Press, 1958. Pp. 1-19.

Hempel, Carl G. "A Logical Appraisal of Operationism," The Validation of Scientific Theories, Phillipp G. Frank, editor. Boston: Beacon Press, 1956. (Copyrighted by American Association for the Advancement of Science.) Pp. 52-67.

Hull, Clark L. "The Hypothetico-Deductive Method," Psychological Theory, Melvin H. Marx, editor. New York: The Macmillan Company, 1951. Pp. 218-233.

Kohler, Wolfgang. "The Mind-Body Problem," Dimensions of Mind, Sidney Hook, editor. New York: New York University Press, 1960. Pp. 3-23.

Marx, Melvin H. "The General Nature of Theory Construction," Psychological Theory, Melvin H. Marx, editor. New York: The Macmillan Company, 1951. Pp. 4-19.

Shoben, Edward Joseph, Jr. "Psychological Theory Construction and the Psychologist," The Structure of Scientific Thought, Edward H. Madden, editor. Boston: Houghton Mifflin Company, 1960. Pp. 152-157.

Thompson, James D. "Modern Approaches to Theory in Administration," Administrative Theory in Education, Andrew W. Halpin, editor. Chicago: Midwest Administration Center, University of Chicago Press, 1958. Pp. 20-39.

Whitaker, Sir Edmund Taylor. "Mathematics and Logic," What Is Science, James R. Newman, editor. New York: Simon and Shuster, 1955. Pp. 16-62.

C. PERIODICALS

Bronowski, Jacob. "A Moral for an Age of Plenty," Adventures of the Mind Series, Saturday Evening Post, CCXXXIII (November 12, 1960), 24-25; 70; 72.

Bruner, J. and C. Goodman. "Value and Need as Organizing Factors in Perception," Journal of Abnormal and Social Psychology, XLII (1947), 33-44.

Bruner, J. and Leo Postman. "Perception, Cognition and Behavior," Journal of Personality, XVIII (September, 1949), 14-31.

Faurot, J. H. "Truth and Responsibility," The Journal of Higher Education, XXX (January, 1960), 1-8.

Guthrie, Edwin R. "Psychological Facts and Psychological Theory," Psychological Bulletin, XLIII (January, 1946), 1-20.

Hochberg, Julian E. and Henry Gleitman. "Perception--Motivation Dichotomy," Journal of Personality, XVIII (December, 1949), 180-191.

Hughes, Donald S. "The Elusive Neutron," Adventures of the Mind Series, The Saturday Evening Post, CCXXIV (February 4, 1961), 22-23; 75-77.

Kohler, Wolfgang. "Gestalt Psychology Today," The American Psychologist, XIV (December, 1959), 727-734.

Levine, R., I Chein, and G. Murphy. "The Relation of the Intensity of a Need to the Amount of Perceptual Distortion. A Preliminary Report," Journal of Psychology, XIII (1942), 283-293.

Martin, Clyde V. "The Place of Philosophy in Educational Research," Phi Delta Kappan, XL (October, 1958), 39-40.

Miller, Van. "The Practical Art of Using Theory," School Executive, LXXVII (June, 1958), 60-63.

Moore, Hollis, Jr. "Things Are Happening All Over," Phi Delta Kappan, XLI (November, 1959), 42-44.

O'Neil, W. M. "Basic Issues in Perceptual Theory," Psychological Review (November, 1958), 42-44.

Postman, Leo, Jerome S. Bruner, and Elliott McGinnies. "Personal Values as Selective Factors in Perception," Journal of Abnormal and Social Psychology, XLIII (April, 1948), 142-154.

Raup, R. B. "The Community Criterion in Judgmental Practice," Studies in Philosophy and Education, I (September, 1960), 4-39.

Wiener, Norbert. "Some Moral and Technical Consequences of Automation," Science, CXXXI (May 6, 1960), 1355-1358.

D. UNPUBLISHED MATERIALS

Graff, Orin B. "Administrative Theory and Human Values," Paper read at the National Conference of Professors of Educational Administration, Macomb, Illinois, August 24, 1960.

Griffiths, Daniel E. "The Nature and Meaning of Theory," Paper read at the National Conference of Professors of Educational Administration, Macomb, Illinois, August 24, 1960.

Wuesthoff, Freda. "Atomic Energy and Peace," Lecture given at the First Meeting of the Stuttgart Peace Circle, March 22, 1947. Printed by the Society for the Scientific Study of Peace, Geneva, 1957.