

INFORMATION TO USERS

This manuscript has been reproduced from the microfilm master. UMI films the text directly from the original or copy submitted. Thus, some thesis and dissertation copies are in typewriter face, while others may be from any type of computer printer.

The quality of this reproduction is dependent upon the quality of the copy submitted. Broken or indistinct print, colored or poor quality illustrations and photographs, print bleedthrough, substandard margins, and improper alignment can adversely affect reproduction.

In the unlikely event that the author did not send UMI a complete manuscript and there are missing pages, these will be noted. Also, if unauthorized copyright material had to be removed, a note will indicate the deletion.

Oversize materials (e.g., maps, drawings, charts) are reproduced by sectioning the original, beginning at the upper left-hand corner and continuing from left to right in equal sections with small overlaps. Each original is also photographed in one exposure and is included in reduced form at the back of the book.

Photographs included in the original manuscript have been reproduced xerographically in this copy. Higher quality 6" x 9" black and white photographic prints are available for any photographs or illustrations appearing in this copy for an additional charge. Contact UMI directly to order.

U·M·I

University Microfilms International
A Bell & Howell Information Company
300 North Zeeb Road, Ann Arbor, MI 48106-1346 USA
313/761-4700 800/521-0600

Order Number 9417032

**Communicating the arcane: A conceptual framework for
environmental interpretation**

Istvan, Laurence Bryce, Ph.D.

University of Washington, 1993

Copyright ©1993 by Istvan, Laurence Bryce. All rights reserved.

U·M·I
300 N. Zeeb Rd.
Ann Arbor, MI 48106

Communicating the Arcane:
A Conceptual Framework for Environmental Interpretation

by

Laurence Bryce Istvan

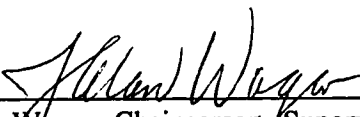
A dissertation submitted in partial fulfillment
of the requirements for the degree of

Doctor of Philosophy

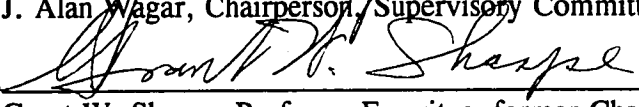
University of Washington

1993

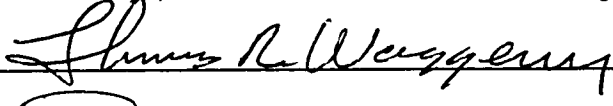
Approved by




J. Alan Wagar, Chairperson, Supervisory Committee




Grant W. Sharpe, Professor Emeritus, former Chairperson



James R. Waggens



Ron S. Lee



Richard J. Baker

Program Authorized
to Offer Degree

College of Forest Resources

Date

13 December 1993

© Copyright 1993

Laurence Bryce Istvan

In presenting this dissertation in partial fulfillment of the requirements for the Doctoral degree at the University of Washington, I agree that the Library shall make its copies freely available for inspection. I further agree that extensive copying of this dissertation is allowable only for scholarly purposes, consistent with "fair use" as prescribed in the U.S. Copyright Law. Requests for copying or reproduction of this dissertation may be referred to University Microfilms, 1490 Eisenhower Place, P.O. Box 975, Ann Arbor, MI 48106, to whom the author has granted "the right to reproduce and sell (a) copies of the manuscript in microform and/or (b) printed copies of the manuscript made from microform."

Signature

Lawrence B. Stora

Date

13 December 1993

University of Washington

Abstract

Communicating the Arcane:
A Conceptual Framework for Environmental Interpretation

by Laurence Bryce Istvan

Chairperson of the Supervisory Committee: Professor J. Alan Wagar
College of Forest Resources

A conceptual framework is offered for research to advance the practice of environmental interpretation. The intent is to improve scientific understanding of interpreting, as a form of communication, by establishing a more organized and encompassing basis for inquiry. Improved understanding and practice of interpretation is important as the public plays an increasing role in resource management decisions.

The framework is developed through conceptual analysis of writings about interpretation, and content analysis of studies of interpreting published from 1972 through 1990. The framework is based on a perspective of interpreting as assisted experience: a person experiencing and forming a relationship with what is being interpreted, assisted by the interpreter. From the conceptual framework, a typology is developed of interpretive contexts and salient factors -- elements (people, things, ideas, etc.), their relationships, steps they can take, and characteristics of each -- that can and ought to be studied.

Analysis of existing studies shows a wide field remains for productive research. Existing studies have focused on the outcomes of interpretation rather than the steps and other factors within interpreting that make it a unique form of communication. The dominant independent (manipulated) variable has been one non-personal service (a sign, brochure, etc.) compared to another or to a personal service (a guided walk,

talk, etc.). Dependent (measured) variables have centered on "knowledge" and "attitudes" (or their cognates). Four of 10 elements delineated in the typology, 8 of 13 relationships, and 42 of 48 steps remain unstudied. Ten of 24 interpretive contexts have not been considered.

Five themes emerge as a core for future research agendas: 1) the need to study interpreting, not just to evaluate interpreting's outcomes; 2) the concomitant need for new measures; 3) consideration of the presence or absence of what is being interpreted, before, during and after interpretation; 4) consideration of the time spent experiencing and making something of what is being interpreted; 5) matching the mode (aural, visual, etc.) of the research measures to the mode of the interpreting. Research methods and techniques for addressing the many factors of interpreting are explored. Research questions and hypotheses that emerge from the conceptual framework are discussed and tests of the framework's validity are proposed.

TABLE OF CONTENTS

	<i>Page</i>
LIST OF FIGURES	vi
LIST OF TABLES	vii
PROLOGUE	1
INTRODUCTION	3
BACKGROUND AND SETTING	4
The Profession of Environmental Interpretation	4
A Role for Interpretation	5
The Profession of Interpretation, Interpretation, and Interpreting	6
Science and Art in Interpretation	7
A GUIDE TO THE DISSERTATION	8
SUMMARY	10
 CHAPTER I	
METHODS, PROCEDURES, AND LITERATURE USED	11
CONCEPTUAL ANALYSIS	11
Application	12
Literature Used	12
Form of Analysis	12
Procedures	13
CONTENT ANALYSIS	14
Application	14
Literature Used	15
Procedures	15
 CHAPTER II.	
THE SCIENTIFIC CHARACTER OF INTERPRETATION RESEARCH . .	17
CATEGORIES OF RESEARCH	17
THE CHARACTER OF RESEARCH	19
 CHAPTER III.	
WHAT IS INTERPRETATION?	22
BACKGROUND	22
CONDITIONS DISTINCTIVE OF INTERPRETING	24
Public, Resource, Interpreter	24
Revelation	25
Experiencing	26
Assistance	26
Conditions Not Distinctive of Interpreting	27

Place? (27); Topic? (27); Audience? (28); Outcome? (28)	
CONTEXTS OF INTERPRETING	29
Communicative Situations	29
Interpretive Cases	30
Interaction	31
INTERPRETING: A DISTINCT ARENA OF COMMUNICATION	35
THREE PERSPECTIVES OF INTERPRETING	36
CHAPTER IV.	
THE CONCEPTUAL CHARACTER OF INTERPRETATION RESEARCH	41
PREVALENCE OF THE THREE PERSPECTIVES	41
TRANSMISSION: THE DOMINANT MODEL OF COMMUNICATION	43
Theoretical Considerations	43
Research Considerations	44
Limitations	45
Applications	47
SHARED UNDERSTANDING: PRAGMATIC COMMUNICATION THEORY	48
Theoretical Considerations	49
Research Considerations	50
Application and Limitations	51
ASSISTED EXPERIENCE	52
CHAPTER V.	
A CONCEPTUAL FRAMEWORK OF INTERPRETING	54
ELEMENTS	55
P	55
I	56
R	57
r	58
Summary of Notation for Elements	59
Interpretive Contexts	59
RELATIONSHIPS	59
The {P I} Relationship	63
The {I R} and {I r} Relationships	64
The {P R} and {P r} Relationships	65
Interpretive Contexts	66
STEPS AND SEQUENCES OF STEPS	66
Basic Steps	68
Exposure (68); Attention (68); Connection (68); Offering (68); Asking (69); Cognizing (69)	

Notation	69
Exposure of P to R	71
Attention by P to R	71
Steps that Offer	71
Steps that Connect	72
Steps that Clarify	72
Steps by R	74
Revealing	75
How (75); What (75); When (76); Who (76)	
Revelation	76
Steps by P	77
Cognitive Steps by P	77
Availability of Steps	79
Coordination of Steps	80
Sequencing of Experience	83
Intent	83
Interpretive Contexts	85
COMPLEXES	85
SUMMARY	89

CHAPTER VI

COVERAGE OF INTERPRETATION RESEARCH	91
INTERPRETIVE CONTEXTS	92
INDEPENDENT VARIABLES	93
Non-personal Services	93
Personal Services	93
Other Factors	95
DEPENDENT VARIABLES	95
Attention and Comprehension	95
Knowledge	96
Steps	97
P connecting with R (97); P connecting with I (97);	
Other steps by P (97); Others' steps (97)	
Relationships	97
Measures of {P R} (98); Measures of {P I} (98);	
Measures of {PRI} (98)	
Other Dependent Measures	98
VARIABLES CONTROLLED FOR	99
Attention and Comprehension	99
Variables Not Controlled For	99
SUMMARY	101

CHAPTER VII	
IMPLICATIONS FOR RESEARCH	102
THEMES	102
Interpreting versus Interpreting's Outcomes	102
Need for New Measures	104
Presence or Absence of R	104
Time	104
Mode Matching	105
FACTORS TO CONTROL	105
Attention and Comprehension	105
Elements	106
FACTORS TO MANIPULATE	107
The Subject of Interpreting: R	107
Cartifacts versus "Real" R	110
Exposure, Attention, and Interaction with R	111
{ P R }	112
Capabilities of P	113
Conditions of { PI }	113
Clarification	114
Communicative Techniques	116
Steps	116
MEASURES	117
Knowledge	117
Cognition	121
Critical thinking (122); Mindfulness (122);	
Cognigraphics (122); Development stages (123)	
Other Steps by P	123
Others' Steps	124
Relationships	124
Measures of "state" (125); Measures of "boundary"	
(126)	
General Measurement Techniques	127
Sources of Observed Effects	128
CHAPTER VIII	
A METAPHOR OF INTERPRETATION	130
EPILOGUE	132
GLOSSARY OF TERMS AS USED IN THIS DISSERTATION	133
BIBLIOGRAPHY	139

APPENDIX A	
<u>INTERPRETATION IS: A LIST OF DEFINITIONAL PHRASES</u>	152
APPENDIX B.	
CLASSIFICATION OF PUBLISHED RESEARCH	158
APPENDIX C	
NOTATION USED IN THE CONCEPTUAL FRAMEWORK	166

LIST OF FIGURES

	<i>Page</i>
Figure III-1 The "transmission" perspective of interpreting.	37
Figure III-2 The "shared understanding" perspective of interpreting.	37
Figure III-3 The "assisted experience" perspective of interpreting.	39
Figure IV-1 Schematic of the conceptual "coverage" of the three notions of interpreting	53
Figure V-1 The "assisted experience" perspective of interpreting	54
Figure VIII-1 A metaphor of interpretation	131

LIST OF TABLES

		<i>Page</i>
Table II-1	Research categories used to classify studies of interpreting published from 1972 through 1990.	18
Table II-2	Number of studies of interpreting published from 1972 through 1990 by research category.	19
Table III-1	Typology of contexts for interpreting.	32
Table IV-1	Number of research studies of interpreting published from 1972 through 1990 classified by three perspectives of interpreting.	42
Table V-1	Elements in the interpretive contexts.	60
Table V-2	Relationships in the interpretive contexts.	67
Table V-3	Steps by P in the interpretive contexts.	86
Table V-4	Steps by I in the interpretive contexts.	87
Table V-5	Steps by P₂ and by R in the interpretive contexts.	88
Table VI-1	Number of research studies published from 1972 through 1990 carried out in each interpretive context.	92
Table VI-2	Independent variables in studies of interpreting published 1972-1990.	94
Table VI-3	Dependent variables in studies of interpreting published 1972-1990.	96
Table VI-4	Controlled variables in studies of interpreting published 1972-1990.	100

ACKNOWLEDGEMENTS

Many people contributed to the work presented here, and in many ways. I want to acknowledge all those interpreters with whom I have discussed my ideas over the years: your frustrations were the impetus for this work and your skills and innovations the seeds from which it sprang. My sincere appreciation goes to the members of my doctoral committee: Al Wagar, who guided the final stages of the work and provided invaluable assistance in preparation of this manuscript; Grant Sharpe, who opened to me the universe of interpretation and supported the choice of paths which led to this culmination; Richard Carter, who provided the intellectual basis for my thoughts and continual intellectual refreshment; and Tom Waggener and Bob Lee, who supplied oft needed reality and relevancy checks. Thank you all. My greatest debt is for the unswerving support of my wife and son, whose sacrifices made the completion of this work possible. Thank you. I love you.

DEDICATION

**This dissertation is dedicated to all those who pursue the craft of interpreting.
May you see more often that gleam of revelation in someone's eyes.**

PROLOGUE

A man stands at the rim of The Canyon. Before him, a yawning chasm streaked with lively color stretches an unimaginable distance away, and down, down, down nearly as far as the eye can see. His jaw slowly returns to normal, but his heart continues to pound. His eyes remain wide with wonder, and his mind suffused with a sense of awe. But then the questions flood into consciousness: How big is it? How did it get here? Why are the colors so vivid, their banding so even? How far does it go? What will I find at the bottom: the footprint of a god, or the home of one?

Another person stands at the rim of The Canyon. Before her, a yawning chasm streaked with bands of colored rock stretches a mile or more away, and down, down it seems, incredibly, at least the same distance. Her heart pounds, her eyes widen with anticipation. And the questions come: How big is it? What kind of rocks is it cut from? How porous are they? What quality is the water flowing at the bottom? How many people will come waterskiing when it is filled?

Yet a third person stands at the rim of The Canyon. She has seen it many times before. Her eyes trace the path of the trail, down, down to the sinewy course of the river so far below. The questions surge into her mind: Why can't I camp down there whenever I want to? Thirty of us used to pack the horses in all the time - what did we do that's so different from these hikers nowadays? What's going to happen when my grandson grows up? Will anybody get to float down the river, or do we just leave it for the fish?

A fourth person stands at the rim of The Canyon. Before him the yawning chasm stretches down, down, and away. He, too, has seen it many times before. But he sees as well the three other people on its rim, and the questions that come to mind are their questions: Why is it? How did it come to be? How can it be used? For what can we best use it? He senses their wonder, their challenge, their frustration.

And he feels excitement from another question, his own question, in the forefront of his thoughts: What do I do to help the others find their answers? He looks once more at the handiwork of nature before him, then turns to begin his work.

INTRODUCTION

This dissertation offers a conceptual framework for studying the form of communication we call environmental interpretation. The framework emerges from a critical evaluation of how we study interpretation (scientifically, as a form of communication). The framework is offered as a step toward improving research in interpretation by establishing a more organized basis for inquiry. Improved research can contribute to improved practice, and improved practice of interpretation is important as the public plays an increasing role in resource management decisions.

The pursuit of knowledge benefits from the development of explicit conceptual frameworks (Kaplan 1964). Indeed, according to Kuhn (1970) such development is one criterion for the emergence of paradigmatic science, enabling the full force of scientific method to be brought to bear on a field's problems. A conceptual framework delineates and puts into perspective all the factors that are expected to make a difference in the design and interpretation of research. As used here, a conceptual framework is something less than theory (although it may encompass theories): it offers no general explanation of phenomena. But a conceptual framework can serve some of the functions that theory serves. A conceptual framework can help guide research decisions as to what to explore and under what conditions, what factors are worth investigating and which are to be controlled, and to some extent which measures and measurement methods to apply and how to interpret the results. In conjunction with related theories, it may lead to hypotheses or predictions for testing. As importantly, a framework can give significance to experimental findings. Within a framework the results of research can begin to build upon each other, creating a structure of scientific knowledge within which each addition has meaning and potential utility beyond the limited scope of its specific context.

The intent of this dissertation is to offer a framework for inquiry which may help to advance the profession and practice of environmental interpretation.

BACKGROUND AND SETTING

This dissertation deals with interpretation. But the term "interpretation" is subject to many interpretations. The next four subsections aim to set the reader on the right track, to give bounds to the discussion, and to provide a background and setting for the conceptual discourse that follows. The introduction then continues with an overview of the methods and literature used and concludes with a guide to the rest of the dissertation.

The Profession of Environmental Interpretation

Interpretation is a multi-talented term. Anything and everything, it seems is fair game for "interpretation," from life (Durant 1970), love (anonymous 1976), and existence (Owens 1968), to death (Ruitenbeek 1973), and taxes (Roy 1973). And, to be exhaustive, otherness (Gunn 1979).

The word *interpretation* derives from Latin for explainer, agent or negotiator. A number of professions have taken "interpreter" as a label. Thus, we have interpreters of foreign languages, oral interpreters (of stories and poems), aerial photo interpreters, and environmental interpreters (of natural science). Many other disciplines have adopted the term to describe all or portions of what they do: philosophers and religious scholars; performers of others' creations (music, drama, dance); critics of other's creations; legal scholars (as has often been noted, judges should interpret the law, not make it); and accountants, to name a few.

However, the most common use of *interpretation* (based on perusal of the card catalogue at the University of Washington Library) is in the sciences. Interpretation -- of theories, data, phenomena, statistics, etc. -- appears to be integral to mathematical, physical, psychological, cultural, social, and biological sciences.

The connection between science and interpretation has deep roots. In Rome over 1,600 years ago, Quintilian recognized some basic tenets of the natural science interpreter: the necessity of sparking a desire to learn and of sensory experience (Keatinge 1910). As the scientific age dawned in the seventeenth century, John Amos Comenius formulated a system of nature teaching which embodied interpretive

principles (Keatinge 1910). He urged that appeal be made to sight, touch, and the use of models and pictures. He also taught the value of relating an object to the experience of the student, and advocated different approaches when teaching children and adults.

Over the course of the current century, a recognized profession of environmental interpretation has developed. Originating in parks and natural areas, the profession has expanded to encompass cultural, historical and scientific subjects in diverse settings. Professional associations, newsletters, and conferences provide forums for sharing information on interpretive practices and philosophies. A peer-reviewed professional journal (Journal of Interpretation) was first published in 1976, and research articles on interpretation appear in other professional and scientific journals.

It is this interpretation -- the scientifically oriented profession of making the arcane and complex interesting and understandable -- with which this dissertation deals.

A Role for Interpretation

Like all human pastimes, interpretation can occur for many reasons. It can be done because the interpreter enjoys doing it. It can be done to entertain or to bring enjoyment to someone else. It can be done to enhance recreational experiences. These are worthy reasons to do and to learn how better to do interpreting. But interpretation also can be and is put to larger social purposes. We live in a world of limited resources. Use and abuse of those resources is now, and portends to be for the foreseeable future, a major issue facing society. Interpretation plays a role here.

In American society, at least, public access to resources (in the broadest sense) is a given; so is direct and indirect public participation in deciding the management of those resources, whether public or private. Endemic orchids can be admired, or trampled under jogging feet; paleolithic carvings can inspire, or be overwritten with graffiti; waterways can be swum and fished in, or cheaply hold society's

excreta; factories can provide jobs and economic strength to a community, or be forced elsewhere by community demands; ancient forests can be preserved, or additional years' return provided on existing social and capital investments; neighborhoods can be preserved, or faster freeway access provided for all; rivers can run free, or keep the wheels of industry turning and light our evenings. Or we may find solutions somewhere in between.

Such individual and social decisions are, at their core, a weighing of values, but that weighing takes place within a framework of experience and knowledge. Yet we, the public, the decision-makers, often have limited experience with the resources and little if any expertise in the social, scientific or technical fields relevant to their management. How are values to be developed and a framework of experience and knowledge constructed? Individually and collectively, we depend on experts for our understanding of resources and resource management issues. Successful communication is required. Whether this communication occurs in educational environments with a goal of general learning, or in recreational settings with a goal of increased awareness and appreciation, or in the course of decision-making processes where specific instances need to be understood, in all cases such communication calls for the arcane and complex to be made interesting and understandable. In other words, it calls for interpretation.

The Profession of Interpretation, Interpretation, and Interpreting

Interpreters, as professionals, do many things. Not all are interpretation.

Dealing with the managers of a park or the board of directors of a nature center, supervising staff, preparing budgets, fixing vandalized exhibits, marketing the program -- all are integral parts of the profession. It is important for interpreters to be trained and to gain competence in these activities (and even to bring interpretive skills to them). But they are not directly related to "doing interpretation", per se, and I exclude them from my analysis.

Other concerns relate to doing interpretation, but in a supportive, rather than constitutive role. Planning, doing topic research, constructing interpretive materials,

gaining basic science skills, fall into this arena. Again, it is important for interpreters to be trained in these skills, and for relevant research to develop the profession's competency. But they do not constitute "doing interpretation".

A third set of concerns are party to "doing interpretation", but fall outside the sphere of "interpreting". Some are sociological: group dynamics, visitor and agency characteristics, interpretation as a profession. Others are communicational: networks (getting the public and the interpreter or interpretive medium in contact with each other), logistics of various media, speaking and writing skills. We need to study and to apply interpretive communication with an understanding of these arenas. But they are not the same thing as interpreting, and have their own sets of questions, settings, and methods for inquiry, and their own results.

Interpreting, then, is the core of all this -- the communicative acts or series of acts around which these other activities, and the profession, revolve. This dissertation deals specifically with interpreting, and how research into interpreting might be strengthened. From here on, *Interpretation* is used as a general name for the communicational aspects of the profession and for their product; *Interpreting* is used to denote the communicative process by which interpretation comes to pass.

Science and Art in Interpretation

"Interpretation is an art, which combines many arts." This has been a tenet of the interpreter's profession at least since Tilden first published it as one of his six principles in 1957. Few interpreters would disagree. But science, also, can play a vital role.

A Calder sculpture is art. But it could doubtfully be brought about without scientific understanding of the tensile strength of steel or calculation of fulcrum position in first class levers. Egyptian painting is art, but the science of perspective drawing added immeasurable depth and richness to canvases after the sixteenth century. Michelangelo's temperas are art, but the pigments created through modern chemistry make possible Hare's vibrant silhouettes.

Likewise, scientific inquiry can augment the art of interpreting. Scientific inquiry may better characterize basic communication materials from which interpretations are crafted, establish rules and frameworks to guide applications and performance, and contribute to the palette with which the arcane is illuminated.

Like all communication professionals, interpreters are concerned with developing and improving their practices and processes. Scientific research into interpreting can be one source of knowledge for improvement. A science of interpreting is not antithetic to the art of interpreting. Rather, it is complementary. And I doubt the former can ever supplant the latter.

A GUIDE TO THE DISSERTATION

This dissertation offers a conceptual framework to guide research in interpreting. Since knowing where you are is essential to guiding yourself anywhere else, I start by looking at the current state of interpretation research. I then analyze what makes interpretive communication distinctive, and explore some limitations of how this communication has been conceived by researchers. Finally, I offer a more encompassing conceptual framework for interpreting, identify which of its factors have been touched upon by previous research and which have not, and explore avenues for future research.

Chapter I presents the methods and procedures used and the literature analyzed for the various parts of the dissertation.

Chapter II assesses the scientific character of interpretive research, through a content analysis of the function and methods of published research. Considerable research has been done in the name of environmental interpretation, and the results have been useful to interpreters. But to what extent is that research allowing us to accumulate a body of scientific knowledge? Put another way, has what we have learned from research on interpretation enabled us to learn even more, and learn it more effectively? Or does each study tend to be an isolated contribution that does not augment a larger body of understanding? **Chapter II** explores these questions;

the findings suggest that interpretive research has followed the latter pattern. So, what might be done to make our research more effective?

One measure of a science is the rigor with which it conceptualizes and delimits its field of inquiry. **Chapter III** looks at the question *What is interpretation?* using the method of conceptual analysis. Bounds and contexts for interpreting are proposed and its distinguishing conditions identified. This forms the core of the conceptual framework developed. Three distinct perspectives that guide thinking about interpreting, and thus research on it, are identified.

Chapter IV assesses, via content analysis, the relative pervasiveness in the published research of the three perspectives of interpreting, and discusses their strengths and limitations. It appears that researchers have been operating within limiting conceptions, and with limited operationalizations, of what it means to interpret. If research in interpreting continues in this mode, it can progress only so fast and only so far. We may continue to pursue scattered studies, each perhaps important in itself, but without developing and building upon a body of knowledge about interpreting. The profession and the science of interpretation can and need to do better.

The conceptual framework offered to improve the study of interpreting is articulated in **Chapter V**. Building from one of the three perspectives identified in Chapter III, conceptual analysis is used to delineate factors -- elements, steps, their relationships, and other conditions -- relevant to the structure and process of interpreting.

Chapter VI looks at the factors that have been studied in existing research on interpreting (based on content analysis of published research) and those that have not.

Chapter VII articulates the factors relevant to interpreting and discusses avenues and methods of inquiry for future research. Some hypotheses about interpreting and tests of the framework are highlighted.

Chapter VIII concludes with a metaphor for thinking about interpretation.

A glossary of terms used in the dissertation precedes the bibliography.

SUMMARY

The conceptual framework provided in this dissertation:

- 1) distinguishes environmental interpretation from other forms of communication and identifies key elements of interpretive communication;
- 2) shows that much existing research on interpreting has been constrained within limiting perspectives and has covered only certain factors while neglecting others;
- 3) provides a typology of factors relevant to interpreting and a notation system for manipulating them;
- 4) identifies research questions and methods that can be applied to interpreting and introduces some concepts from communication theory that have potential utility for interpretive research.

No conceptual framework, nor full-blown theory, is ever complete or final. The comprehensiveness of this framework is necessarily limited by the pioneering nature of the effort and by one individual's powers of deduction and intuition. Nevertheless, such a framework can provide a fresh standpoint for further investigation and, hopefully, can stimulate others not only to use it, but to challenge and test its view of interpreting. If this brings us a step closer to a more complete scientific understanding of interpreting, it also will bring us, I trust, to a better practice of interpretation.

CHAPTER I

METHODS, PROCEDURES, AND LITERATURE USED

This dissertation presents an intellectual inquiry, not (predominantly) an empirical one. As such, the process and product of the dissertation revolve around methods from the conceptual side of science -- inference, intuition, and the capturing of insight to formulate a sense of the subject at hand. Applied in a systematic fashion through the method of *conceptual analysis*, these ideational tools were used to delineate content and structure for what it means to interpret. The content and structure were then elaborated to articulate a conceptual framework for research in interpreting. The conceptual inquiry was augmented and grounded through *content analyses* of existing research studies.

Three bodies of literature were used in the development of the dissertation. General literature on interpretation provided grist for conceptual analysis. Research studies of interpreting also provided grist for conceptual analysis, and were the data source for the content analyses. Works on communication theory helped frame the conceptual analysis process and development of the conceptual framework.

CONCEPTUAL ANALYSIS

Central to the dissertation is the method of conceptual analysis -- a systematic means for drawing distinctions between and within concepts and their associated terms (Audi 1983), based upon usage (written or spoken statements) of the concept. Conceptual analysis illuminates (through specification, deduction, inference and similar tools) the content and structure of a concept to yield a set of conditions that are necessary and sufficient for applying the concept.¹ As Audi points out, to be useful an analysis need not yield a complete set of necessary and sufficient

¹By content, I take Audi to mean the elements that are being talked about, and by structure I take him to mean the relationships of those elements and their ordering. As discussed below, other conditions can be addressed, as well, to explicate a concept.

conditions; in fact, few analyses ever do. Analysis merely needs to "bring out the content or structure of the concept in such a way as to clarify the concept and indicate its relation to at least some other concepts" (:90). Conceptual analysis is a long-established method of inquiry in philosophy and in this century has been applied to a widening range of problems inside and outside of philosophy.

Application

For this dissertation, conceptual analysis was applied as a process, not an end in itself. The process was used to "tease out" from multifarious statements about interpreting, the underlying substance of what is being talked about and what is being said about it.

Conceptual analysis was applied at three stages in the development of the conceptual framework for research in interpreting. Conceptual analysis was the basic tool used to delineate the scope, range and distinguishing characteristics of interpreting, to distinguish it from other forms of communication, and to identify conceptual perspectives of interpreting common to the profession (Chapter III). Conceptual analysis was applied to help articulate the structure and processes of interpreting and to develop a typology of its relevant factors -- what researchers can and ought to be studying (Chapter V). Lastly, conceptual analysis helped to elaborate the framework's implications for research in interpreting (Chapter VII).

Literature Used

The conceptual analysis drew upon a wide body of writings in the field of environmental interpretation, including philosophical and historical treatises, textbooks, handbooks, agency reports and manuals, research and professional journals, association publications, and graduate theses. Appendix A and the bibliography document these.

Form of Analysis

The form of analysis used followed Carter's (1985) perspective on observing, which is based upon the vertical model of science adopted by Hempel (1952), Kaplan

(1963), and others.² Descriptions of interpretation were examined to identify (following Carter), various "conditions": elements (people, places, things, ideas, etc.), steps (actions taken by elements), relationships among elements, steps, and other relationships, and other conditions necessary and/or sufficient for each. Also looked for were conditions of structure, including spatial and temporal order among elements, steps, and relationships.

Procedures

For delineating what interpretation is (Chapter III), I assembled a set of phrases describing interpretation (listed in Appendix A). The phrases were analyzed for elements, steps, and relationships. Lists of these were made. Also, "sketches" of each description of interpreting were made, showing who does what when. The lists and sketches were compared, linked together, and elaborated to develop a coherent "sense" of what it means to interpret. In an iterative fashion (since any "sense" of something develops through its use as much as through its specification) this "sense" of interpreting was used to contrast interpreting with other forms of communication, to delineate conditions specific to interpreting and the contexts for studying it, and to delineate extant perspectives of interpreting.

For Chapters V and VII, the "sense" of interpreting and its elements, steps, and relationships worked out in Chapter III were used to articulate the conceptual framework. In addition, research studies were examined, using the same conceptual

²The vertical model separates three realms of scientific endeavor: "conditions", "observations", and "ideas". "Conditions" are, roughly, physical and mental realities and "ideas" are, roughly, abstract notions, such as rules of logic, about how "conditions" relate to each other. "Conditions" and "ideas" reference those concrete and abstract things existing in the world, separate from us and from each other, about which we form "observations" (theories, laws, facts, etc., each of which contains something of "conditions" and something of "ideas"). (While not exclusive to instrumentalism, this model strongly reflects that philosophical approach to the issue of how we achieve knowledge.) For conceptual analysis, "observations" are of interest primarily to help isolate and organize the "conditions" and "ideas" of the concept at hand.

process, to "tease out" further conditions and ideas for consideration in the study of interpreting.

CONTENT ANALYSIS

The conceptual work was grounded to the existing interpretation research literature at three points, in three different ways. Each instance used *content analysis* of the same body of research articles, but each had a different "target" (Krippendorff 1980) or scheme for analysis. Content analysis is "a research technique for making replicable and valid inferences from data to their context" (Krippendorff 1980:21). It provides a way to describe the content of communications and to make inferences about the communications' "meaning" in an objective, systematic way.

Application

Three content analyses were performed. (Full descriptions of each analysis scheme are contained in the relevant chapters.)

The content analysis for Chapter II assessed the "scientific character" of the body of interpretation research. The analysis target was the purpose and research method of each study. The results point to the need for the conceptual work offered by the dissertation.

In Chapter IV, the "conceptual character" of interpretation research is assessed. The target for this second content analysis was the conceptual perspective of interpreting to which each research study adheres. The results show the relative extent to which three different perspectives of interpreting have framed research and set the stage for articulating a more encompassing research framework.

For Chapter VI, the third content analysis assessed the coverage of existing research. The analysis target was the context and independent, dependent and controlled variables in each research study. The results show which of various factors in the proposed research framework have been studied and which have not.

Literature Used

The literature used for the three content analyses included all articles reporting research on interpreting published in the Journal of Interpretation from 1976 to 1990 (including a separate research monograph), in The Interpreter from 1978 to 1988 (excluding 1982-83), and in the Journal of Environmental Education from 1969 to 1990. (These are, respectively, the official journals of the largest and second largest interpreter associations in the United States [they merged in 1988], and the premier journal of environmental communication). In addition, all research reports on interpreting issued by the USDA Forest Service from 1972 to 1990 were analyzed. Research studies cited in the reviewed articles also were analyzed, encompassing articles from five additional journals and research reports from several government agencies. See Appendix B for a complete list of the studies analyzed.

This body of literature is believed to reflect the true status of interpretation research as a whole, in terms of the functions and methods of research, the underlying perspectives of interpreting, and the factors studied. The choice of journals could have introduced bias, however. Research of potential significance to interpreters appears in many publications. If different approaches, perspectives, or interests have appeared in journals other than those reviewed, they may not be adequately represented here.

Procedures

The three content analyses were linked in that the coding for each was done at the same time, during the same reading of the research reports.

Each report was read in its entirety (in approximate order of publication date), and notations made highlighting the background of the study, experimental variables, hypotheses (if any), and researchers' statements of purposes and results. Each report was reread and the data coded for the three analysis schemes. After a period of several months to allow details of the studies to recede from memory, the initial coding results were reexamined. Some minor changes resulted. The content analyses were carried out by the author only; no estimates of reliability were made.

However, the process of duplicate review and use of pre-set coding schemes controlled for obvious sources of bias. I believe this procedure provided sufficient reliability for the purposes of this dissertation.

CHAPTER II.

THE SCIENTIFIC CHARACTER OF INTERPRETATION RESEARCH

This chapter assesses the scientific character of the body of published research in interpreting. By "scientific character" is meant the utility of the research in advancing the field, in building upon the work of others, in contributing results that have relevance beyond the scope of an individual study itself. Science advances most effectively when research expands upon, more fully elaborates, or tests a coherent body of thought; science advances less surely when research is scattered, addressing problems perceived, and conceived, individually. Research on interpreting appears to be making little progress toward developing a body of scientific knowledge about interpreting.

CATEGORIES OF RESEARCH

I adapted the content analysis method Tedeschi et al. (1981) used to assess the character of social psychology research. They categorized all articles appearing in two leading social psychology journals over 2 years, using eight major research categories developed to reflect the purposes and methods of research. Their intent was to answer the question, "If social psychology is truly a scientific discipline, has work done by those in the field allowed us to accumulate a body of scientific knowledge?" (p.161). I have the same intent.

Table II-1 compares my research categories with those of Tedeschi et al. I kept separate two of their subcategories, and collapsed the others. I also collapsed two of their major categories -- exploratory studies and correlational studies -- into one. Their distinction of correlation studies was based heavily on theoretic-methodologic issues unique to a highly statistics-driven field. In interpretation, on the other hand, correlation-type analyses are used for seeing "what happens if" and are thus exploratory studies, or they are used for specific hypothesis testing, in which case they fall into another category.

Table II-1 Research categories used to classify studies of interpreting published from 1972 through 1990.

Tedeschi, et al.	Istvan	description
Methodological	1. Methodological	- to develop or improve a particular technique of inquiry
Typological	2. Typological	- to classify types, kinds, processes or relationships
Exploratory	3. Exploratory and correlational	- to "see what happens if"; to discover relations, if any, among variables. Usually, causal inferences are not made, and hypotheses are not examined.
Correlational		
External validity	4. External validity	- replication studies, or studies to demonstrate the reliability of previous findings in new settings or to establish alternative operationalizations.
Intuitive -demonstration	5. Intuitive - demonstration	- to evaluate a hypothesis based on intuition, common sense, or suggested by the literature, but not deduced from or directly suggested by theory.
-associated theories	6. Intuitive - associated theories	- to evaluate a hypothesis developed through analogy with one or more existing theories in other fields.
Hypothetical-deductive -demonstration	7. Hypothetical-deductive	- when the major hypothesis is derived from existing theory, and the results demonstrate the validity of a hypothesis, extend the domain of the theory, or reformulate the theory into quantitative terms or as a model.
-extension		
-quantification		
Strong inference -formal	8. Strong inference	- to make a discriminating test between competing hypotheses generated by two or more existing theories, by a theory and an intuitive hypothesis, or between two or more intuitive hypotheses.
-formal v. intuitive		
-2 or more intuitive		

The authors' own statements of research intent were used for classification when available. Otherwise, indicators such as the presence or absence of hypotheses, the source of hypotheses, the type of analysis performed, or the stated source of ideas, methods or choice of variables were used to assign studies to the eight categories. After a waiting period, review of the initial results led to one reclassification. The category to which each study was assigned is shown in Appendix B.

THE CHARACTER OF RESEARCH IN INTERPRETING

Table II-2 shows the number of reports classified into each research category. No hypothetical-deductive or strong inference studies were found. The most frequent type of research was the external validity study (11 of 36), followed by the exploratory and correlational study (10 of 36).

Table II-2 Number of studies of interpreting published from 1972 through 1990 by research category.

Research category	Number
1. Methodological	5
2. Typological	1
3. Exploratory & correlational	10
4. External validity	11
5. Intuitive demonstration	5
6. Intuitive associate theory	4
7. Hypothetical-deductive	0
8. Strong inference	0
TOTAL	36

Although there are no established theories of interpretation from which readily to draw hypotheses, several conceptions, or points-of-view, about interpreting exist that might be granted 'theory' standing. None, however, appear to have been used to generate testable hypotheses. Thus, interpretation research has not utilized some of the more powerful tools of scientific inquiry (Platt 1964). We have yet to begin testing hypotheses derived from explanatory theories in our field, let alone pitting one theory against another.

Nor has the general tool of hypothesis testing been widely applied. Given that interpretation lies at the juncture of many, more well established sciences, we might expect the number of studies evaluating a hypothesis drawn from associated theory to be higher than 4 out of 36. Even the evaluation of intuitively-generated hypotheses has been limited (5 studies).

The preponderance of replication experiments (11 of 36) may indicate we are becoming more confident of that which we already know (assuming positive results from these studies). Alternatively, it may indicate researchers are in a rut. Even so, the field clearly is still casting about for ideas -- witness the ten exploratory studies. Methodological studies would help advance a field searching for new ground. Few (5) have been done, however.

Perhaps these results ought not to surprise us. Most interpretive research has been driven by agency concerns, to wit: to evaluate (and improve or justify) a current interpretive program, to test (and thus choose) one or another interpretive method, or to demonstrate the effectiveness of interpretation in meeting an agency's management needs. The research questions asked and the methods employed to answer them have mostly been determined by these agency needs, while the research settings have been as varied and scattered as the agencies that instigated them. It follows, then, that in the absence of a guiding framework, research in interpretation would tend to be scattered and yet follow, to a great extent, a circumscribed research repertoire. In a sense, we may be following a "research paradigm", even though we have no theoretical one.

The result of following this "paradigm", however, is that research on interpretation, as a whole, has not been optimally structured to construct a body of scientific knowledge. It would be interesting to perform a review similar to this on a regular basis to track future progress in interpretation research.

The next chapter begins a quest to take us out of the current mode of research by establishing a stronger conceptual basis for inquiry.

CHAPTER III.

WHAT IS INTERPRETATION?

What is interpretation? I offer here not a definition of the term but, rather, an explication of the concept. Little conceptual work is available for understanding what interpretation is, especially what it is as a form of communication. This chapter takes a step toward filling that gap.

BACKGROUND

Interpreters have tackled in a number of ways the issue of what their field is. In 1957, Freeman Tilden eloquently set forth in Interpreting our Heritage a rationale and six guiding principles for interpretation. Tilden's thoughts remain the basic tenets of the profession. Grant Sharpe's Interpreting the Environment (1976, 1982) provided a compendium of interpreters' experience in the practical execution of personal interpretive services (talks, walks, etc.) and non-personal services (signs, displays, brochures, etc.). This book has been the most widely used text in undergraduate interpretation curricula (Hartmann 1983). Other authors (e.g. Grater 1976; Frandsen 1985) have added to and supplemented these foundations for learning the profession.

Missing, however, from these works on why and how to interpret is a rigorous focus on interpretation as a form of communication. How is it different from other forms of communication? What does one do when one interprets? What does it mean to have interpreted something? These questions - relating to both applied and conceptual understanding of interpretation - all need asking and answering. Some authors have touched upon them.

On the applied side, Boulanger and Smith (1973) and Dick et al. (1974) provided summaries of principles from education and communications pertinent to interpreters. Cherem (1977) offered a list of active (verbal) and non-verbal language techniques appropriate for interpretive communication. Ham (1983) surveyed experimental results from cognitive psychology, with examples of practical

applications to structuring the forms of interpretation known as personal services. However, none of these efforts analyzed how interpretation relates to other communicative acts, nor addressed the question of what constitutes an interpretive communication.

On the conceptual side, Cherem (1977) proposed a model of interpretation encompassing many aspects of the profession, but made no distinctions about interpreting per se, lumping all communicational issues as "techniques and services". Hammitt (1981a) offered support for Tilden's principles from the theory of cognitive mapping. He found that five of the six principles could be elaborated and understood in terms of this theory of how individuals process and store new information. (The principles are: relate to the personality or experience of the visitor; reveal, don't just offer information; provoke the visitor's curiosity; present a whole rather than a part; and address children differently. Hammitt could not see how the sixth, interpretation being an art which combines many arts, fit the theory.) But Hammitt offered no new perspectives on how interpreters might influence cognitive maps. Moscardo (1988) drew from cognitive psychology to suggest we consider the "mindfulness" of visitors; Cable et al. (1986) suggested interpreters incorporate Fishbein's theory of attitude formation into their measurements of interpretation effectiveness. While potentially valuable, these suggestions are of limited scope, and neither Moscardo nor Cable et al. provide a conceptual framework for interpretation research.

Machlis and Field (1984) did pursue the implications of a wider viewpoint. They challenged practitioners and researchers to apply sociological concepts and theory to interpretation. Only some of these, however, have import for the communicational aspect of interpretation.

There is philosophical but little conceptual work, then, to help us understand what interpretation is and what it is not, as a form of communication. Through the method of conceptual analysis, the remainder of this chapter provides a rigorous look at the concept of *interpreting*.

As described in Chapter I, a set of phrases describing interpreting (mostly in the form, interpretation) was assembled from diverse sources. These phrases are listed in Appendix A. Conceptual analysis was applied to delineate elements, steps, relationships, and other conditions in the phrases and develop a coherent sense of the content and structure of interpreting, based upon the collected wisdom of the profession. The citations in italics which follow are drawn from the phrases in Appendix A to illustrate the points being made about interpreting.

CONDITIONS DISTINCTIVE OF INTERPRETING

Most authors listed in Appendix A and cited here agree that interpretation is a form of communication, or at least that communicating is integral to it: ... *a particular type of communication (anon.)*, ... *the communication of information (Beechel)*, ... *a process of explaining (Biggs and Roth)*, ... *that body of communication, devices and facilities (Brown)*, ... *people talking (Edwards)*, ... *attractive communication (Edwards)*, ... *to establish communication (Hof)*, ... *translation into the language of the people (Lovelady)*, ... *communicating ideas (Sharpe)*, ... *to translate or explain (Wallin)*.

But there are many kinds of communication: persuasive, mass, personal, interpersonal are some common divisions. Each overlaps with the others, but each also has aspects that make it unique or at least discriminate it from the others for practical and research purposes. The key question, then, is what makes interpretive communication, interpretive? The answer lies in interpreting's participants and their roles and actions vis-à-vis each other.

Public, Resource, Interpreter

A key aspect that emerges from the analysis of phrases defining interpretation should come as no surprise to interpreters. It is that three "elements" are necessarily involved, and involved more or less equally, in interpreting. These three elements are, roughly: someone for whom interpretation is being done, something which is being interpreted, and an interpreter.

Roughly, because this specific phraseology carries with it preconceptions about the roles and actions of each body and of their relationships. The conceptual analysis is better served by employing some neutral (or at least more neutral) notation to facilitate the discussion. I use the notation **P**, **R**, and **I**.

P is the person(s) participating in the interpretation, who is not the professional interpreter. **P** often is conceived as the visiting public, but interpretive communication need not be so limited.

R is the thing (Latin: *res*) involved in the interpretation. Traditionally, this has been a resource -- natural, cultural, recreational -- and we will not go too far astray if we read **R** as such. But the concept of a resource carries considerable baggage of its own. We need not let relative value or stewardship responsibility delimit our interpretive activity; such restrictions may be agency concerns, but are not distinctively interpretive ones.

The third participant, **I**, is the interpreter who choreographs, if you will, the interpretive dance. **I** may participate through personal services like talks, walks, and point-duty or through non-personal services like signs, brochures, and exhibits.

Revelation

The concept of revelation appears basic to interpreting: ... *to bring to light an underlying coherence or sense (Taylor)*, ... *revealing meanings and relationships (NAI)*, ... *the revelation of significance (Edwards)*, ... *the revelation of a larger truth that lies behind any statement of fact (Tilden)*. That interpretation is revelation is one of Tilden's six principles. Revelation implies that something about **R** is unknown or hidden from **P**. Interpreting reveals it.

Revelation implies at least some exposure and attention to **R** by **P** prior to the interpreting, else hidden has no meaning. If the interpreter offers some idea or concept or feeling about **R** without **P** having ever experienced **R**, **P** can only make something of what is offered, not of **R**. Only when **R** is made focal can revelation occur and something offered by **I** become more than an isolated "fact". As Tilden

admonished, "Interpretation should aim to present a whole rather than a part". (1967:40).

Revelation also implies that interpreting must concern itself with conditions in at least three points in time: prior to interpreting (incomplete awareness of **R**), during interpreting (attention to something new about **R**), and after interpreting (more complete awareness of **R**).

Experiencing

Interpreting reveals. But how does revelation come about? The key appears to be **P** experiencing **R**: ... *people perceiving and experiencing an environmental resource (Hammitt), ... the visitors' self-experience (Carl)*. This can, of course, be direct experience: ... *firsthand experiences with that site or with subject matter and real objects found at that site (Cherem)*. But there are ways **P** may experience **R** other than or in addition to directly. **P** may experience **R** through a model or surrogate (\mathbb{R}). **P** also may be exposed to others' experiences with **R**, for instance **I**'s or another **P**'s (P_2) ... *sharing of an experience (Files)*. **I** or P_2 may relate other people's experiences, as well.

In any case, **P** has a substantive and active role in interpreting. And that role entails not just that **P** interact with **R** and/or **I**, but perceive **R**: think about it, make something of it, and assign significance and meaning to it.

Assistance

The role of **I** in interpreting is to assist **P** to experience **R**, to facilitate revelation. *Your role is as facilitator to the visitors' self-experience rather than as interpreter of the "facts" to them (Carl), ... aiding people in perceiving and experiencing an environmental resource (Hammitt), ... the facilitation of a relationship between an individual and his or her environment (Hof), ... to assist the visitor in developing a keener awareness, appreciation, and understanding of the area (Sharpe)*.

Assistance entails interaction by the interpreter with **P**. It implies that the interpreter has special skills and/or knowledge and/or prior experiences. And

assistance implies that the interpreter uses those special skills in support of P's activities, not in lieu of them.

Conditions Not Distinctive of Interpreting

Four conditions often mentioned by definers of interpretation do not offer clear distinctions.

Place? Some authors see the place of the interpreting as distinctive: ... *in outdoor recreation settings (Sharpe)*, ... *experiences with that site (Cherem)*. They emphasize its occurrence on-site, or within particular natural or cultural milieus. But if "place" is necessary, off-site interpretation (a widely used part of many interpretive programs) becomes an oxymoron. It would exclude such clearly interpretive activities as talking about raptors in a school classroom, with an owl perched on your arm. And if "place" were sufficient, then it could be argued that any communicating taking place in the specified milieu would be interpretive. But a politician announcing his reelection campaign on the steps of the Capitol can scarcely be said to be interpreting that edifice. So place is neither necessary nor sufficient to delineate interpretive communication. This is not to say, however, that place may not affect interpreting.

Topic? Many authors also find distinctive the topic of the communication: ... *our natural, cultural, human and scientific heritage (Beechel)*, ... *environmental knowledge (Brown)*, ... *the resource (Fischer)*, ... *an environmental resource (Hammitt)*, ... *natural, cultural and recreation resources (NAI)*.

But history would indicate no such limitation. The profession got its start focussing on the natural environment, but it quickly expanded to include a wide variety of cultural and historical topics as well (see Cherem 1977 for a list). Science museums and breweries, technology centers and airplane factories all employ interpreters today to communicate with the public. Interpretation seems inclusive with regard to its topics, rather than exclusive. While certain topics may appear to lend themselves to interpretive communication, it will be more useful to let human creativity rather than arbitrary definition set the limit. Such openness has a practical

side as well: it enables researchers to cast a wide net in pursuing both ideas and examples for inquiry into interpretation.

Audience? Some authors find distinctive a certain property of the people being communicated with: ... *the visitor (Carl, Fischer, Sharpe, Wallin)*. They are in a "leisure" frame of mind and are exposed to the interpretive program for recreational purposes or at least as part of their recreation (Field and Wagar 1973). But leisure status clearly is not sufficient, else the lifeguard yelling at the boys to stop dunking each other would be interpreting. Nor is leisure status necessary. A school class visiting a forest, or a wildlife commission studying elk damage there, can benefit from interpretation just as much as the vacationing public. However, the status of the people is relevant to, if not distinctive of, interpreting. This issue is approached further when the nature of interpreting's constituents is explored.

Outcome? Some authors find distinctive the outcome -- the effects -- of the interpretive communication: ... *stimulates discourse on environmental problems, and results in environmental reform (Brown)*, ... *its [the resource's] perpetuation through the park's management objectives (Fischer)*, ... *to encourage future experiences (Simpson)*.

But clearly, outcome -- *a posteriori* conditions -- can be neither sufficient nor necessary to distinguish -- *a priori* -- a concept. Else, like pornography, we can never know if something is interpretation until we see it. The intended party need not answer the phone for us to have properly placed a phone call. Outcome, however, can be a measure of more or less success. And this measure can be most useful in directing future application of the concept (Tom never answers at 3 p.m. but most always at 6 p.m.).

What about expected outcomes? Are objectives distinctive of interpretive communication? Perhaps. But they appear more relevant to defining the agency's interest in employing interpretation than to discriminating interpretive from other forms of communication. First, there is considerable range to the objectives posed by interpreters, and the depth and nature of these have changed considerably over

time. Second, the set of objectives most often cited currently -- to accomplish management objectives, to educate, to change attitudes, to persuade, to goad into action -- can all be accomplished through means other than interpretive communication, and even non-communicationally. The interpreter is part of a team working to bring about these goals; but agency success is not the same as interpretive success. Hopefully the interpreter, and interpretation, bring something unique to the agency's tasks. It is that unique something I am delineating here.

On a philosophical, as well as practical level, a distinction based on objectives confuses motives with means. If we are to do a better job of interpreting, we must better understanding and master means. Then we can apply them to our changing motives.

CONTEXTS OF INTERPRETING

In what contexts do **P**, **R**, and **I** associate? These are the contexts of interpreting where research might be carried out. There are four situations of interest, and three types of interpretive service for each; interaction may or may not be available. Thus, $4 \times 3 \times 2 = 24$ contexts exist (see Table III-1).

Communicative Situations

The four situations are:

1. **P** not in the presence of **R**. **P** can experience no revelation, perceive nothing new, about **R** except through memory or as mediated by someone else.

A person stands alone in the city. She can self-inform about her surroundings. She is oblivious of The Canyon far away (unless she has seen it before or other people have told her about it or shown her pictures of it). She can make nothing (or nothing new) of The Canyon unless she gets help from someone and/or goes to see it.

2. **P** in the presence of **R**. **P** may self-inform in regard to something(s) significant or meaningful to her.

A person stands at the rim of The Canyon. She notes things significant to her and comes to conclusions meaningful for her. Questions which arise may lead to further observing -- seeking new vantage points, pulling out the binoculars, even kicking a rock or two. But questions may go unanswered. And she is oblivious to questions unasked.

3. **P** and **P₂** (one or more additional people) not in the presence of **R**. Each can try to inform the other of her own realizations about things significant or meaningful. But not everything is easily shared.

Two people stand together in the city. They can make nothing of The Canyon far away, unless one or the other has seen or heard about it. If so, they may share significant (to one or both) thoughts about it. Questions by one can be answered, to the best ability of the other. But unless one person is quite familiar with The Canyon, questions are likely to go unanswered ... and unasked.

4. **P** and **P₂** in the presence of **R**. Each can try to inform the other (as in 3, above). Having **R** to refer to may allow certain ideas to be more easily shared. Also, **P** and **P₂** may work together ("two minds are better than one") to reveal something more about **R**.

Two people stand at the rim of The Canyon. They both note things significant to themselves, and reach meaningful conclusions. Then one speaks: "I wonder what that red band is?" and points. "Gee, I don't know. But I've heard that iron makes rocks red. Maybe it's got iron in it." And so on. The two help each other, bringing (potentially) more things to attention than one alone would notice, and finding more and/or different meanings through their interaction.

Interpretive Cases

The three interpretive services for each situation are:

- a. No interpretation.

b. **Non-personal interpretation services.** A live interpreter is not present (or at least expected to be present) during the use of the service by **P**. Non-personal services include (following Sharpe 1982): Audio-devices [and video], signs and labels, interpretive publications, self-guided trails and auto-trails, and exhibits. Non-personal services are denoted as **II**.

c. **Personal interpretation services.** A live interpreter is present during the use of the service. Personal services include (Sharpe 1982): Information duty, conducted activities, interpretive talks, and living interpretation (role playing, performances, or demonstrations).

Interaction

In addition to the communicative situation and interpretive case, interaction between the participants may or may not be available. Interaction is important. It permits both iterative "clarification" and "tuning" of communication. When interaction is lacking, such tools are unavailable.

Clarification takes many forms for many purposes. Some common ones are clarification of reception ("What did you say?"), of language ("What does that mean?"), of what is being talked about ("No, that one over there", or simply pointing with the hand), and of what is intended, i.e., the point of the communication ("So why did you tell me it's blue?").

Tuning involves tailoring communication to the specific situation, with regard to both **R** and **P**. "Seeing as how an eagle just landed in front of us, let's forgo the lecture on shale deposits", and "I heard you say you're a truck driver. Did you know the tree from that stump would have taken seven semis to haul out of here?" Perceived interest, past experiences, and current happenings (and many other things, potentially) all may inform, or demand, tuning.

Table III-1 organizes the communicative situations, interpretive cases and interaction possibilities into "interpretive contexts". A particular context is defined by tracing from the top (**P** or **P** with **P**₂) down through the situation, case and

interaction. The interpretive contexts will be revisited as the conceptual framework is developed.

Table III-1 Typology of contexts for interpreting.

P	P (alone)											
R absent or present	no						R					
Interpretive service	none		II		I		none		II		I	
Interaction - no, + yes	-	+	-	+	-	+	-	+	-	+	-	+

P	P with P₂											
R absent or present	no						R					
Interpretive service	none		II		I		none		II		I	
Interaction or not - no, + yes	-	+	-	+	-	+	-	+	-	+	-	+

Interpretive service The type of interpretive service.
- none; II non-personal; I personal.

Interaction Interaction of **P** with the lowest element present in the context hierarchy (from lowest to highest, I or II, **R**, **P₂**).

The following tale illustrates the contexts for interpreting, which are given in short-hand notation.

A person stands alone in the city. Without prior knowledge, she remains oblivious of The Canyon. If she has prior knowledge of The Canyon, she still may be passive (Pnn-); or she may actively think about The Canyon (Pnn+).

PnII- A person -- Mary -- stands alone in the city. An article in the newspaper talks about The Canyon: how its geologic formations, exposed by a river cutting through over millions of years, are unique in the world; how, at a mile deep and five across, it could hold the New York City island of Manhattan and all its

buildings several times over; and how the million people who visit each year are seeing less and less of it, because of air pollution. She develops a sense of The Canyon and is concerned for it. But new questions have been raised for her (How big is Manhattan compared to my city? Does the pollution really keep you from seeing it?), questions which remain unanswered. But she notes the time of the evening's lecture listed in the paper.

PnI+ Mary corners the visiting Interpreter who gave the lecture on The Canyon. She gets some more of her own questions answered, adding to the expanded sense of The Canyon already gained from the talk. But she keeps asking "How can it be that big?" The interpreter finally agrees with her: "You must come and see for yourself!"

PRn+ Six months later, Mary stands at the rim of The Canyon. She marvels at the size. But she wonders, am I seeing as much as I ought, or is there pollution today? She finds the bands of yellow and red the Interpreter had talked about. But what are the brown ones, and are those blue ones, too? She walks along, and confirms their color. What causes that?

PRI- Mary reads an interpretive sign. She finds one of the distant peaks noted in the diagram, and confirms she can't see another. Yes, it's polluted today. But nothing about the blue rocks. (They are rocks, aren't they?) Interaction with the interpreting is lacking.

PRI+ An interpreter on point duty fields Mary's question. "Those bands down there?" Mary points again. "Oh, those over there. Yes they are a type of rock, a shale. Actually, up close they look more purple." "But how old are they?" "They were laid down in an old lake bed about 10 million years ago." Mary asks about the pollution, too. She was right!

PP₂nn+ Mary meets another tourist in the hotel lobby who arrived after dark. Mary shares some of her findings of the day with Dan, but he just shakes his head at the thought of blue rocks. And Mary can't answer Dan's questions about the

trees of the canyon. Mary hadn't even thought about trees! Tomorrow, they decide, they will take a guided hike together and look at rocks and trees.

PP₂nI- In the morning, after seeing the slide show in the visitor center, Mary and Dan talk about geology and vegetation (and occasionally other things mentioned in the slide show). But most of Dan's questions still are unanswered.

PP₂nI+ Dan asks a ranger in the visitor center about canyon vegetation. They discuss the kind of tree Dan has wanted to see, and the ranger mentions a parasitic plant that can stunt the tree's growth. This is news to Dan! Where can he see one of those? The ranger doesn't know, but he gives Dan some hand-outs on trees. Mary, meanwhile, finds a pamphlet on geology.

PP₂Rn+ At the trail head, Mary points out to Dan a tree that looks peculiar. He confirms it's what he has been looking for.

PP₂RI- The geology pamphlet points out that two kinds of blue rocks band the canyon, one much younger than the other and thus higher up on the cliffs. Mary hadn't noticed two sets of bands. Could those be the second? No, they seem black. Where are the blue? The pamphlet didn't anticipate and can't respond to her question.

PP₂RI+ As the Interpreter leads the group along the trail, the cliff wall beside them changes from yellow to brown to dark blue. The interpreter stops, and mentions that one of the two kinds of blue rock is exposed only on this side of the canyon. "And now", the interpreter says, "you are standing next to it." Mary reaches out and feels the rock, crumbling a piece in her hands. "Is this shale?" "Yes, a very weak shale. Once exposed, it erodes easily." While the Interpreter answers another question, Mary points out to Dan the blue band far below and across the canyon. "That's shale too, the other blue one." Dan nods, then looks ahead on the trail. Hopefully they will get out of this shale soon, he thinks. Not a thing is growing in it.

INTERPRETING: A DISTINCT ARENA OF COMMUNICATION

Human communication generally has been conceptualized and studied in two different but complementary and overlapping ways. Each has a different focus. Six different "arenas" of interest have been identified, three within each focus.

One focus has been on interaction and interacting. Here, communication has been conceptualized and studied in three arenas: as the interaction between two or more people (interpersonal communication), between cartifacts¹ and a person (written and visual communication), or between cartifacts and many people (mass communication). In each case, the interaction of the two elements constitutes communication. What is being "talked" (written, read, etc.) about, is just talked about (physical presence not relevant), or is involved as the end point of communication ("Look at that").

The other focus is on the internal workings of the communicator(s). The psychological (and sometimes physiological) needs, wants, and capabilities of a person are conceptualized and studied. These needs, wants, and capabilities fall into three general arenas: the person vis á vis herself, the person vis á vis the outside world, and/or the person vis á vis other people.

The issue of assisting may be considered in any of these six conceptual arenas -- generally, as assistance by one person to another to develop communicative competence with regard to cartifacts or other people. To the extent that basic capabilities, such as observing and acting on observations, are considered, assistance with developing competence with regard to the outside world and oneself also may

¹In communications theory, the term artifact is used for entities made by a communicator to represent something else. Signs, pamphlets, books, videos, labels graphs, are all examples of artifacts. Often, artifacts are left for someone to use (usually read or see) at a later time, in the absence of the communicator herself. However, the term artifact would cause confusion for interpreters who deal regularly with actual physical remains of things (often the resource being interpreted) that are called artifacts. Thus, to represent these created communicational entities I have adopted the term cartifact, drawn from their usual graphic-based nature.

be considered. (When communication is stipulated, as it often is, as fundamental to all human endeavors -- indeed requisite to "being human" -- then nothing is excluded from consideration.)

Interpreting stands out (but not apart) from these existing conceptions of communication on three interrelated points.

First is interpreting's focus on the critical role of not two, but three elements in communicating. An **R**, that which is talked about, is not just talked about. It is directly involved: ... *first-hand, sensory experiences (Brown and Cherem, Cherem), ... through the use of original objects (Tilden), ... people talking, one to one, over something real (Edwards)*. Each of the triad -- **P, R, I** -- is an equal partner playing a distinct role in the communicative process: *My job as interpreter is ... to establish communication ... between you and Yosemite Valley (Hof)*.

Second is interpreting's focus on revelation. **R** is experienced, but incompletely. Something hidden is exposed ... the arcane is made clear. And **R** is reexperienced, anew and afresh. And not alone, but through the active intervention of another person.

Third is interpreting's focus on assisting experience. Other conceptions address communication to develop capabilities or as capabilities for experiencing the world. Interpreting is different in that communicating is done to assist present experiencing.

Taken together, these points give interpreting a distinct place in the panoply of communicative arts, and make it a distinct field for inquiry in communications science.

THREE PERSPECTIVES OF INTERPRETING

Three perspectives of interpreting appear in the definitional phrases. These perspectives are ways of looking at interpreting, ways of thinking about it, not physical models of it. The perspectives are not exclusive of each other. But as distinct ways of thinking about interpretation, they delimit for us what is of interest

and what isn't, what is expected to happen and what isn't, and what is expected in practice and what isn't. The implications of these delimitations for interpretive research are more fully explored in the next chapters.

Each perspective gives a role to **P**, **R**, and **I**. But that role varies.

One perspective has **P** being the recipient of something transmitted about **R** by and through **I**: ... *the communication of information about ... our heritage (Beechel), ... the media by which a greater knowledge and perception of the resource ... is related to the visitor (Fischer), ... Interpretation ... conveys the meaning of something (Grater)*. It may be diagrammed as in Figure III-1:

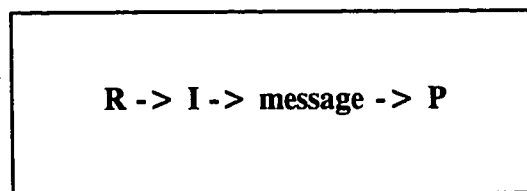


Figure III-1 The "transmission" perspective of interpreting.

Johnny "knows" Mount Rainier is covered by glaciers because we tell him so. This is the common "sender -> message -> receiver" model of communication.

The second perspective has **P** and **I** sharing something about **R**: ... *in which you, the interpreter, excite in others a response ... comparable to your own (Corbin), ... sharing of an experience or idea (Files), ... the helping of the visitor to feel something that the Interpreter feels (Wallin)*. It may be diagrammed as in Figure III-2:

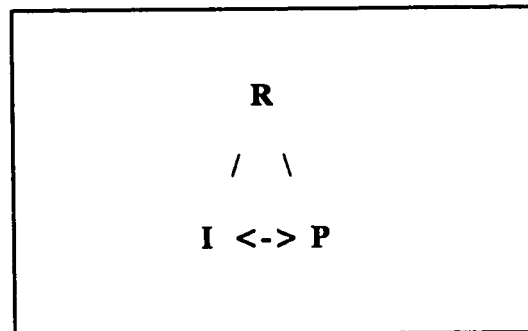


Figure III-2 The "shared understanding" perspective of interpreting.

Johnny comes to understand the glaciers covering Mount Rainier as he and the interpreter talk about how high the mountain is and how perpetually icy its summit.

The "interpretive practices" perspective of communication (Cicourel 1974, Coulthard 1977, Garfinkel 1967) parallels the shared understanding perspective. Interpretive practice makes focal the interaction of two (or more) people in a given "context". The import of an **R** arises through that interaction and the meaning jointly ascribed to **R** by the participants as part of their common situation. The role of any particular **R** as part of "context" within a communicating episode is not well defined, nor is the relationship of the people with **R**. (The focus of research has been on how the people interact, how they come to share, or not, each other's views, not on their relationship with **R**). Note that for interpreting, one of the people is **I**, someone who brings special skills to and plays a special role in the communicating. In the interpretive practices research, there has been no particular differentiation of **I <-> P** communication from **P <-> P₂** communication.

The third perspective is one of **I assisting P to experience R**: ... *built around first-hand, sensory experiences ... , Your role is as facilitator to the visitor's self-*

experience (Carl), ... aiding people in perceiving and experiencing (Hammit), ... the facilitation of a relationship between an individual and his or her environment (Hof). **R** is present, or at least made present through the skill of the interpreter, and **R** is experienced by **P**. This perspective may be diagrammed as in Figure III-3:

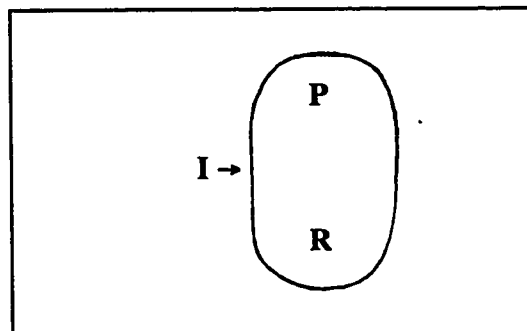


Figure III-3 The "assisted experience" perspective of interpreting.

Johnny comes to perceive the glaciers on Mount Rainier as he measures the rings on a broken, rock-buried tree, feels the cold and grit of an icy stream, remembers the striations on a granite boulder, and listens to the grinding from a blue-lined crevasse.

This perspective seems to strike closest to the philosophy of interpretation evinced at least since Tilden (and his work documented a generation of the best in actual practice). The interpreter is there to help; but he does not do all the work. Much of it is up to **P** and **R**.

Two points are important for understanding this perspective of assisted experiencing. One is the line encircling **P** and **R**. It indicates a relationship. This is not the same as the open arrow between elements of the transmission perspective or two-way open arrow of the shared experience perspective. Nothing is transferred

or received. Rather, something is perceived. **P** makes sense of **R** and with **R**, as some things about **R** are revealed. This perception involves the physical senses, of course; but it involves something else as well, like memory, thinking, and feeling. Thus, a relationship is different from mere physical exposure or interaction. And the study of relationships needs to be different as well.

The second point is the closed arrow, \rightarrow , between the interpreter and the **P** **R** relationship. This closed arrow indicates actions or "steps" taken by **I**, steps to help **P** make something of **R**. What these actions are or may be is explored in Chapter V.

But first, Chapter IV examines how these three perspectives have shaped inquiry into interpreting.

CHAPTER IV.

THE CONCEPTUAL CHARACTER OF INTERPRETATION RESEARCH

This chapter examines the three perspectives of interpreting which underlie research on interpretive communication. The prevalence of each in research is assessed, and their conceptual underpinnings and limitations are discussed. Understanding the three perspectives helps us understand why research on interpreting is focused where it is today and points the way toward a more complete way of thinking about interpreting, articulated in Chapter V.

PREVALENCE OF THE THREE PERSPECTIVES

Research studies on interpreting published from 1972 through 1990 were classified as to which of the three perspectives of interpreting they adhere. The literature analyzed and procedures used are described in Chapter I. The characteristics used for classification were:

Transmission:

- a study specifically referenced as its foundation the transmission perspective or its related theories, or
- delineation of dependent or independent variables was based on terms like *transmit, convey, relay, communication of, communication to, response*, or
- independent variables were solely information, or
- dependent variables were solely information gain, attitude change, or "receiver response to the communicating"

Shared understanding:

- a study specifically referenced as its foundation the shared understanding perspective or its related theories, or
- delineation of dependent or independent variables was based on terms like *share* or *common understanding*, or

- dependent variables were commonality, between the interpreter and the public, of feeling, attitudes, meaning, or knowledge

Assisted experience:

- a study specifically referenced as its foundation the assisted experience perspective, or
- the public was exposed to the resource or to a cartifact as surrogate for the resource, and
- dependent variables included the public's satisfaction, enjoyment, or evaluation of the interpreting or of the resource

Table IV-1 shows the classification of research articles according to perspective. The transmission perspective is the most common, guiding 22 of 36 studies, followed by assisted experience (10 studies) and shared understanding (4 studies).

Table IV-1 Number of research studies of interpreting published from 1972 through 1990 classified by three perspectives of interpreting.

Perspective of interpreting	Number
Transmission	22
Shared Understanding	4
Assisted Experience	10
TOTAL	36

These results indicate that the transmission of something, via interpreting, has been a dominant perspective in interpretation research. No changes appear to have occurred over time: in 1988 (the last year for which research articles were found), six transmission studies were published, three assisted experience studies, and none based on shared understanding. Data reported by Moscardo (1988) in examining research on interactive museum exhibits supports this tendency: in the seven studies

he cited, five looked at knowledge transfer, two looked at cognitive processes of the exhibit viewers, and one considered (along with knowledge gain) the experience of viewing the exhibits in their setting.

The following sections examine what each perspective of interpreting brings to research. Described are their theoretical and philosophical backgrounds, and the types of entities and interactions each emphasizes and those it ignores. Chapter V then develops, from the assisted experience perspective, a conceptual framework for research in interpreting.

TRANSMISSION: THE DOMINANT MODEL OF COMMUNICATION

The transmission perspective of interpreting directly parallels the "linear" transmission model of communication. Thayer (1987:35) characterizes this model as: " $A \rightarrow B = X$ (A ... "communicates" something \rightarrow ... to B ... with X effect)". This model has framed research in communication for several decades; Thayer calls it the dominant paradigm of communication in the Western World. It has enabled researchers to explore and make predictions about the outcomes of some communicative acts. To understand its strengths and weakness, consider its origins and underlying assumptions.

Theoretical Considerations

Emerging around the middle of this century (Shannon and Weaver 1949), the transmission model is a child of its times. Great advances in technology were being made, hand in hand with increased understanding and control of the physical phenomena from which the technology derived. Not least among these were the technologies of mass communication: telephony, radio, television, even high speed printing. Social scientists, looking for ways to investigate consequences of these advances, not surprisingly focused on the conceptual tools which played a major role in the development of the technologies themselves. If the concepts of connections among entities (source/medium/receiver), and the information content of messages transmitted through these connections, worked so successfully for technology-

technology communication, why not apply the same ideas to human-human communication as well?

This focus on the actions and effects of physical entities also meshed easily with a prevailing perspective in biological science -- behaviorism. Like many scientific theories, behaviorism tries to explain actions as causal relationships. As applied to communication, this is aptly captured in Skinner's (1957) statement that the "ultimate aim is the prediction and control of verbal behavior". Thus, behaviorism provides the research methodology and framework through which the transmission model maps human communication.

Research Considerations

Six factors are salient for transmission model researchers: the sender, the message, the medium, the receiver, the receiver's response, and feedback from the receiver to the sender (Mendelsohn 1974). (The necessity of attending to the message has also been recognized. Our words must catch and hold another person's ear, or our sign the hiker's eye, for communication to occur.) These factors can be viewed and studied as constituting a system (Hawes 1973). How are they conceived in interpreting?

The sender is the interpreter. The characteristics of this person, such as credibility and trustworthiness, influence communicative effect (Dottavio and McLellan 1985, Malandro and Barker 1983).

Relevant to the message are both its content and its form. Content can be ... *information (Beechel)* and especially ... *scientific facts and figures (Lovelady)*. Content also can be ... *ideas (Coutant, Edwards, Sharpe)*, including ... *environmental knowledge (Brown, Fischer)*. *Meaning* may also be transmitted in messages (*Grater*). Message forms include ... *exposition (Grater)*, ... *explanation (Grater, Biggs and Roth)*, ... *entertainment and education (anon.)*, and ... *translation (Lovelady)*. Cherem (1977) lists rhetorical devices interpreters can use to structure message form. Dick et al. (1974) list other message factors studied by researchers following a transmission model.

Media available to the interpreter are many. They include ... *devices and facilities* (Brown) and are often ... *illustrative* (Tilden). Sharpe (1976) provides a compendium of media commonly used by interpreters. He emphasizes the importance of matching the media to the setting and the visitor.

The receiver of the message is the visiting public. Field and Wagar (1973) pointed out characteristics of visitors which can influence interpretation. These include their leisure frame of mind and their diversity, including age, social groupings, and disabilities. Field and Wagar also discuss the need for motivation and reward to get and keep the visitor's attention.

Two types of feedback are salient in the transmission model. The first is the ability to ... *clarify an issue* (Coutant) about the content during the interpreting. The second is feedback to evaluate the interpreting (Wagar 1972).

Within the transmission model, the success of interpreting is equated with its effects: the receiver's response. Effects looked for include the receiver "having gotten" the content (the information, ideas, knowledge, or meaning) proffered in the message; the receiver being influenced by the message (changing his attitudes, knowledge or level of understanding); or the receiver changing his actions following interpretation: ... *provoke a response* (Coutant, Tilden), ... *interest, inform and stimulate* (Washburne), ... *results in environmental reform* (Brown). The behaviorist conception is that of a stimulus and a response.

Limitations

Every model carries the theoretical and conceptual baggage of its origin. Two major limitations for the study of human communication come with the transmission model.

The first limitation is the crucial presupposition that the behavior of participants in communicating can (ultimately) be reduced to reaction. For inanimate entities, this may be true. Heat an iron rod and its atoms vibrate faster -- always, and always in the same way. Apply a certain electrical current to a crystal, and it moves in one direction; remove the current, and it moves back. Always! This is

what makes technologies like the transistor possible. The "state" of a transistor is a direct function of the forces acting upon it. Control those forces and you control, absolutely, its state. In this respect, physical phenomena are simple to understand. (Calculating the interaction of these forces may, of course, not be so simple!) Inanimate entities have no choice whether to react or not, or how to react.

Living beings are different. Under the same set of forces, they can and do behave in many ways. Light a match under a man, and he may jump, or he may freeze, or he may move away, or he may blow it out, or he may dump a glass of water on it, or he may (as T.E. Lawrence) not care. Or all matches may be banned from a household, to prevent being burned in the first place.

Many researchers have tried to pin down this difference.⁴ The crux appears to be what Carter (1985, 1990a) has called "step-taking" capability. Inanimate entities have only a single-step capability: they react. Living beings are capable of multiple-step taking. They can respond both with different kinds of steps (including the null-step) and with consecutive steps. They can create new steps. And they can take those steps in response to nothing at all: the capability, as Mendelsohn (1974) put it "to initiate actions as well as to react".

The repertoire of steps possessed by a human being is potentially vast. Steps derive from several sources. One is history: unlike a molecule of oxygen, we can learn from our experiences. A second is cognitive ability: we can and do (some might say must) create our own ideas about our environment and what to do in and with it. A third is purposiveness: we may want or need to change the steps we take, or at least the direction in which we take them.

⁴Lashley (1951), for example, saw problems of "...serial order..." in human communication; Barnlund (1962) saw that communication "...is man's attempt to cope with his experience, his current mood, his emerging needs."; Schramm, et al. (1961) noted that "It is the children who are most active in this [television-child] relationship..."; and Grossberg and O'Keefe (1975) insisted we must account for "...intentionality and purpose...".

Step-taking and step-taking ability need to be considered in studying interpreting. The transmission model doesn't consider them.

The second limitation (not unrelated to the first) concerns the coverage of the transmission model. The factors salient within the transmission model fall short, in both in both numbers and quality, of the universe of factors salient to human communication. As Thayer (1987:36) put it, the transmission model of communication "simply cannot account for the facts"; the nature of the communicator, the nature of the communiqué, and the nature of the communicatee *may* be necessary conditions, but are never sufficient conditions, for communicating. It is not, Thayer argues, that the parts are complexly related, as in a physical system. It is that, for most human communication, the parts define each other. Knowing the "nature" of the elements is not sufficient for knowing the nature of their relationship.

The limitations of the transmission model for studying human communication, including interpretation, are thus clear. The underlying principles of the model depend upon cause -> effect relations, treating organisms as if they were inanimate, reaction-only entities (Cherry 1978). And the search for causal laws requires that the precursor conditions be both necessary and sufficient to the outcome. Neither case holds for interpreting. Transmission may be a fitting model for studying inanimate entities; it is much less so for studying people.

Applications

The transmission model has helped identify areas in which people tend to take similar actions in similar situations -- i.e. they may exhibit a reasonably limited step-taking repertoire. Thus, the external variables identified for the situation predict enough of the internal and external conditions for step-taking, to provide reasonable correlation with the actions that occur. But not always.

The rather high probability of unexpected action or reaction is evident throughout transmission model research. We know that some individuals are not 'properly' affected; but we can't predict how many and which ones. More importantly, effects reliably predicted for specific individuals in specific situations

do not obtain for different individuals, or for the same individuals in different situations, or even the same individuals in the same situation at different times (Barefoot and Strickland 1982). Feldman (1978) reviewed the communication literature and concluded that no general conclusions can be made for improving interpreting, other than that communication in any situation will depend on: the characteristics of the people receiving the message, the materials being transmitted, the environment for transmission, the measure of effectiveness, and the sensory mode of measurement (note the transmission perspective). Malandro and Barker (1983) and McKroskey and Young (1981) would add the characteristics of the message sender.

The transmission model has been helpful. It has resulted in an array of findings, many of them useful for interpreters. But this help is limited. As with all models, transmission can not explain everything and its limitations for providing understanding of interpretation seem severe. As Chomsky (1959) presciently noted in his review of Skinner' Verbal Behavior: "The magnitude of the failure of all this [research] to account for [so much] verbal behavior serves as a kind of measure of the importance of the factors omitted from consideration, and an indication of how little is really known about this remarkably complex phenomenon."

Like swimmers using a snorkel, the transmission model helps us explore the surface waters of our interpretive ocean. But to go deeper, we must come up with new tools -- tools which will enable us to better cope with the depth of human communicative complexity.

SHARED UNDERSTANDING: PRAGMATIC COMMUNICATION THEORY

The shared understanding perspective focuses not on transfers of information or ideas and the effects of such transfers, but on the establishment of a common viewpoint or common experience between the actors in communication. This occurs through interactive communication between the participants. Many variants of this perspective exist, each with its own twist. The following discussion is based on the

pragmatic communication theory of Habermas (1979), which builds on the work of Austin (1962), Searle (1972), and others.

Theoretical Considerations

Pragmatic theory identifies three functions which communicating performs in any situation: (1) to represent something in or about the world, (2) to express intentions of one person to another, and (3) to establish "legitimate" interpersonal relations between the participants. The intent of communicating is to come to a common understanding between the participants -- an understanding of each other's speech, an understanding of the world, and an understanding of and with each other. The outcome of this understanding is reflected in "comprehension [of language], shared knowledge, mutual trust, and accord with one another" (Habermas 1979:3).

The fulfillment of the three functions depends upon meeting four "validity conditions", called "comprehensibility", "truth", "truthfulness", and "rightness", respectively. (In addition to these conditions, communication requires attention).

The condition of comprehensibility is generally assumed. We do not intentionally use a foreign language, or put our utterances in nongrammatical form; even minor difficulties in comprehensibility elicit rapid response: correcting feedback, for instance, or escape from the situation (like turning off the communicator). Where feedback is not available, comprehensibility may in fact be a problem.

The validity condition of truth relates to external nature, to what is being talked about. It asserts that "I am stating a fact about the world". The validity condition of truthfulness relates to the internal nature of the communicator and his intentions. It asserts that "I am being truthful; I would not lie". The validity condition of rightness relates to the relation of those attempting to communicate. It asserts that "I have a right, it is appropriate for me, to tell you this".

A valid communicative relationship is conditional upon establishment of these four points; thus the name validity conditions. They are always relevant to all participants in communicating; each individual must attend to their acceptance by the

other(s). Failure to establish the validity conditions will lead to non-communication (failure to achieve common understanding), or worse, to mis-communication (where the speakers believe they have accomplished their purpose but in fact have not).

When there is doubt about validity conditions, a person may make them "thematic", that is, provide an utterance (or cartifact) whose purpose is to explicitly address the questioned validity condition.⁵ In the absence of the speaker's thematization of each validity condition, the listener is free to interpret and accept or reject the validity conditions on his own terms.

Often, validity conditions are established by the situation: by past experience between the participants, by normative expectations related to role or social position, by physical cues (such as quoting, reading from a book, or tone of voice), and other factors. When we communicate in a familiar situation, truthfulness and rightness are commonly assumed to be accepted by the participants, and our utterances are strictly cognitive -- we talk about **R**. However, when we do not overtly thematize the other validity conditions, the importance of their acceptance tends to be ignored in the evaluation of communication. The role of situation and history in the success of communicating may be overlooked by researchers, as may the issues of attention and comprehension. When we investigate interpretation, we can not afford to overlook the status of each validity condition for **I** and **P**.

Research Considerations

Pragmatic communication research asks three basic questions: Was the communicating attended to? Was it comprehensible? Was it accepted? Acceptance depends on establishment of the validity conditions, that is, on agreement by the participants to the rightness, truthfulness, and truth of the others' utterances; context

⁵Thus, researchers in pragmatic communication classify utterances as cognitive: "Trees are green" (truth is thematic; truthfulness and rightness are assumed); as expressive: "I wouldn't kid you. Trees are green" (truthfulness is thematic; truth and rightness are assumed); or as interactive: "I teach forestry; trees are green" (rightness is thematic; truth and truthfulness are assumed).

plays a key role in establishing validity conditions. Beyond attention and comprehension, then, successful communication is seen as comprising two parts: (1) establishment of interpersonal relations which enable (2) understanding of facts about the world to be shared -- for interpretation, facts of and about **R**.

Research from a pragmatic perspective has focused on conversational communication and how the participants interact in different situations (Giglioli 1972; Schenkein 1978). In conversation, feedback is immediately available: if a validity condition is not initially accepted by the listener, the speaker can make a new thematization of the questioned condition. Researchers have studied how validity conditions are challenged and how they are effectively thematized. For instance, what happens when they are not accepted by one or both participants? What happens if members of a group differ on accepting a validity condition, and at what point may group interactions sway or override individual validity concerns? Research on personal interpretation can apply and build from this research base.

Existing research is quite limited in non-conversational settings (such as with signs and brochures, or certain group presentations). In non-conversational settings, direct feedback is unavailable; establishment of the validity conditions must be attended to in other ways (if they are attended to at all). Generally, when validity conditions have been included in research on non-conversational communication, the focus has been on comprehension (following attention). Research on interpretive communication could profit by examination of how other validity conditions may be established to achieve the desired **P I** communication.

Application and Limitations

Pragmatic theory provides a road map for exploring the communicating and potential communicative mishaps between **I** and **P**. The theory looks at many of the same phenomena as the transmission model (e.g. sender credibility and truthfulness; message form and content; feedback) but as emergent conditions of the interaction of **P** and **I** in a setting, rather than as prior characteristics of either actor or of the message. It also makes salient additional factors, such as intent and context.

Interpretation researchers can use this perspective for studying human communicative interactions in several arenas. In personal services, the interaction of **P** and **I** can be examined. When **R** is a person (such as in living interpretation or role-playing), pragmatic research models may be relevant. When more than one **P** is involved in interpreting, examining their shared understanding may be fruitful for research. And, to the extent **P** experiences **R** only as mediated by **I**, shared understanding between **P** and **I** may be important.

But shared understanding and pragmatic theory say little about the role of **R** in interpreting. **P** interacting directly with **R** is outside their scope of concern. And they don't cover everything about how **I** can assist **P** in understanding **R**.

ASSISTED EXPERIENCE

Along with the transmission and shared understanding perspectives, the assisted experience perspective underlies some research on interpretation. This perspective makes central **I**'s assistance in bringing about a relationship between **P** and **R**. Assisted experience makes things salient that are not salient to the other perspectives and looks at things salient to the other perspectives in a different way. Information and ideas about **R** are important, but only insofar as they mold what **P** makes of **R**. Likewise, the interaction of **I** and **P** is important, but as a means to abet the interaction of **P** and **R**. Success in interpreting is defined by the relationship of **P** with **R**, not with **I**, and not as **P** having "received" something about **R**. The assisted experience perspective thus subsumes, conceptually, the transmission and shared understanding perspectives (Figure IV-1).

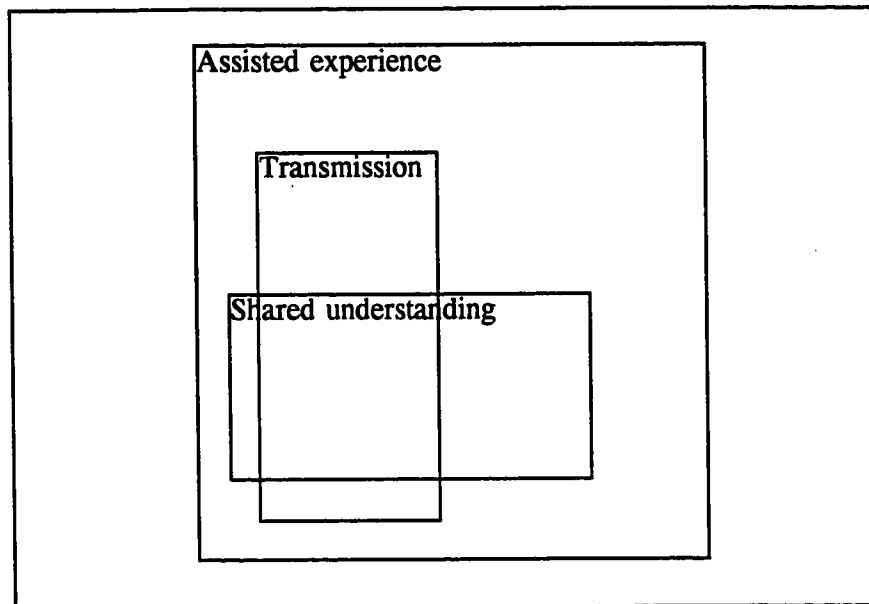


Figure IV-1 Schematic of the conceptual "coverage" of the three perspectives of interpreting

The assisted experience perspective does not deny what we know from transmission or shared understanding research, but enables us to see more and to see it in a different light. And that light may prove more illuminating.

Despite underlying much interpretive philosophy and some research, the assisted experience perspective has not been systematically articulated in the interpretation literature. Nor does there exist an analogous communication theory or model (although relevant insights and concepts can be drawn from several such theories). Chapter V offers a systematic articulation of interpreting as "assisted experience" and delineates the factors relevant to its practice and research. Then, in Chapter VI, the research literature is reviewed to identify which factors have been studied and which emerge as significant but so far neglected. In Chapter VII, potential research areas and methods for further investigating interpreting are discussed.

CHAPTER V. A CONCEPTUAL FRAMEWORK OF INTERPRETING

In this chapter, I propose a systematic formulation of the assisted experience perspective of interpreting -- of the public "experiencing" the resource with the help of an interpreter. The analysis delineates factors relevant to interpreting and fits the factors into a conceptual framework, respecting both the structure and process of interpreting. From the conceptual framework, a typology of factors salient to research in each context of interpreting is presented.

The conceptual framework is intended to expose for researchers the factors that can make a difference in interpreting, but not necessarily how those differences can be made. (The latter are tactics. Tactics are, at times, discussed to provide context or to illustrate the factors but are not exhaustively explored.) The conceptual framework offers a way to organize what we know and to delineate what we don't. Within a conceptual framework, future research can begin to discriminate which factors make what differences in interpreting. A focused research agenda can emerge and better understanding of interpreting ensue.

The working basis for the conceptual framework is the perspective of interpreting as "assisted experience" (Figure V-1): ... *facilitation of a relationship between an individual and his or her environment (Hof), ... built around first-hand, sensory experiences (Carl).*

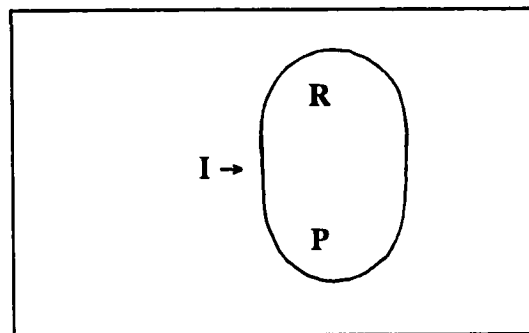


Figure V-1 The "assisted experience" perspective of interpreting

The elements of interpreting are examined first, followed by relationships between elements and by steps and sequences of steps taken to mold the relationships. Complex relationships are briefly examined. Conditions which may influence each are discussed. To facilitate the discussion, additional notation is introduced as needed. (Appendix C lists all notations used.) It is hoped the notation system will not only help the reader follow the analysis, but provide a tool for manipulating concepts that researchers and others can use in their own thinking about interpreting.

ELEMENTS

Elements are the "things" that interact in interpreting. This section delineates interpreting's elements and discusses conditions, like age, physical and cognitive limitations, and group affiliations, that the elements bring to interpreting.

P

P can be an individual or a group. The difference is important. If **P** is a group, we can not ignore the potential of $P \leftrightarrow P_2$ interactions. Members of the group may interpret for each other, altering any effect of the interpreter. Group behavior, knowledge, or emotions may be quite different from those of any individual within the group, and the steps available to them different as well. For instance, Feldman (1978) studied the effect of supplying interpretive information about nature trail opportunities to motoring tourists. People driving alone stopped more often to hike nature trails than those traveling with companions. Feldman attributed this difference to the need for all people in a car to agree before a stop would be made.

We also can not ignore differences between **Ps**, whether groups or individuals. Field and Wagar (1973) discuss many types of "social" diversity, including age, interests, objectives, and social groupings. The physical abilities of **P** also are relevant. As Beechel (1974) discusses, someone with disabilities (sight, hearing, mobility, etc.) may come to "know" **R** differently than those without restrictions. A blind person cannot "see" a Douglas-fir, but can feel its girth and walk the length of a fallen giant. A wheel-chair-bound person cannot wade in the

surf on a cobble beach, but can test the strength of a mussel's byssal threads and note the round-worn shape of the rocks and pebbles.

Likewise, cognitive abilities determine how and what **P** may make of **R**. Differences between children and adults have been noted and examined by many authors, among them Hammitt (1981a), Machlis and Field (1978), and Tilden (1957). A four-year-old may be thrilled by simple "big-tiny" comparisons, ten-year olds by how many friends with arms outstretched it takes to encircle the tree, and adults by what size house the lumber from the tree might provide.

A particular type of cognition -- memory -- is especially relevant. Not just the content of existing memories, but their availability as well as the ability to commit new ideas and feelings to memory, will make differences in **P**'s formation of a relationship with **R**. For example, people with multiple experiences with an area, who feel they already "know" an area, may be less likely to accept new information or take a new viewpoint about it (Lime and Lucas 1977).

I

I is the interpreter, assisting **P** to experience and make something of **R**. In the case of personal services, **I** is physically present. Much interpretation, however, takes place through non-personal services, **II** (signs, brochures, exhibits, etc.), created for interpretive purposes by an **I**. The differences between having and not having an interpreter present during interpreting are important, as several studies have shown (Roggenbuck et al. 1982, Oliver et al. 1985). Since **I** creates **II**, for simplicity in what follows, **I** will generally be used except where differences between the two are emphasized.

Like **P**, **I** also may be singular or a group (two interpreters leading a walk, or a set of exhibits). The members of a group may have differing strengths and weaknesses. Likewise, a group may exhibit properties different from its members considered individually.

Other things about **I** may be relevant to interpreting or its effectiveness. Several that have been studied are not properties of **I** itself, but arise from **I**'s

relationship with **P** or **R** (or their relationship). These are discussed under relationships, below.

R

R is something about which we interpret. It plays a key role in the interpreting. Deciding what **R** is, delimiting it conceptually and operationally, is central to developing, evaluating, and researching interpretation. Future study may well show that failure to clearly specify **R** is a major source of failure or confusion in research (and of ineffectiveness in interpreting).

R may be the whole resource. Mount Rainier, for instance, or Mount Rainier National Park (two very different things). Or **R** may be a part of the "whole": elk that live on Mount Rainier, for instance.

But elk can be a "whole" in and of themselves, too. Whether elk are a part of Mount Rainier, or a "whole" in themselves is a function of how **P** and **I** perceive them. It is a question of the bounds of **R**, which in turn will affect the relationships and their boundaries. What the interpreter intends to be focal, the preconceived **R**, may not be what **P** perceives, and this can lead to problems in interpreting and in studying interpreting.

Note also that an **R** like "elk" may be a group (of animals), not just a single thing. **R** might also be a system, such as a herd of elk or an ecosystem.

R is a thing. But **R** can be an ideational thing, such as a concept, as well. Of course, we use concepts to talk about a "real" **R**, to reveal ... *the larger truth that lies behind any statement of fact (Tilden)*. But a concept can be made focal in interpreting, and accorded **R** status. In fact, interpreters do this quite often. When we use games to simulate, for instance, predator-prey relationships, it seems to be the concept that is focal, not any larger environment. (If so, we can predict that **P**'s immediate understanding of the lesson of the game will not differ whether carried out in the woods (a "predator-prey environment") or in a school building. This isn't to say that **P**'s understanding would not be different following a subsequent walk in the woods looking for evidence of predators and prey.)

R might be an affective thing, an emotion or feeling, as well. We can not only help the visitor feel something, ... *a sense of wonder (Wallin)*, ... *experiences that tug at the human emotions (Brown and Cherem)*, but can interpret those emotions as well. Usually, though, researchers are more interested in emotion as an indicator of the state of **P**'s relationship with **R**.

What if **R** is not present, but only \mathbb{R} , a cartifact? (Note that this cartifact may be used by a live interpreter **I** or as part of a non-personal service \mathbb{D}). Is this still true interpretation? Clearly, the profession treats it as such. But the use of such cartifacts adds complexity to interpreting. The interpreter generally is interested in \mathbb{R} only to make **R** available to **P**, through **P**'s imagination or memory. But does this mental transference from \mathbb{R} to **R** occur in **P**? And how good is the transfer? Yorke Edwards (1976) provides an eloquent example of an interpreting mishap. Visitors to a marshland nature center who saw an exciting film made over several seasons and emphasizing close-up views of rarely visible wildlife behaviors were disappointed with their subsequent walk through the real, tranquil marsh with only flitting birds and an occasional otter distantly in sight. We must be wary of interpreting \mathbb{R} instead of **R**; the researcher needs to watch for this effect.

r

When exploring interpreting, it is important to distinguish from **R** the ideas, facts, feelings -- "characteristics" if you will -- about **R** which **I** or **P** may introduce (or produce) in the interpreting. I use the notation **r** for these elements. They may, of course, be present as cartifacts: \mathbb{r} . For examples, **R** may be trees. That trees are green is **r**, and a picture showing different shades of green in trees is \mathbb{r} . (These elements are different from ideas, concepts, etc. which are the focus of the interpreting, and thus made **R**.) We also are interested in the authorship of the ideas, thus: r^P or r^I .

Summary of Notation for Elements

To summarize, the elements and their notation are:

- P** a person for whom the interpreting is done
- P₂** another person or persons in the same interpretive context
- I** personal service(s) provided by an interpreter or interpreters
- II** non-personal service(s), created by interpreters to act in their stead
- R** what is being interpreted; the subject of the interpreting
- ℝ** cartifact(s) representing **R**
- r** concept(s) about **R** (ideas, information, "facts", feelings, etc.)
- r̄** cartifact(s) representing **r**

Authorship of cartifacts and concepts is shown by adding **I** or **P** as a superscript: r^I or r^P , $r̄^I$ or $r̄^P$, and \mathbb{R}^I or \mathbb{R}^P . Recall also that the closed arrow " \rightarrow " indicates, in a general sense, actions or "steps" taken by someone (in this case **I**) to influence someone or something. What such steps may be is discussed in detail later on, where additional notation for steps is introduced.

Thus, a tree is **R**. A picture of the tree provided by the interpreter is \mathbb{R}^I ; one taken by the visitor is \mathbb{R}^P . That the tree has enough wood to make two houses is **r**. A diagram showing that the tree has enough wood to make two houses is $r̄$ ($r̄^I$ is usually assumed; which **I** may be highly relevant). The pictures, ideas, and diagrams may be presented to the visitor **P** via an interpreter **I**, or via some non-personal medium **II**.

Interpretive Contexts

The marked boxes in table V-1 indicate the contexts of interpreting in which the elements may play a role. What role they do play in any specific interpreting is a matter to determine empirically.

RELATIONSHIPS

Central to the assisted experience perspective is the notion of relationship, indicated by brackets. For instance, **P** and **R** are seen as coming to have a

Table V-1 Elements in the interpretive contexts. Marked cells indicate contexts in which the element may play a role.

	P (alone)						P with P ₂							
	not present			R present			not present			R present				
	none	I	II	none	II	I	none	II	I	none	II	I		
Interpretive service	-	+	-	+	-	+	-	+	-	+	-	+	-	+
Interaction	-	+	-	+	-	+	-	+	-	+	-	+	-	+
Elements														
P	x	x	x	x	x	x	x	x	x	x	x	x	x	x
P ₂														
I														
II														
R														
IR														
I ¹														
II ¹														
I ^P														
II ^P														
IR ^P														
I ^{1P}														
II ^{1P}														

Interpretive service = The type of interpretive service: none; II non-personal; I personal.

Interaction = Interaction of P with the lowest element present in the context hierarchy (from lowest to highest, I or II, R, P₂).

relationship, $\{P R\}$. I interacts with, facilitates and molds that relationship, $I \rightarrow \{PR\}$. I does not interact just with P , that is, not just $I \rightarrow P$. Other relationships also can be adduced from the structural diagram of the perspective (Figure V-1), and are discussed below.

In a relationship, each entity influences the other(s) simultaneously and interdependently. Interpreters may find a familiar illustration in Muir's "everything is hitched to everything else". How often have interpreters tried to get the public to understand how everything in nature is "interrelated"? Interaction is key. In essence, the relationship is the interaction, not just a product of it. As such, a relationship is different from the elements that comprise it and may have properties different from and independent of the properties of any of its constituents.

To illustrate: Run your thumb along the long edge of this page of paper. Now run your thumb along the bottom edge. Look at where the two intersect ... the corner of the page. Can you run your thumb along this corner? No! Neither is it long and thin, like the edges. Rather, it is a point.

And that is the point. Two elements, when brought into relationship, may create something new, which is neither a part nor a property of either. And such a relationship must be treated as another, independent factor for purposes of understanding interpretive communication.¹

Within a relationship, there may be one or many different relations -- ways in which the elements relate to each other. Carter (1991) describes five kinds of relations frequently used in cognition: inside-outside (e.g. core - apple), before-after (e.g. bud - flower), similarity (e.g. Jonathan - MacIntosh), difference (e.g. red delicious - golden delicious), and association (apple - tree). These and other relations

¹Two other familiar examples would be the lichen (two very different organisms, an alga and a fungus, living together as one), and ripples on a pond (which arise from a relationship of water molecules and energy but are quite distinct from either water or energy and have their own properties -- such as smoothness, wave length, amplitude -- which water and energy do not).

will be of interest to researchers exploring particular relationships in interpreting. For the current purpose of conceptually articulating interpreting, it will suffice to distinguish the relationships that are of interest.

The notation to delineate relationships is:

{X Y} to indicate a relationship (the equivalent of an encircling line).
Order within the brackets is irrelevant, for a relationship.

For example, what **P** and **I** make of each other is the relationship **{P I}** or alternatively **{I P}**.

Additionally, one important aspect of relationships will need notation:

{X:Y} indicates what the left-hand element makes of the right-hand one. In denoting this aspect of a relationship, order within brackets is relevant.

Thus, what **P** makes of **I** is **{P:I}**. What **I** makes of **P** is **{I:P}**. To illustrate, when we study lichens as lichens, it is the relationship **{alga fungus}** that is focal. When we study how, in the lichen, the fungus affects the alga then **{alga:fungus}** is focal.

A Note on "Making Something Of"

A relationship has been defined in this dissertation as elements "making something of" each other interdependently. Researchers have seen as salient what one element "makes of" the other, **{P:I}** for instance. The concept of "making something of" can lead into deep philosophic waters, however. It may ease understanding of the discussion which follows to consider "making something of" as a gradient of concepts. At one end of the gradient lies, for example, **{P I}**. What **P** makes of **I** and what **I** makes of **P** are salient -- each sentient being can make something of the other. With regard to the "making something of" aspect of the relationship, **{P I}** seems symmetric: **{P I} = {I P}**. Toward the other end of the gradient might be, for example, **{P R}** where **R** is a fish in an aquarium. **{P:R}**, what **P** makes of **R**, is salient, but from some perspectives **{R:P}**, what the fish makes of the aquarium-goer, may not be. From these perspectives, a fish may "react" or may "respond to a stimulus", but it does not "make something of" a

person. (A "higher" animal like a dog or a horse might be seen as doing more than "reacting", but still be seen as interacting on a different level than a person.) At the far end of the gradient would be, for example, $\{P R\}$ when R is a rock. For some, $\{R:P\}$ is meaningless. A rock may fall and influence P but it doesn't "make something of" P ; the $\{P R\}$ relationship with rocks would be asymmetric, and $\{P R\}$ and $\{P:R\}$ would be synonymous.

The point of this dissertation is to provide a consistent conceptual framework that delineates what may make a difference in interpreting, not to shed light on or add heat to philosophic debate. To delineate the framework, I presume symmetry of relationships and use for them a consistent notation, $\{ \}$, structure, $\{P R\} = \{R P\}$, and wording, "making something of". Discussed are the "makes something of" aspects of relationships, for example $\{P:R\}$, that the conceptual analysis points to as salient and/or that have been studied in research. The point of the dissertation will not be missed if different readers view differently the possible aspects and/or the symmetry of relationships or read "makes something of" in some situations as "reacts" or "responds to" or "is influenced by". The symmetry of relationships and the utility of different views of them are an issue for empirical determination.

The $\{P I\}$ Relationships

$\{P I\}$ is the relationship that, distinct from R but not from a specific communicative context, is focal to pragmatic communication theory (Chapter IV). We may fruitfully apply the concepts and methods of this theory to the development of $\{P I\}$ during interpreting. Both prior conditions (past experience) and the current interpretive exchange are important in molding $\{I P\}$. How well the relationship develops will influence the errors in communicating which inevitably occur, and their correction (or not). Opportunity for clarification between I and P is an issue of step sequencing, discussed later on.

The animate versus inanimate distinction makes $\{P I\}$ and $\{P \text{I}\}$ potentially quite different with regard to their import for interpreting, so they are often treated separately in what follows.

In addition to the relationship itself, the aspects of $\{P\ I\}$ that are discussed are $\{P:I\}$ (what P makes of the interpreter), $\{I:P\}$ (what the interpreter makes of P), and $\{P:I\}$ (what P makes of, for instance, an exhibit or brochure). Computers may soon make $\{I:P\}$ relevant to interpretation research as well.

The $\{I\ R\}$ and $\{I\ r\}$ Relationships

The interpreter, whether interpreting or creating cartifacts, has a relationship with the chosen R . She will know facts about it, have ideas about it, have feelings about it and attitudes toward it. Any of these may and will be used in plying her craft. One or more of them may be offered to P ; others may be considered by P , whether made focal by I or not. Understanding the constituents and state of the $\{I\ R\}$ relationship will be important for understanding interpreting.

Several conditions may be pertinent. Among these are the duration of the relationship (how long has she worked in this park?), I 's knowledge and feelings about R , and I 's prioritization of these. The interpreter needs to be aware of her own ideas about R and her own emotions, because they will influence both her relationship with P , and P 's relationship with R . The researcher needs to consider them for the same reason. Enthusiasm is infectious, and so is ennui. (Or so we can hypothesize).

When R is a living thing, especially an animal, $\{R:I\}$ may be relevant. For instance, zoo visitors often note, and remark upon, the keeper who gets along well with her charges, the one with whom, it seems, the "animals can communicate". These are the keepers sought out for interpreting.

What I makes of concepts about R , those r s that we use during interpreting and that Tilden and others admonish us not to confuse with it, are also relevant to researchers. Both $\{I:r\}$ and $\{I:r\}$ are considered. For instance, how well will an interpreter who disagrees with an agency's policy relate that policy to P ? Likewise, an interpreter who is uncomfortable with a prop may not use it well, if at all.

The relevant relationships and their aspects are: $\{I\ R\}$, $\{I:R\}$, $\{R:I\}$, $\{I:r\}$, $\{I:r\}$. Authorship of cartifacts is also discriminated.

The {P R} and {P r} Relationships

The interpreter's goal is: **P** making something of and with **R**. ... *an attempt to create understanding (Alderson and Low)*. Either currently or by past experience brought to mind, we have **P** exposed and attending to some **R** with which she is not completely familiar. With the assistance of **I**, a relationship comes into existence. (Of course, such a relationship can and does occur without benefit of an interpreter or his cartifacts. In this case we have not interpretation, but everyday experience. To some, this is the ideal: ... *to need no interpretation, to have the experience stand before us unmediated by anyone or anything [Brown and Cherem].*) But assuming some interpretive intervention, what would we know about {**P R**} to help us interpret better?

The prior condition of {**P R**} is crucial to interpreting. For instance, what does **P** already know about **R**? What **rs** are already known, remembered, and relevant? Bultena et al. (1978) found frequent visitors dissatisfied with interpretive programs primarily geared to first-time visitors. The frequent visitors sought more in-depth and challenging presentations.

As important as what **P** knows is what **P** feels about **R**. Hammitt (1982), for instance, found that preference for a visual scene increased recall of that scene. Of course, preference is just one way in which **P** could relate to **R**, and recall is just one expression of such a relationship. The point is, both affective and cognitive conditions affect a relationship.

Also relevant is the existence of analogous relationships, something about some other **R** familiar to the visitor through which he can make something of the **R** currently at hand. Tilden made this one of his six principles: interpretation must relate "to something within the personality or experience of the visitor" (1967:9). Hammitt (1981) proposed conceiving of the prior experience of **P** in terms of cognitive maps (Kaplan and Kaplan 1978). A cognitive map might be represented as {**P R₁R₂R₃...**}; interpreting fits a new **R** into this relationship, by analogy or

association with the existing ones. Researchers could explore the viability of this viewpoint.

We usually conceive of the $\{P R\}$ relationship as asymmetric: $\{P:R\}$, P makes something of R . But what of the converse: $\{R:P\}$? What the mountain makes of the public does not seem relevant, at least in a Western philosophic tradition. But it could be highly relevant when R is a re-creation that involves people (performances, living interpretation), or when R is a living thing. For example, "The bunny snuggled right up to Sally, didn't it?" and "The rabbit ignored the children" suggest two very different interpretive experiences (see Reames and Rajewski 1988). It seems, at least, that anytime the interpreter I becomes part of the R being interpreted, or that R is living and can interact with P , what R makes of P (and probably also what R makes of I) is relevant.

Just as the conditions of $\{P R\}$ are relevant to research, so are those of $\{P:r\}$, and $\{P:r\}$. For example, a person who "knows" that all snakes hatch from eggs may need to see a viviparous birth to change his impression. And someone who is color blind may not grasp a graph done in green and red.

The relationships and aspects here are $\{P R\}$, $\{P:R\}$, $\{R:P\}$, $(P:r)$, $\{P:r\}$.

Interpretive Contexts

Table V-2 indicates the interpretive contexts within which each of the relationships and their aspects discussed above may be relevant. Note that the marked squares indicate where a relationship may play a role. How it is involved in any specific interpreting is a matter the researcher needs to determine empirically.

STEPS AND SEQUENCES OF STEPS

Interpreting is an activity. As Woodcock (1977) points out, it is the verb, to interpret, which is distinctive of the field, not the noun. It is the steps, or actions, taken to interpret, and the conditions necessary for those steps, that we are vitally interested in. It is through steps that the interpreter assists P 's experience. But P also takes steps (and so may R). Articulating what steps may make a difference, and

Table V-2 Relationships in the interpretive contexts. Marked cells indicate contexts in which the relationship may play a role.

P R	P (alone)						P with P ₂							
	not present			R present			not present			R present				
	none	II	I	none	II	I	none	II	I	none	II	I		
-	+	-	+	-	+	-	+	-	+	-	+	-	+	
Interpretive service interaction														
Relationships and their aspects														
{P I} ({P:I}, {I:P})			x	x										
{P II} ({P:II}, {II:P})		x	x	x										
{I R} ({I:R}, {R:I})		x	x	x										
{P R} ({P:R}, {R:P})	x	x	x	x										
{I r ^I } ({I:r ^I })		x	x	x										
{I r ^{II} } ({I:r ^{II} })		x	x	x										
{I r ^{I,II} } ({I:r ^{I,II} })														
{P r ^I } ({P:r ^I })		x	x	x										
{P r ^{II} } ({P:r ^{II} })		x	x	x										
{P r ^{I,II} } ({P:r ^{I,II} })	x	x	x	x										
{P P ₂ } ({P:P ₂ }, {P _{2}:P})}	x	x	x	x										

Interpretive service = The type of interpretive service: none; II non-personal; I personal.
Interaction = Interaction of P with the lowest element present in the context hierarchy (from lowest to highest, I or II, R, P₂).

what may make a difference in those steps, is fundamental for research on interpreting.

Basic Steps

This section presents basic steps and notations for them. The ensuing sections look at steps and combinations of steps relevant to **I**, **P**, and **R** in the various interpretive contexts, and at the coordinating of steps and at the sequencing of steps.⁷

Exposure One step that may be taken in interpreting is to expose **P** to something. For instance, **P** visits the canyon or encounters a deer. Exposure is basic to any experience; it must, however, be followed by attention.

Attention Attending to something means to focus on it, to train the mind on it. With exposure and attention, the possibility arises of making something of that which is attended to. Whether this relationship, { }, develops is a separate matter (and a separate step).

Connection Steps can go beyond attention and involve active connection. Someone may "connect" with **R**, for instance, and handle it or manipulate it. Manipulating can be mental or physical.

Offering Offering something is a basic step available in interpreting. Things that can be offered include conceptual things -- **r**'s -- like ideas, facts and feelings. "Real" things also can be offered, including artifacts (an arrowhead or a petrified shark's tooth) and parts of **R**. "Here, shake hands with this spruce tree." **I**, in particular, may offer tools to **P**. Tools can be physical or mental. For

⁷Carter (1985, 1990a) has explored the basic, two-part nature of step-taking: observing, followed by moving. (He notes that our moving capabilities are better developed than our observing capabilities and that our scientific understanding parallels our capabilities.) In this dissertation, observing and moving generally are not distinguished. A notation system different from Carter's is used, as well, which may ignore the full sense of Carter's distinctions. The reader is referred to Carter's works for a more exhaustive and profound analysis of step-taking. Conceptual and theoretical understanding in this area could prove useful to interpreters.

example, I may offer ways to attend to **R** (a pair of binoculars, for instance, or an analogy: "Think of the earth as an onion..."), or ways to connect with **R**, like a butterfly net.

Asking Along with offering goes asking. Questions (verbal or otherwise) may clarify something, may offer something, or may invite further steps to be taken, including stimulating attention and cognizing.

Cognizing This is the "making something of" of interpreting. It can involve many things, for instance bringing something from memory, making something new (a new idea or thought or feeling), or perceiving a new relationship or association. For our purposes, memory is distinguished separately. Other cognizing is regarded as one step which may follow other steps and lead to even further steps. What and how things are cognized will affect the steps that follow, and are prime subjects for empirical research.

Notation

The following notation is used to facilitate working with steps.

- XY** Two elements side-by-side, without punctuation, indicates exposure.
- :** Between elements indicates attention, with the element on the left attending to the one on the right (thus **P** attending to **R** is **P:R**).
- ::** Between elements indicates both attending to each other (thus **I::P**).
- <** An open, reverse arrow indicates "connecting", such as touching, handling or manipulating.
- >** An open arrow indicates "offering".
- ?>** A question arrow indicates "asking".
- !>** An exclamation arrow indicates remembering or "knowing".

That which is offered, asked, known, or connected with is at the "arrowhead". Thus **P** connecting with **R** is **P -< R**, or **I** offering an idea is **I -> r**.

{X:Y} Indicates cognizing.

- ,** A comma between steps indicates related steps, in the sequence taken.
- ...** Ellipsis between steps indicates unlisted steps in a sequence.

Thus, the interpreter calling **P**'s attention to **r** is: **I->r, Pr, P:r** (note that three steps are involved). What **P** makes of **r**, if anything, is the later step **{P:r}**. (Note that the cognizing notation is the same as the relationship notation, because the step of making something of **r** is what **P** makes of **r**.)

Steps can be used as constituents of other steps. For example, **-<** can be used as a symbol for a connecting tool. **I ->-<** is the interpreter offering, for example, a butterfly net. **I ->:** is the interpreter offering a tool for attention, like a pair of binoculars or a mental analogy.

The heart of interpreting is the suite of actions signified by **I → {P R}** ... *to establish communication ... between you and Yosemite Valley (Hof)*. What can **I** do to help establish this communication, to assist and guide **P** in developing and keeping ideas and feelings about **R**, to have a relationship with **R**? What steps can the interpreter take? Creating **{PR}** involves actions by **P** and potentially by **R**, too. What steps can **P** take? What steps can **R** take? What steps by **P** and/or **R** may the interpreter want to coordinate with? And what are the conditions relevant to taking such steps?

Clearly, the suite of actions signified by **I →{P R}** is potentially complex. But these are the factors of interpreting which we want better to understand. By delineating these steps and step sequences, we become aware of where they may break down and from what a "failure to communicate" can arise. This is a vital area for future research.

The interpreter, **P** and **R** can take many types of steps. The categories below outline some major functions that step-taking serves in interpreting and issues related to those functions. In no sense are the categories mutually exclusive. An offering step may clarify, for instance, and vice versa. Nor are the categories necessarily exhaustive of everything an interpreter or **P** or **R** might do to interpret.

Exposure of P to R

One step the interpreter may take is to expose **P** to **R**, providing the opportunity to experience it: **I** ->**R**, **RP**. This step alone may be sufficient for interpreting, since with exposure some degree and kind of **{P R}** can be established.

If **P** already is looking at the mountain, no action need be taken by the interpreter. In this case, arguably, interpretation is lacking. But assembling a group on the meadows at Sunrise to watch the dawn bathe Mount Rainier in lilac and pink is interpretive. And further attempts "to interpret" such an experience may well detract from the experience. Arranging exposure to **R**, particularly a specific timing or location of exposure, is a basic component of the interpreter's toolbox we may want to learn more about.

Attention by P to R

Experiencing the grandeur of sunrise, however, shades into something more than just exposure to the mountain. Usually, the interpreter works to ensure **P** attends to **R** and focusses on it (or some part of it, some time of it, or an idea about it): ... *aiding people in perceiving and experiencing [something] that they might not otherwise experience without interpretation (Hammit)*. Toward this end, he may offer opportunities to physically interact with **R** ... *through the use of original objects, by first hand experience, and by illustrative media (Tilden)*. Or he may reveal something new and unexpected about **R**, including conceptual things, **r**, about **R**. Again, attention may occur without action by the interpreter, and still leave plenty of room for interpreting: "Hey Ranger, what bird is singing that lovely song?".

Steps that Offer

Offering something for **P**'s consideration is central to much interpreting. That which is offered may reveal or assist the revealing of something about **R**. Offerings also may clarify or assist **P** in experiencing **R**. **R** itself may be offered. Providing exposure to **R** (or opportunity for exposure) is one type of offering.

Forms for offering are numerous. Any of the senses would be appropriate for offering. A useful division might be by the "mode" in which the offering is processed by P. Educational psychologists have identified four basic modes: tactile ("Pick it up and feel it!"), kinesthetic (acting out, for instance, the role of a predator or the motion of a tree in a windstorm), auditory ("Listen to what I say"), and visual modes (Christensen 1985). Each mode has many possible expressions. For example, auditory offerings include talking, reciting (someone else's words), music, singing, noises, sounds, even silence. Visual expressions include text, pictures, motion pictures, live plays, graphics, maps, and real objects. The absence of something can be expressive as well. At Wind Cave National Park, as the guide quiets the group, then turns out the main light, then douses the last flashlight, silence and utter darkness become key interpretive experiences.

Steps that Connect

Helping P "connect" with R, some part of R, or an r can be important to interpreting. Connection enables P readily to pursue his own steps in exploring, questioning and experiencing R. It supports P's ability to make something of R. Give someone a salt crystal, and that person can feel it, taste it, weigh it, scratch it with a knife and scratch a fingernail with it, streak it on a ceramic plate, and/or hear it squeak against another crystal.

Connecting with R can be as simple as giving R to someone or bringing someone to R. Connecting may also entail providing tools for manipulation -- scales for weighing, for instance, or the concept of scales of hardness. (The notation system in this dissertation is offered as a tool for manipulating, mentally and on paper, concepts about interpreting.)

Steps that Clarify

Clarifying is a key process in any communicating. Such an iterative step-taking is characteristic of natural conversation (Goffman 1967, Hymes 1972, Schegloff 1972); often, these iterative steps involve the thematization of validity conditions. (P: "How do you know that?" I: "We round them up every year and

count them.") The discussion of validity conditions in Chapter IV pointed out some clarifying steps **P** and **I** can take to develop their communicative relationship, through thematization of validity conditions. Such steps can be useful for understanding parts of interpreting, but are not unique to interpreting nor sufficient for understanding all of it.

Clarifying steps and sequences of steps often take the form of a question. But steps to clarify need not be questions, nor need they be verbalizations. Relocation to get a better "view" of something, physical handling and manipulation of an object, and mental "manipulation" of an idea can all clarify.

Ham and Shew (1979) suggest that the opportunity to ask questions of **I** increases **P**'s enjoyment of interpretive activities. Anecdotal information also suggests that getting **P** to ask her own questions makes for stimulating interpretation. Such questioning works to clarify either or both r^I and r^P ; it also may generate new r^P s. (**P**: "But why isn't this apple red?" **I**: "It isn't ripe yet." **P**: "But it's on the same tree as that red one!" **I**: "Does that tell you something?" **P**: "You mean all the apples don't ripen at the same time?" **I**: "Yep! That's right.")

The interpreter, also, may want to check to see if an r^P is the same as the r^I put forward. Sometimes, congruency may be important, with incongruencies leading to additional clarifying steps on the part of **I**. In other instances, the interpreter may just want to see what **P** has come up with on her own. Either can be accomplished by asking for direct expressions of r^P , or by inference from other expressions or actions. The researcher, too, often uses degree of congruency between r^I and r^P to look at interpreting. This may sometimes be the best we can operationally muster, though it is a long way from looking at **{P R}**.

Besides direct clarification, **I** may also redirect **P**'s attention to **R** or r , or may re-expose **P** to **R**. (**P**: "How do you know that?" **I**: "Watch, and you will see what happens.") Such reconnection with **R** may clarify. It may also reinforce the existing relationship, providing the opportunity to make something new of **R**, or leading to new questions.

Another type of clarification may occur during or after interpreting. **P** will check her ideas (r^P , including about r^I) against **R**. No interpreter need be involved.

Steps by **R**

So far, the discussion has centered on steps by **I** and **P**. But **R**, too, can take steps. People and animals as **R** take steps, of course. But not only animals. Plants, even inanimate objects can take (or provide) movements and actions which can influence and be part of interpreting.

Perhaps the most obvious step by **R** occurs as what the profession calls an "interpretive moment". An osprey swoops down to snag a fish, a deer emerges from the woods, an iceberg calves off the glacier, or from the group is heard "Hey Ranger! A snake!" Interpreters are trained to take advantage of such serendipitous interpretive opportunities. But the interpreter can increase the chances of them happening by attention to **R**'s step-taking. For instance, the interpreter can learn when and where animals are most active or least frightened of people, or which glaciers are advancing fastest and have the highest calving activity. Both personal and non-personal interpreting can be structured to take advantage of such knowledge. We can take a group to where the wolves were heard howling the night before, or locate an interpretive sign at the most active geyser. Even more simply, an interpreter could, for instance, focus on deciduous trees when the leaves are changing color and falling in autumn, and on evergreens when they are most obviously such, in the middle of a snowy landscape.

P's steps, too, can be influenced by **R**'s steps. Distributing schedules for Old Faithful or providing a notice system to alert people to uncommon occurrences currently in progress are good interpretive strategies.

Captive animals may be encouraged to take interpretive steps. Adjusting feeding schedules or strategically locating grooming areas may accomplish this. Also, captive animals may be trained. (This is not advocating "pet tricks" but getting animals to do "animals things" at appropriate times and places). For instance, a

captive hawk can be trained to spread its wings or talons on command, or an alligator to gape its jaws, or, simply, a farmyard sheep to let young children feed it grain.

Revealing

With exposure and attention, the minimum requirements are met for **P** to establish a relationship with **R**, to make something of **R**. But a key part of "interpreting" is still lacking: revelation. As discussed in Chapter III, revelation of something about **R** that is unknown or hidden from **P** is central to interpreting, helping to distinguish it from other forms of communication. The many aspects of *revealing* include how, what, when, and by whom. Also, revealing only starts the process; there are several more steps in revelation.

How Revealing may occur through offering or sharing something ("Look at this!"). Or revealing may occur through providing **P** a new, different look at something -- by asking questions, by focussing attention, or by exposure or re-exposure. Revealing may be cognitive (offering facts or ideas). It also may be temporal (the sunrise assembly is an example) or physical, as from a changed perspective or from physically removing an obstacle. People can't climb inside a tree, but we can supply "tree cookies" for them to hold and count rings. Revealing may also be psychological: "Listen very carefully as we go along". Enhancement of the senses, physically (a magnifying lens, for instance) or psychologically, is a tool for revealing often used by interpreters.

What The unknown, that which is revealed, could be **R** itself, or a physical part of **R**, unnoticed until pointed out by **I**: ...*expand a horizon ... [of] individuals not previously aware of the situation (Coutant), ... an environmental resource that they might not otherwise experience without interpretation (Hammit)*. Likewise, **R** itself might be hidden in something. Information about **R** also may be revealed: ... *the communication of information (Beechel), ... environmental knowledge (Brown), ... ideas (Sharpe)*.

But "information" alone is insufficient for interpreting. Something more is revealed: ... *"Interpretation", by contrast with information, conveys the meaning of*

something (Grater), ... explaining the "hows" and "whys" behind something (Biggs and Roth), ... to bring to light an underlying coherence or sense (Taylor), ... revealing meanings and relationships (NAI), ... the revelation of significance (Edwards), ... the revelation of a larger truth that lies behind any statement of fact (Tilden), ... in which wisdom reveals itself (Inuit). Let us call these significance and meaning.

Interpreting also can reveal emotions and feelings. Whether these are to be shared or stimulated is unclear; perhaps both may be appropriate: ... *tug at the human emotions (Brown and Cherem), ... excite in others a response (Corbin), ... sharing of an experience (Files), ... the helping of the visitor to feel something that the Interpreter feels (Wallin).*

When Revealing may occur at one or many points in interpreting. The example of a sunrise on Mount Rainier is a case where the revealing constitutes the interpreting. Other, direct "revealings" may occur during interpreting, through the offering of facts or ideas or the sharing of feelings. And revealing may come as the result of interpreting. On a walk, have each person pick up a douglas-fir cone. Tell the tale of the forest fire, and the mice who sought shelter in the only tree with bark thick enough to keep it from crashing to a fiery end. Then, "prove" the story to them: have the people find the "mice" hiding in the cones of the tree.⁸

Who takes the step(s) to reveal something also may be of interest for researchers. **P** may reveal things to and for himself. **P**₂ may reveal things to **P**, and vice versa. **I** may reveal things to **P**. And **R** may act to reveal something about itself, too.

Revelation

Despite all that may be done to *reveal* something to **P**, **P** must do something, too, for *revelation* to occur. **P** must attend to and make something of what is

⁸Bracts between the scales on a Douglas-fir cone have long "tails" with short "feet" on each side and look like mice trying to hide under the scales.

revealed. The process of *revelation*, then, involves at least three steps. The following are examples of some forms of interpreter-assisted revelation.

I ->R, RP, P:R, {P:R} The interpreter exposes **P** to **R**, **P** attends to it, and makes something of it.

I ?>r, P:r, {P:r}, {P:R} A sign asks a question, **P** thinks about it and understands something new about **R**.

I ->-<, P:-<, I ->R, P:R, P -<R, {P:R} **I** offers a tool for connecting (e.g. an insect net), and **P** watches how to use it. **I** then offers exposure to the insects, **R**, **P** attends to them, and uses the net to catch some. Lastly, **P** appreciates something about insects: at least, how hard they are to catch.

Steps by P

P may, of course, take his own steps to become familiar with **R**, including exposure, attention and connecting. He also may reveal things to himself, through many of the same kinds of steps **I** can use. Differences lie in, for example, **P**'s skills and abilities at revealing: the time he has, including time to prepare; and his access both to **rs** and **R** (all presumed more restricted than those for **I**). Also different may be **P**'s prior interest in **R**, leading him to (or not to) concern himself with **R**.

Cognitive Steps by P

With exposure and attention and something revealed, the minimum requirements are met for **P** to establish an interpretive relationship with **R**, to make something of and with **R**. Converting **P:R** and/or **P:r** into **{P R}** is up to **P**. It is **P**'s step(s) to take. But the interpreter is there to help, and to help he will need to understand how **P** takes the step(s). The more we understand, through research, the better we can delineate steps the interpreter can take to help.

Scientists have developed numerous theories and models to address the mental processes by which people make something of the world. It is not the purpose of this dissertation to attempt a review of scientific knowledge in this arena. Rather, general points are noted and specific ideas from the interpretation literature introduced to

provide context for placing steps used by and available to the interpreter. This context also suggests areas for future work by researchers in interpretation.

To understand how to interpret better, we need to understand if and how **P** develops ideas and feelings, if and how these are remembered and forgotten, and the role of the senses ... *senses which await to be aroused by the interpreter (Chapelle)*. As Knotts (1984) pointed out, these are both physical senses: touching, tasting, feeling, seeing, hearing, smelling, and mental senses: curiosity, memory, beauty, responsibility, wonder, and "common sense". We need to understand the way **P** employs these senses: attending, connecting, handling, manipulating, cognizing and expressing (Carter 1985). We also need to understand how much experiencing **P** can handle at one time, how prior experiences may shape future ones, and which prior experiences may enable future ones to happen.

Such understanding will help us identify steps **I** can take to assist **P** to form **{P R}**. Steps **I** can take include choosing modes and sequences for attending to **R** and **rs**; choosing specific **rs** to make focal for **P**; choosing ways to present those **rs**; and setting expectations for the boundary and state of the **{P R}** relationship. In short, better understanding will help the interpreter "assist experience" by creating opportunities for **P** to exercise her own faculties in forming **{P R}**.

Ideas from cognitive and behavioral psychology in particular have been explored by interpreters. Hammitt (1981a, 1984) noted the potential applicability of cognitive map theory and emphasized the relevance of continual evolution in **P**'s cognitive patterns. Ham (1983) incorporated similar ideas in his synthesis of findings from cognitive psychology applicable to interpretation. He emphasized meaningfulness and relevance in **I**'s communications, and the importance of themes, concept clustering and conceptual frameworks in presenting an **r** for **P** to consider. Both provided potentially useful guidance in exploring **{P R}**. Further mining of this literature and related communication theories might prove fruitful to researchers.

Availability of Steps

Which steps can be taken by **P**, **I**, and **R** will affect and often define what interpreting takes place. Researchers, in particular, need to be clear on what steps are available so as not to confuse lack of effect with no possibility of effect.

Limitations on steps arise from two sources. One is capability -- does **P** (or **I** or **R**) have the competence (knowledge, skills, physical and mental abilities, etc.) to take the step? These are conditions of the elements.

The other limitation on steps arises from the situation, restricting use of the capabilities available. Interpreters are familiar with "If I only had the money I could ...". Money is one type of situational limit. Some of the many others are discussed in the next paragraphs.

How may **R** (or \mathbb{R}) be experienced? Is it visible, touchable, tastable? **I** may have some control over this. People who never get off the bus have a different experience than those who take advantage of a stop to stretch their legs and feel the spring of the prairie sod underfoot. Also, if all of **R** is not available for direct experiencing, all or parts of it may be invoked through imagination. But can and does **P** make this leap? And does each **P** in a group experience the same imagined **R**? When **R** is being called to mind (based on past experience or current description), the steps available for garnering new experience are limited, and the chances for interpretive mishaps greater. When the mountain is fogged in, interpreting the fog may be more reasonable than trying "On a clear day you would see that ...".

In recreational settings, special demands are placed on interpretive communication (Field and Wagar 1973). These demands may not be unique to recreational settings. Two of these demands have import for both the cognitive and physical steps available to develop **{P R}**.

First, **P**'s time for attending to the interpreting is limited. Thus, the steps **P** can take also are time-limited. We need to understand how quickly (not just how and how well) people incorporate new information or generate new ideas of their own.

We need to consider whether **P** is given enough time to take the steps he is capable of -- time to mull over the **rs** proffered by **I**, and to mull over **R** -- to create his own impressions. (This is different from, but complementary to, how many minutes or seconds **P** spends attending to **I** or **II** or **R**.) Likewise, the chance for further steps to experience **R** means that interpreting for visitors staying a week or coming back for their second visit will be a different experience than for those staying only a day. Different steps are available to them. Multiple visitation offers its own opportunities for step-taking (see the discussion under sequencing of steps).

Second, **P** usually has no external incentives to pay attention to either **R** or **I**, nor can there be sanctions for "failing" to grasp an interpretive message. Internal incentives may exist, such as the desire to get one's money's worth, entertainment value, or a desire to know. But generally **I** must work to capture or harness **P**'s interest and attention, both initially and throughout the interpreting.

Clarifying steps also may or may not be available. Clarification of communications and ideas is a powerful tool, as discussed above. Chances for clarification are often available during personal services. Clarification seldom is available with cartifacts. An exception may be interactive exhibits, like the quizboard (Wagar 1972) or computer games (Gillies and Wilson 1982) or, more recently, interactive video. Here, **P** is given a chance to clarify his understanding of **R**; for instance, r^P is elicited and compared to r^I . Sequencing exposure to cartifacts and sequencing their content to anticipate questions raised by **P** may be means to provide clarification in non-personal interpreting.

Coordination of Steps

The "interpretive dance" -- the coordinated steps taken by **I** and **P** (and **R**) to mold **{P R}** -- can take a multitude of forms. I present here two basic sequences that are evident in the definitions of interpretation. They illustrate the difference adding a simple step to a basic core can make in interpreting, and how adding different steps can lead to very different results.

1) First, consider $I \rightarrow R, R:P, \{P R\}$: ... *experiencing an environmental resource that they might not otherwise experience without interpretation (Hammitt)*. Here, the interpreter exposes P to the resource, followed by P attending to it and making something of it (forming a relationship with it). To some, this might seem devoid of interpretation, but for some R s and P s it may be quite appropriate. It may occur inappropriately too, especially in the form $I \rightarrow \mathbb{R}, P:\mathbb{R}, \{P R\}$. Or is it $\{P R\}$? Usually we don't know. We put up a picture with a name or even a description on it, and call that interpreting. But is it? Or, to be less philosophical, is it good interpreting?

Adding a simple step to this first sequence creates a powerful form of interpreting. That step is P asking a question; thus $I \rightarrow R, R:P, \{P R\}, P ? > r^P$. ("Gross! But without a shell, don't slugs just get gobbled up whenever something finds them?"). P can direct the question to I . Or P may direct it, physically, to R , seeking new experience and new revelation; this is called experiential, hands-on learning. When the question is answered, the step sequence becomes $I \rightarrow R, R:P, \{P R\}, P ? > r^P, \{P R\}_{\text{revised}}$. The interpreter can mold this experience in several ways (besides just answering the question). Questions may be elicited from P , directly or by offering generic or leading questions (via I or \mathbb{I}). The interpreter may direct the question to R , encouraging direct experience. "Pick up the slug and see if you can tell why most birds won't eat one." Or the question may be directed to another P who is present, encouraging shared thoughts and shared questions. The interpreter might also ask a question back to P . Through questioning, P is able to add considerably to her relationship with R (and with I and, potentially, other P s). We would expect P 's feelings toward R to change and her knowledge of R to increase.

A step may be added at the beginning of the exposure sequence, too, with different results. Here, the interpreter primes the visitor for the experience prior to exposure to R . For instance, the interpreter can ask a question: $I ? > r$, or offer an idea $I \rightarrow r$. Another example of such "priming" would be perception training:

having **P** practice smelling, listening, seeing, prior to going out to meet the resource. Roth and Hodgson (1979) found that perception training significantly enhanced the pleasure visitors felt during an environmental encounter.

2) Now consider a second basic sequence, $I \rightarrow r$, $P:r$, $\{P r\}$. This is the offering or sharing of something about **R** (here, via cartifact): ... *the communication of information (Beechel)*, ... *conveys environmental knowledge (Brown)*, ... *communicating ideas (Sharpe)*, ... *sharing of an experience or idea (Files)*. But as discussed in Chapter IV, this is an incomplete conception of communicative reality.

A more complete delineation of such communication would be: $\{I R\}$, $I:r$, $\{I:r^I\}$, $I \rightarrow r^I$, $P:r^I$, $\{P r^I\}$, $\{P R\}$. The interpreter develops an idea; offers it, cartifactually in this case, for example as a sign noting that leaves are green because they contain chlorophyll; **P** attends to the sign, understands it, and incorporates it into his view of **R** (the trees).

Note how this step sequence differs from the transmission model of communication discussed in Chapter IV. **P** is not the recipient of an r from **I**. Rather, **P** attends to r^I , but then must make something of it, must create his own version, r^P .

The interpreter has many tools available for presenting r s or r s. The reader can mine the interpretive practices literature for instruction in using them. The key however, is that each is necessarily imbedded in a minimum sequence of steps, and can be imbedded in many other steps, including exposure and re-exposure to **R**.

The congruence of r^I with r^P is what we often seek, and, for research purposes measure, in interpreting. Clarifying steps to reach congruence between r^P and r^I have already been discussed. Remember, though, that incongruence can arise from any of the steps, not just the presentation of the information. Sources of incongruence are more fully explored in the discussion of research measures in Chapter VII.

Congruence of information is not the same as what **P** makes of **R**. Any particular r^P will be only one of many factors (among them other r^P s) which

influence {**P R**}. So we expect low correlation between any particular **r** and {**P R**}. That six people in a group learned how long salmon fry stay in their home stream does not mean each will want to protect that stream as much as the other people do, nor as much as the interpreter does. Only in special cases where the shared **r** dominates possible relationships with **R** -- such as if **r** is the only, or only salient, point about **R** for most everyone -- would we expect r^P to predict {**P R**}.

Sequencing of Experience

In any interpreting, **I** must decide which **R** and which **rs** to make focal to **P**. (**P** may focus on others, as well. **R** may also play a role: "Ranger! A snake!") **I**'s decisions must, in part, be based upon the expected ability of **P** to incorporate the ideas and experiences into a "sense" of **R**. In particular, what does **P** need to know before he can learn the next thing? Some things may be best experienced in a certain order. **I** should also be wary of throwing everything at **P** at once; the phenomenon of "museum fatigue", which Robinson (1928) aptly noted is a mental overload rather than physical weariness, is well established.

The need for sequencing is well understood and practiced in education, where regular, repeated contact with the student is expected (Hammitt 1984). Many interpretive settings, in contrast, offer no expectation of multiple contact with the same **P**. Sequencing is usually thought of in terms of minutes or hours, not days or months. This need not be so. Veverka (1978) has pointed out opportunities for sequencing of experiences across interpretive sites, or within a site. Sequencing would potentially permit a more complex **R** and more complex **rs** to be made focal. Such complexity would be highly appropriate for repeat visitors to multiple sites, as Bultena et al. (1978) found.

Intent

In discussing the role of the interpreter in influencing {**R P**}, the issue of intent can not be avoided. If the goal of interpreting is to have **P** experience **R**, to develop a relationship with it, what characteristics does the interpreter want that relationship to have? For instance, which facts or ideas? What boundaries or states?

What about **P**'s empowerment for future actions, including future experiencing -- **P**'s ability to add new ideas, forge new bonds, and alter the state of the relationship? When interpreting intends to go beyond just assisting experience, to structuring the outcome of that experience, such questions are relevant.

Intent often relates to agency concerns: ... *the park's management objectives (Fischer)*. Interpretation may be intended to mold {**P R**} to a particular form. Promoting agency objectives has been seen as a legitimate role of interpretation (Fischer 1966, Sharpe 1982). But, as Edwards points out, it makes interpretation, in part, a propaganda service (cited in Sharpe 1982). Propaganda is a well studied field, and interpreters could do well to understand both its potential for use and abuse.

Intent may also relate to activist concerns: ... *experience to encourage future experience (Simpson)*, or ... *[to stimulate] discourse on environmental problems and result in environmental reform (Brown)*. Interpretation may intend to abet a particular function. The linkage between actions taken and understanding, feelings, knowledge, attitudes or similar factors, is also a well studied field to which interpreters may look for insight. Cable et al. (1986) and Hungerford and Volk (1990) discussed the application to interpretation of two methodologies to study such linkages.

Researchers should be wary, however, of equating propaganda or activist effect with interpretive effect. If the only measure of success we use is meeting the agency's or the activist's intent, the success of propagandizing or empowering is being measured, not the success of interpreting per se. In interpreting, **P** develops his own relationship with **R**. And that relationship may be different -- in what facts and ideas are salient, in where its boundaries fall, in the affect **P** has toward **R** -- from the relationship the interpreter, as agency or activist, intended. The argument is not whether interpreters should use agency and/or activist intent to structure interpreting (that is a philosophic question that appears affirmatively answered by the profession), but rather, that in evaluating success we should look for, and at, other

things as well. Interpreting and what interpreting accomplishes are much richer than whether an attitude changed or an action was taken.

Interpretive Contexts

Tables V-3 through V-5 indicate the contexts in which steps and step sequences discussed above may be relevant. Note that the marked cells indicate where a step may play a role. Whether it does in any specific interpreting is a matter the researcher needs to determine empirically.

COMPLEXES

In interpreting, the various relationships can not be divorced from each other, from the other elements, or from steps which are taken. Each may and will interact with the others, and we need to be aware of these interactions. I call such compound interactions *complexes*.

For instance, {P I} can not be divorced from {P R}. In particular, the "state" of {P R} may influence {P I}. For instance, P's ideas about R will be compared to what I is saying. Social psychology research suggests that congruence between P's existing ideas and what he hears from I would improve {P I}; lack of congruence would lead to reevaluation and questioning of I by P.

Likewise, the "state" of the {P I} relationship will affect {P R}. One measure of state would be affect -- e.g. positive, negative, neutral. Effects of affect would be evident, for instance, when a negative relationship caused P to reject or discount what I brings to the interpreting (Grater 1976). A sloppy interpreter who makes a poor first impression often makes only that impression. A misspelled sign may be more remembered for its misspelling than its content. In such cases, P might still form a relationship with R, but it may be jaundiced by the presence of I. A highly positive {P I} relationship can have the opposite effect, leading to greater positive feelings of P toward R. Thus, we would expect, for instance, a greater feeling of kinship by P with R when P feels kinship with I than when she doesn't. Advertisers have used this effect for years (Sargent 1965).

Table V-3 Steps by P in the interpretive contexts. Marked cells indicate contexts in which the step may play a role.

P	P (alone)						P with P ₂							
	not present			R present			not present			R present				
	none	I	I	none	I	I	none	I	I	none	I	I		
-	+	-	+	-	+	-	+	-	+	-	+	-	+	
Interpretive service interaction														
Steps by P														
PR exposure														
PIR exposure														
P:R attention														
P:R attention														
P:r ^I attention to I's idea														
P:r ^P attention to P's idea														
P:r ^I attention to I's cartifact														
P:r ^P attention to P's cartifact														
P !> r ^P remembering														
P -> r ^P offering														
P ?> r ^P asking														
P ?> r ^I asking														
P -<R connecting with R														
P -<R connecting with R														
P -<r connecting with r														
PI exposure														
P:I attention														
PII exposure														
P:I attention														
P -<II connecting														

Interpretive service = The type of interpretive service: none; I non-personal; I personal.
 Interaction = Interaction of P with the lowest element present in the context hierarchy (from lowest to highest, I or I, R, P₂).

Table V-4 Steps by I in the interpretive contexts. Marked cells indicate contexts in which the step may play a role.

P	P (alone)						P with P ₂							
	not present			R present			not present			R present				
	none	I	II	none	I	II	none	I	II	none	I	II		
Interpretive service interaction	-	+	-	+	-	+	-	+	-	+	-	+	-	+
Steps by I														
I -> R offering exposure to R														
I -> R offering exposure to R														
I -> I offering an idea														
I -> I offering an idea via cartifact														
I ? > I asking questions														
I -> : offering tools for attending														
I -> -< offering tools for connecting														
II -> R offering exposure to R														
II -> R offering exposure to R														
II -> I offering an idea														
II -> I offering an idea via cartifact														
II ? > I asking questions														
II -> : offering tools for attending														
II -> -< offering tools for connecting														
I:R ^I attending to P's idea														
I:R ^I attending to P's cartifact														

Interpretive service = The type of interpretive service: none; II non-personal; I personal.
 Interaction = Interaction of P with the lowest element present in the context hierarchy (from lowest to highest, I or II, R, P₂).

Table V-5 Steps by P₂ and by R in the interpretive contexts. Marked cells indicate contexts in which the step may play a role.

P	P (alone)						P with P ₂					
	not present			R present			not present			R present		
	none	I	I	none	II	I	none	II	I	none	II	I
Interpretive service interaction	-	+	-	+	-	+	-	+	-	+	-	+
Steps by P ₂												
P ₂ -> R offering exposure to R												
P ₂ -> R offering exposure to R												
P ₂ -> P ₁ offering an idea												
P ₂ -> P ₁ offering an idea via cartifact												
P ₂ ? > P ₁ asking questions												
P ₂ -> : offering tools for attending												
P ₂ -> < offering connecting tools												
P ₂ :P attending to P's idea												
P ₂ :P attending to P's cartifact												
Steps by R												
R -> R offering exposure												
R:P attending to P												
R:I attending to I												
Interpretive service =												
Interaction =												

The type of interpretive service: none; II non-personal; I personal.
Interaction = Interaction of P with the lowest element present in the context hierarchy (from lowest to highest, I or II, R, P₂).

Often, as in the above example, it is one participant's view of a relationship with another participant that is relevant.⁹

In some definitions of interpretation, exposing **P** to **{I:R}** or getting **P** to share some, usually emotive, part of **{I:R}** is the intent of interpreting: ... *the helping of the visitor to feel something that the Interpreter feels (Wallin)*, ... *an experience in which you, the interpreter, excite in others a response to a work ... comparable to your own response (Corbin)*. Clearly, sharing **{I:R}** is one tool an interpreter can use to mold **{P R}**. **{I:R}** is used as an **r** offered to help **P** form a relationship with **R**. But only if the **{I:R}** relationship is the subject of interpreting -- is made **R** -- can interpreting stop at **P**'s interaction with **{I:R}**.

Complexes play a significant role in interpreting. The possibilities are vast. They encompass essentially any combination of elements, relationships, and steps available in a single interpretive context. Complexes that researchers have studied are listed in Chapter VI.

SUMMARY

A conceptual framework for interpreting has been presented in which three main actors -- **P**, **R**, and **I** -- all play roles. It is the many-possibilitied interplay of the three elements, the steps they can take and the relationships they can forge, that make up interpreting. This chapter has delineated key factors in that interplay -- factors related to the elements, to their relationships, to possible and actual steps, and to the conditions of each. These factors are the conceptual building blocks and the conceptual mortar of interpreting.

⁹A's views of B's views of x can be represented as **{A:{B:x}}** and can include B's views of A, (represented as **{A:{B:A}}**) or even A's views of B's views of A's views (**{A:{B:{A:x}}}**). These are basic concepts of many cognitive and behavioral models which have been applied to communication and may find application to the study of interpreting. See, for instance, Wiemann and Bradac (1989) on the study of communicative competence, or Kim (1986) on coorientation.

In the next chapters, the factors salient to the conceptual framework that have and have not been studied by researchers are assessed. Research questions and hypotheses that emerge from the framework are discussed and methods and techniques for addressing them are explored. Some key predictions are identified that may serve as tests of the framework's validity.

CHAPTER VI

COVERAGE OF INTERPRETATION RESEARCH

The previous chapter identified and discussed factors that play a role in interpreting. This chapter looks at which of those factors researchers have studied and which they haven't. The various research roles a factor has played are analyzed but not how well the factors were studied. How the various factors might fruitfully be addressed is examined in Chapter VII, including potential methodological and measurement tools.

Research studies on interpretive communication published from 1972 through 1990 were analyzed to identify the factors -- elements, relations, steps, and complexes -- that have been used as variables in research. The analysis noted whether the factors were used as independent variables, dependent variables, and/or variables controlled for (at least partially)¹⁰, and in which interpretive contexts the factors were studied. Chapter I discusses the literature analyzed and procedures used for this content analysis. Appendix B lists the factors and contexts for each of the 36 published studies.

In Chapter III, 24 interpretive contexts were delineated. Each context reflects the intersection of one of four communication situations with one of three interpretive services, with interaction available or not. In the tables in this chapter, a context is defined by a single column, traced from **P**, or **P** with **P**₂, down through the presence or absence of **R**, the interpretive service, and interaction.

Some studies included more than one factor as independent, dependent, and controlled variables and/or looked at more than one interpretive context. Each inclusion of a factor in a context was counted as a separate instance.

¹⁰The terms *independent variable*, *dependent variable*, and *control variable* may not be strictly applicable to all research included in the analysis -- correlational analysis, typology development, or a multifactor design, for instance. The terms are used, however, as familiar designations for what is expected to make a difference (independent variable) to which outcome (dependent variable) under specified conditions (controlled variables).

INTERPRETIVE CONTEXTS

Table VI-1 shows how many research studies were carried out in each interpretive context without regard to the factors that were studied in the context. Six studies compared two contexts and one study compared no-interpretation, a non-personal service, and a personal service.

Table VI-1 Number of research studies published from 1972 through 1990 carried out in each interpretive context. More than one context may have been used in each study.

P	P												
	not present						R present						
R	not present						R present						
service ¹	none		II		I		none		II		I		
interaction ²	-	+	-	+	-	+	-	+	-	+	-	+	
number	0	0	2	0	2	0	0	0	8	0	1	1	14
P	P with P ₂												
	not present						R present						
R	not present						R present						
service ¹	none		II		I		none		II		I		
interaction ²	-	+	-	+	-	+	-	+	-	+	-	+	
number	1	0	6	1	1	4	0	0	5	1	2	9	30
¹ Service The type of interpretive service. - none; II non-personal; I personal. ² Interaction Interaction of P with the lowest element present in the context hierarchy (from lowest to highest, I or II, R, P ₂).													

The most used context for research (nine usages) is a live interpreter, in the presence of R, interpreting interactively for more than one person (PP₂RI+). The next most used context (eight times) is a non-interactive, non-personal service used by one person in the presence of R (PRI-).

Across all contexts, non-personal services were studied 23 times and personal services 20 times.

Research has not been carried out in 10 of the contexts, including five of the six "no interpretation" contexts. In these, other communication research may be available. Three "interpretation present" contexts that remain completely unstudied are PnII+ and PRI+ (interactive, non-personal services used by one person with or without R present, such as interactive computer games), and PnI+ (an interpreter interacting one-on-one with someone without R present, such as in a museum). Five other contexts have been included in research only once each.

INDEPENDENT VARIABLES

Table VI-2 shows the factors -- elements, relationships, steps and complexes - - used as independent or manipulated variables in the 36 published research studies. (Because studies may include more than one independent variable, the numbers add to more than 36.)

Non-personal Services

The factor most commonly studied as an independent variable has been non-personal interpretation services (II) -- signs, brochures, exhibits, etc. These were studied alone 16 times and coupled with a personal service (I) 13 times. Of the 16 times that personal services were studied alone, "straight effects" (e.g. interpretation versus no interpretation) were analyzed seven times and "relative effects" (e.g. brochures versus audio-tapes) six times.

Personal Services

The next most commonly studied factor has been live interpretation (I). Nine examinations of straight effects and two comparisons of one personal service versus another have been reported. The relative effects of an interpreter plus a non-personal service (e.g. a ranger handing out a brochure) versus a non-personal service alone (e.g. a brochure picked up from a box) have been studied four times. The relative effect of an interpreter versus a non-personal service has been studied nine times.

Table VI-2 Independent variables in studies of interpreting published 1972-1990. Only studied factors are shown.

P	P alone				P with P ₂																				
	not present		R present		not present		R present																		
	none	I	none	I	none	I	none	I																	
service ¹	-	+	-	+	-	+	-	+	-	+	-	+													
interaction ²	-	+	-	+	-	+	-	+	-	+	-	+													
Elements																									
P																									
I		1																							
I ₁ vs I ₂								1																	
I ₁ vs I ₂	1				1																				
I vs I																									
I vs none																									
(I+II) vs I																									
R ₁ vs. R ₂ (subject)	2																								
R vs R																									
r ₁ vs r ₂ (content)																									
Relationships																									
{P:R} attitude, etc.					2																				
{P:P ₂ } group effects								1	1																
Steps																									
PI exposure		1																							
PII exposure						4																			
PR exposure																									
II -> I ¹ offering	1																								
II -> I ¹ vs II ? > I ¹ offer v question																									
I -> : offer sensing tool																									
TOTALS	0	0	4	0	2	0	0	0	9	0	1	2	1	0	8	1	1	5	0	0	7	1	2	10	54

¹ Interpretive service = The type of interpretive service: none; I non-personal; I personal.

² Interaction = Interaction of P with the lowest element present in the context hierarchy (from lowest to highest, I or II, R, P₂).

Given the ongoing tension within the profession over personal versus non-personal services, tied to among other things cost and professional opportunity (see, for instance, Mullins 1985) even more **I** versus **II** studies might have been expected.

Other Factors

Only eight factors other than **II** or **I** have been manipulated as independent variables, most only once. Each of these is important to interpreting. In particular, prior exposure to **R**, a cartifactual \mathbb{R} versus the real **R**, and the availability and use of questioning, appear crucial. Manipulation of these to learn more about the differences they make to interpreting should be high on a list for study.

R also is important to interpreting. But the differential effects of various **R**'s have been looked at by only two studies, both of which focused on resulting attention to the interpreting. The effect of different **R**s on other factors, such as **{P R}**, **P < R**, or **{PRI}** needs exploring.

It is equally interesting to note the extent of what has not been studied. Four of the ten elements (delineated in Chapter V), 11 of 13 relationships, 17 of 20 steps by **P**, and 13 of 16 steps by **I** have not been used as independent variables in research. Nor have steps by **R** or by **P₂** been studied. There appears to be a wide and productive field for future research.

DEPENDENT VARIABLES

The factors measured as dependent or outcome variables in existing interpretation research are shown in table VI-3.

Attention and Comprehension

Attention was evaluated as a dependent variable four times in the 36 studies analyzed. (It was otherwise controlled for only 3 times, Table VI-4.) Comprehension was a dependent variable once, and was not explicitly controlled in any study. Perhaps researchers assume that attention and comprehension are integral to good interpretation, and are taken care of by careful interpreters practicing their craft. But attention, at least, has been recognized as a basic measure of interpretive

Table VI-3 Dependent variables in studies of interpreting published 1972-1990. Only studied factors are shown.

P	P alone						P with P ₂																		
	not present			R present			not present			R present															
	none	I	I	none	II	I	none	II	I	none	II	I													
service	-	+	-	+	-	+	-	+	-	+	-	+													
interaction	-	+	-	+	-	+	-	+	-	+	-	+													
Relationships																									
{P:R} attitude, etc					2	1	1			2		2													
{P:I} "liking", etc,		1										2													
{P:II} "liking", etc,	1				2			1				4													
{P:ir} comprehension					1							1													
Steps																									
P:I attention		1										1													
P:II attention	1				2							3													
P!>R recognition of scene					1							1													
P!>I' knowledge					3		1	1	1	3	4	2													
P->I' new critical thinking											1	1													
P-<II connecting (during)					1			1				3													
P-<II connecting (intent)							1					2													
P-<R connecting (after)					1			3		1		9													
P-<R connecting (intent)										1		1													
Complexes																									
P:{PR} awareness												1													
P:II...{P:R} mindfulness								1				1													
P:1...P:2... use of senses												1													
{P:{R r}} beliefs										1		3													
{P:{P:r}} perceived knowledge										1		4													
{P:{PRI}} "enjoyment", etc.												5													
{P:{PRII}} "enjoyment", etc.											2	5													
{I:{PRI}} "satisfaction", etc												1													
{I:{PII}} "satisfaction", etc.												1													
TOTALS	0	0	2	0	2	0	0	0	16	0	3	2	3	0	7	3	1	9	0	0	12	2	6	17	85

effectiveness (Wagar et al. 1976, Lime 1988) that we could use more often.

Knowledge

Direct measures of "knowledge" are the most widely used dependent variable in research in interpreting (20 of 85 dependent variables, or 24%). Indirect measures of P's learning ($\{P:\{P:r^P\}\}$), rather than specific measures of "knowledge", were used four times.

Steps

P connecting with R Actions or behavior by P toward R account for eleven percent (10 of 85) of the dependent variables in the research studies. The majority (9 of 10) looked at P's actions toward R after the interpreting. Eight of the nine were measures either of vandalism or of choices of recreation areas to protect the resource. These are agency concerns. Only one study looked at interpreting's effect on P's affinity for R as evidenced by further actions, in this case revisiting R. We could learn from indirect observations as well, such as whether P pauses to listen to birds more often after interpretation about birds.

P connecting with I P's use of interpretive material, P - < I, as part of the interpretive experience was employed twice as a dependent measure. Intentions to reuse the interpretation (reread a brochure or attend the same tour again) also were measured twice.

Other steps by P Only one study looked at a kind of action by P different from behavior toward or against R or I, in this case P's use of various senses as part of the interpreting. Differential effects of the various senses were not explored, however.

Others' steps All of the steps employed as dependent variables pertain to P. But there are other actors in interpreting, too; both I and R may take steps in response to interpreting. Their actions are a wide-open area for development of research measures.

Relationships

Measures of relationships and complexes made up over 45 percent (39 of 85) of the instances of dependent variables employed in research. But despite the use of similar or the same terms for measures in different studies, three different constructs actually have been assessed: $\{P R\}$, $\{P I\}$, and $\{PRI\}$.

Measures of $\{P R\}$ Measures of the $\{PR\}$ relationship accounted for 15 percent (13 of 85) of the instances of dependent variables used. The studies focused almost exclusively on one aspect, $\{P:R\}$. Terms for measures of $\{PR\}$ or $\{P:R\}$ used by researchers included *pleasure, liking, preference, familiarity, attitude, importance, and awareness*. Beliefs about R ($\{P:\{R r\}\}$) were measured in another 3 cases.

Measures of $\{P I\}$ Measures of $\{P I\}$ and its aspects constituted 9 percent (8 of 85) of the instances of dependent variables employed in the research studies. Most (7 of 8) looked at P 's perception of I : $\{P:I\}$ or $\{P:I\}$. Besides the *likes* or *dislikes* (and their variations) of the interpreter or service, measures of $\{P:I\}$ also included the *perceived authority, character and credibility* of the interpreter. One study assessed the interpreter's perception of $\{PI\}$ ($\{I:\{P I\}\}$).

Measures of $\{PRI\}$ Measures of $\{PRI\}$, the complete "interpretive experience", and its aspects have been used as dependent variables eleven times -- five for non-personal interpretation and six for personal services, all with R present. Two other common interpretation scenarios have not been studied: personal services with R not present, (e.g. slide-illustrated talks) and non-personal services with R not present, (e.g. off-site brochures or museum exhibits). P 's perceptions of the relationship, $\{P:\{PRI\}\}$ or $\{P:PR\}$ have been measured 10 of 11 times and I 's perception of it, $\{I:\{PRI\}\}$ only once. But whether I and P share the same view of the interpreting would be valuable knowledge for improving interpretation.

Other Dependent Measures

The remaining dependent measures were used only once each. Comparing the framework from Chapter IV to the tables in this chapter makes clear the broad

area from which additional dependent variables can be drawn. Of particular note is the absence of questions, $P \rightarrow$, from the list of dependent measures used. Whether interpreting stimulates P to ask about something deserves researcher's attention. Also of interest is the absence of any measure of augmentation, through interpreting, of P 's ability to take steps (regarding either R or I). Such empowerment has been seen as an important goal for interpretation (Brown 1971). P 's ability to take action or his confidence in his ability to take action would be measures available to researchers.

VARIABLES CONTROLLED FOR

Table VI-4 lists the variables controlled for in the 36 studies of interpreting.¹¹ Seventeen instances lacked direct control for any variable.

The variable most commonly controlled for (12 times) was an existing relationship between P and R , based on prior exposure. Conditions of P were controlled for ten times. Twelve other variables were controlled for four or fewer times each.

Attention and Comprehension

Of particular note is that attention to interpreting, $P:I$ or $P:II$, was only controlled for three times in 36 studies (and used as a dependent variable seven times). Comprehension, $\{P:r^I\}$ or $\{P:r^II\}$, was not explicitly controlled for. Communications research should always check whether a message is attended to and understood (Samuelson 1984). Interpretation research might well follow the same advice.

¹¹As noted by Isaac and Michael (1981:84), *control variables* are so-called because they are controlled, held constant, or randomized so that their effects are neutralized, canceled out, or equated for all conditions. This can be done through statistical manipulation or research design. Often it is possible and desirable to design these factors into research as independent or dependent variables.

Variables Not Controlled For

As telling as what has been studied is what has not. The lack of control for conditions of **I**, whether a human or a non-personal service, is surprising. So is the complete disregard of the interpreter's relationship with the resource. Can we really assume interpreter experience, competence and comprehensibility? Attention to these areas may bear fruit in better understanding of the differences in interpretive success.

The time **P** had with **R** was controlled for only once. But time to interact with (and to think about) **R** is crucial to making anything of **R** and needs to be more intensively considered by researchers. Likewise, the time spent attending to the interpreting merits consideration.

SUMMARY

A wide field remains for productive research on interpreting. A great many factors relevant to interpreting have not been studied, nor have all of the contexts for interpreting been considered. The dependent measures used for research have centered on "knowledge" and "attitudes" (or their cognates). Other relationships and steps by **I**, **P**, and/or **R** have been paid scant attention.

The next chapter discusses key themes that research in interpreting can pursue and methods that may be applied to study them. Some hypotheses to test the conceptual framework are also presented.

CHAPTER VII

IMPLICATIONS FOR RESEARCH

This chapter discusses areas of potentially fruitful research to expand our scientific understanding of interpreting. Various factors delineated in the conceptual framework are highlighted, and ways to study them explored. Throughout the chapter, hypotheses or predictions arising from the analysis of interpreting are indented and labeled. Likewise, measurement tools with potential new or novel application to interpretation research are indented and labeled. The attempt is not to be exhaustive but rather to suggest potentially fruitful expansions of the existing research repertoire.

THEMES

Several common themes emerge from the review of existing research compared to the conceptual framework. These themes make up a core for future research to understand interpreting. They are highlighted here so the reader can look for them (and hopefully see examples of them in his or her own experience) as the discussion of research implications is pursued. The themes are:

- The need to study interpreting, not just to evaluate interpreting's outcomes
- The need for new measures
- The presence or absence of **R**
- Time
- Mode matching

Interpreting versus Interpreting's Outcomes

Research in interpreting has been dominated by the evaluation of the outcomes -- the end effects -- of specific interpretations. We look at outcomes because specific outcomes are what we, and the agencies funding interpretation, want to see. But any interpreting is much richer than whether or not a fact was learned, an attitude was changed, or an action was taken. Research needs to tap that richness to better

understand interpreting. By focusing on outcomes, we may be blinded to what it is that leads to these outcomes and so impede any ability to improve outcomes.

To illustrate, if we make a chair and ask people if it is comfortable, "Yes" or "No" tells us the "outcome" of our chair. But to improve the next chair, we need to elicit something more: "why is the chair comfortable?" or "what makes the chair comfortable?" We find that springs in the cushion contribute to the chair's comfort, put springs in our cushions, and discover some people find them comfortable and some not. We may then try different springs, and come to realize that it is the "springiness" of the springs that count. Now we can measure the internal effect, "springiness", not just the outcome effect, "comfort". We can test cushions without building a chair. With time and attention to factors other than just "chair" and "comfort" insight may come that "springiness" is a function of the weight of the person and the resistance of the springs. Now we can design chairs to match people, *a priori* -- if we can predetermine the resistance of the springs and estimate the weight of the person. A whole new field of tensile mechanics is now applicable to chair making. We begin to study the relation of wire diameter to coil circumference or the effect of tempering on latitudinal deflection. We develop special tools and techniques for this research, enabling us to focus and learn about that special part of chair-making which concerns the cushion springs.

Interpreting is analogous to chair-making. Too often, research has just asked -- "yes or no" -- if interpreting was "effective". Some research has answered more probing questions, some insights have been gained, and some differences which particular factors make to interpreting have been identified. The intent of a conceptual framework is to delineate what may make a difference to the interpretive "chair" -- elements, steps, relationships and complexes that play a role in interpreting. With the conceptual framework in hand, research is needed to discriminate which factors make what differences, to help establish a research agenda to study the "springs" that make a difference. Research can then advance our understanding of these factors, using tools and techniques specific to each. Our

understanding will advance best as we examine matters internal to interpreting rather than focus on outcomes.

Need for New Measures

Measures used currently do not capture key factors about interpreting, but focus on outcome effects and then only on a small number of possible outcomes. Adapting measures from other fields and developing new ones for interpretation research need to proceed hand in hand with expanded exploration of interpreting. New measures should apply to questions within interpreting, not just the after-effects of interpreting.

Presence or Absence of R

A key premise and hypothesis of the conceptual framework is that differences will arise depending on whether or not R is present before, during and/or after interpreting. Looking for such differences will provide a test of the framework and, if supported, key information to guide and assist further research.

Researchers have often controlled for P's exposure to R prior to the interpreting. But few studies considered exposure during interpreting. The focus has been on P:I, not P:R. None considered the difference exposure after the interpreting but before measurement of the dependent variable might make.

Research also needs to consider more than just exposure to R. Whether P paid attention to R, connected with it, or made something of it will make a big difference to interpreting.

Time

Time, for {IP} to be established, for steps to be taken by P to evaluate and make something of R and r, and for {PR} to form, is a key factor of the conceptual framework. Looking for the effects of the time allowed at each step will provide key information to guide research. In particular, the evolution of {P R} over time needs to be considered. The "Aha!" may come later, perhaps even in a new setting. As Dustin and McAvoy (1985) put it, "Sometimes years pass before the fire takes".

Researchers need to find ways to address the passage of time, and/or detect the spark before it kindles into the fire.

Mode Matching

A "mode" is the psycho-physiological means for interacting with the environment, such as spoken, written, visual, graphic, kinesthetic, or hands-on. When studying P's responses to interpreting, the mode of the interpreting and especially the mode in which P processes the interpreting (senses used, type of knowledge or feeling elicited, etc.) should match the mode in which P is asked to express her experience(s) to the researcher. For example, a hands-on experience ("Here, feel how slippery this clay is when wet") can best be studied by hands-on measures (which of three substances felt is clay). Mode matching avoids discrepancies in how experience is acquired and processed, and how P is expected to relate that experience to the researcher.

These five themes should be kept in mind as the following sections, discussing factors to control, factors to manipulate, and measures that can be used in research to explore interpreting, are read.

FACTORS TO CONTROL

Attention and Comprehension

As pointed out in Chapter VI, checking for attention and comprehension is a basic requirement for communication research. Researchers should, for instance, first check whether a cartifact is looked at and read, or an interpreter heard and listened to, before assessing other factors that depend on hearing or seeing the interpreting. Empirical estimation of readership (listenership, viewership, etc.) also can be made and factored into (or out of) study results.

Measures of attention may also be used to better understand interpreting. Dick et al. (1974) list principles of attention discovered in communications research. Location, attractiveness, and competing attractions all influence attention. In

comparing alternative messages, for example, similarity of such conditions needs to be maintained, or controlled.

Comprehension is relatively easy to control for. The wording (layout, etc.) of the material can be checked with a sample of the anticipated users, and changes made. Alternative wordings may also be prepared for different audiences. Tests for comprehension will focus on two factors. First, the words and syntax (symbols, mode of display, etc.) must be familiar to and understood by the audience, and they must mean approximately the same thing to most people. Second, the message itself must be legible under the conditions in which it will be used; print size and style, color, and contrast all are important. (Such factors also may interact to influence attention.)

Elements

Attention to the elements **I**, **P**, and **R** may bear fruit in better understanding of differences in interpreting.

As discussed in Chapter VI, measuring or controlling for differences in **I** is important. Researchers need to consider the experience, competence and comprehensibility of the interpreter. Also, the researcher must be clear on whether it is a group of **I**'s (as in team interpretation) or **I**'s (a series of exhibits), or the individual members, which is of interest, and choose measures and research designs accordingly.

Differences between **P**s may lead to differential interactions with **R** and/or **I**. When **P** is a group we need to be clear whether we are trying to influence or measure the group's or the individual's relationship with **R** and/or **I**. As mentioned in Chapter V, group behavior, or knowledge or emotions may be quite different from those of any individual within a group. Machlis and Field (1984) outlined sociological issues related to groups. Physical and cognitive abilities of **P** also are important. Research measures need to take these into account.

A potential condition of **P**, illiteracy, argues for measurement tools other than paper-and-pencil. Only a few studies analyzed in Chapter VI controlled for written

artifacts being read; none approached the issue of whether the measurement tool was useable, and to what degree, by the study subjects. Again, when testing children we usually take this into account. But non-written tools could be applied to adults, avoiding the possibility of confounding from reading and writing restrictions. This arena of measurement methods deserves further exploration.

FACTORS TO MANIPULATE

The conceptual analysis points to particular factors that have potential for making a difference in interpreting. These need to be manipulated in research to understand what differences they make and how they make them. Systematic research in these area will expand understanding of interpreting and its practice.

The Subject of Interpreting: R

As something about which we interpret, **R** plays an integral role in any interpreting. Deciding what **R** is, delimiting it conceptually and operationally, is central to developing, evaluating, and researching interpretation. But we have yet to study the effects (on research and on interpreting) of how **R** is delineated by **I**.

Hypothesis Failure to clearly specify **R** may be a major source of failure or confusion in research, and of ineffectiveness in interpreting.

If we are not clear about what **R** is, we may confuse our messages, talking about **rs** that are irrelevant and which **P** can not fit into his **{PR}**. In research, we may use unconnected dependent variables, expecting **P** to have a relationship with something to which he hasn't really been exposed, or to know something about an **R** that wasn't interpreted.

Three examples are illustrative.

1) In Chapter IV, it was argued that a concept (as opposed to a physical thing) can be made focal in interpreting, and accorded **R** status. From this argument, the following hypothesis is derived.

Hypothesis When games are used to simulate a concept, it is the concept that is focal, not any larger environment, and **P**'s immediate understanding

of the lesson of the game will not differ with the environment in which the game is played.

For instance, a game to simulate "predator-prey" relationships is expected to be effective whether carried out in the woods (a "predator-prey environment") or in a school building.

Note how such a hypothesis depends on a clear delineation of **R**. Without such delineation, the hypothesis could not be tested.

2) Becker et al. studied whether interpreting affected visitors' acceptance of a new policy not to mow roadside vegetation along the Blue Ridge Parkway. The interpretive message stressed (along with the lower cost of not mowing) that mowing impairs the "natural beauty" of the parkway. Becker et al. hypothesized that the message would bias visitors toward support of less human intervention and a lower intensity of vegetation management in general. But this did not occur. People exposed to the interpretive message preferred pictures of unmowed roadsides significantly more than those who were not exposed to the interpreting. But reactions to pictures of burning, shrub removal, or tree removal were unaffected by the interpretive message. As Becker et al. put it: "The message supporting less mowing activity only affected the respondents' opinions toward mowing". This is not surprising. **R** clearly was "roadside mowing". If the interpreting does not make the leap to a more general "vegetation management", why should we expect the audience to?

3) The first two examples concern hypothesis development and expectations about **P**'s conceptualizing. What about straight-forward facts or information? Confusion over information that we expect **P** to learn may seem unlikely, since researchers can draw points to test for from the interpretive text. But even here, specification of **R** (or lack of specification) can confound research. Consider the following scenario.

The area forester, who is a wildlife specialist, leads a hike for the general public on Tiger Mountain State Forest (TMSF). As is agency policy,

she introduces herself and the State Forest at the beginning of the hike. "Hi. I'm Sally. Welcome to Tiger Mountain State Forest. The Department of Natural Resources manages these 13,000 acres to generate revenue for support of the state's school system, to provide recreation, and to protect the environment, including water resources, fisheries and wildlife. And today we are going to look at some of my favorite wildlife -- cavity nesting birds. As you may know, in the Puget Sound trough we have 16 species of cavity nesters, and on Tiger we have confirmed 9 of them. Let's see how many you can learn to identify, and how many we can see today!" She then enthusiastically leads the group to different areas where they identify several species and view some nest holes. Nothing further is said about the state forest in general. The focus is birds.

What is **R** here? The 'cavity nesters', or 'the cavity nesters as part of Tiger Mountain', or 'the cavity nesters as part of TMSF', or 'TMSF as a haven for cavity nesters'? A researcher (who could be the forester herself) evaluating the knowledge component of this interpretive activity would ascertain that basic information about the State Forest (size, mission, managing agency) had been presented. Clearly (she muses), this is important information for understanding why cavity nesters live on Tiger. So the evaluation instrument might ask questions like: "How large is Tiger Mountain State Forest?" or "For what three things is the State Forest managed?" But these questions likely would elicit inconsistent responses. Why? The researcher is assuming **R** was 'TMSF as a haven for cavity nesters'. But the information presented about the state forest was tangential to the hike, and to the interests of the hikers. Unless put into a context of 'here's why TMSF is such a good place for cavity nesters', it is likely to be lost. The {**PR**} relationship is with birds, not TMSF. Even though the information was presented, we can not expect it to be incorporated into each hiker's view of what happened, unless it is made focal and relevant. That is, unless it is made and dealt with as part of **R**.

What about experiential evaluation of the bird-watching hike? Questions about $\{PR\}$, where R is cavity nesters ("Did you enjoy seeing them?" "How many do you think you can identify?"), are appropriate to indicate outcomes of the hike. But questions tangential to R , such as "How do you feel about TMSF?" or "Have you changed your opinion of the DNR?" would not tell us much about this interpretive experience. The response to such questions would be much more likely a function of the prior conditions of $\{P \text{ DNR}\}$ and $\{P \text{ TMSF}\}$ than of $\{P \text{ this interpreting}\}$. The latter would likely be lost in the noise of the former. Structuring research to maximize signal-to-noise ratios is important.

It would also be appropriate to study effects internal to the interpreting. For instance, the effects of particular bird sightings could be studied. Was the person who first spotted the bird someone who earlier had asked questions about its habits and habitat? Did spotting the bird lead this person to help others look for the next species? Such research questions are needed to explore interpreting, not just interpreting's outcomes.

Cartifacts versus "Real" R

The difference between \mathbb{R} (a cartifact) and R (a real thing) is potentially important to interpreting, as those in the profession have noted. For instance, Reames and Rajewski (1988) wondered whether live animals are the best means for interpreting to children, or would literal or anthropomorphized pictures do just as well or better for some age groups? Naylor (1985) wrote about successfully "bringing the park literally into the classroom" (via artifacts) as opposed to slide shows or lectures.

Although most researchers note whether R or \mathbb{R} is present in their studies, only one study has tested for effects of this difference. Hammitt (1981b) found that R had a greater effect on $\{PR\}$ than did \mathbb{R} for visitors to a bog. But professional experience (such as the marshland movie described in Chapter V) might indicate the contrary. Further exploration of the extent and conditions for differential effects of R and \mathbb{R} is needed.

For instance, based on cognitive learning theory, we could hypothesize:

Hypothesis Prior experience with **R** will lessen the difference in effect of \mathbb{R} versus **R**.

The more familiar we are with the **R**, the more memory and imagination control $\{P \mathbb{R}\}$ and make it $\{P R\}$. Thus the more similar the reaction to \mathbb{R} and **R**. As Herzog et al. (1976, quoted in Hammitt 1981b) put it: "The individual's response is not to the photograph per se, but to a distillation of experience and knowledge about the place or scene depicted".

In another vein, the effects of different authors of \mathbb{R} could be studied. For instance, if **P** creates the cartifacts, they may be different from those created by **I**, and more salient to **P** and to other, future **Ps**. Interpreters often use cartifacts (photographs in particular) created by visitors. Hammitt (1981b) used photographs taken by visitors in his research (but mixed them with photographs taken by interpreters and others). Differences for interpreting arising from different authorships, and/or different styles imparted by different authors, have yet to be examined by researchers.

When \mathbb{R} is used in interpreting, the researcher should recognize that the **R** perceived by **P** may be just \mathbb{R} , not the **R** the cartifact is intended to reference. (Again, the marshland movie seems a case in point). We can test for any differences such differences in perception make. The researcher looking at cartifactual interpreting must take care to discriminate $\{PR\}$ from $\{P\mathbb{R}\}$ and to determine how many **Ps** made the $\mathbb{R} \dots \mathbf{R}$ transfer.

Exposure, Attention, and Interaction with **R**

As mentioned in Chapter VI, exposure to **R** was manipulated only three times to test for effects on interpreting. But whether Mount Rainier is in view or hidden by fog makes for different interpretive experiences. Is the resulting $\{PR\}$ stronger and more readily developed when **R** is in view (or touchable, tastable, audible, etc.) than when it is not? This, and related questions, should be readily answerable by

research in every-day interpretive settings. It might even be possible to reanalyze existing research to look for the effect of exposure to **R**.

Exposure of **P** to **R** can occur prior to, during, and/or after interpreting, or not at all. Single or multiple exposure may also occur at any of these points. The difference made by the extent and the timing of exposure merits research.

Prior exposure and attention by **P** to **R** and development of a resulting **{PR}** play a basic role in determining what interpreting should be and what it accomplishes. Revelation, which is distinctive of interpretive communication, means that there is something about **R** that **P** doesn't or hasn't had a chance to grasp (or doesn't currently have salient, or has forgotten). Or at least **I** assumes **P** doesn't know something. But what **P** doesn't already grasp makes a big difference for the interpreter and his success. **P** may assume he 'knows' **R** or **r**, in which case **I** may have to change **P**'s knowledge (preconception) or at least dissuade him of it, if a new **{PR}** is to be experienced by **P**, or new **r**'s considered or accepted. Interpreting that presents material already grasped by **P** will probably lose attention, or be rated poorly by the participants (see Bultena et al. 1978, among others). Likewise, interpretation that assumes a given level of understanding from which to build may go wildly astray if **P** lacks that understanding. Good interpreters try to find out what their audience knows, or at least is likely to know, and adjust accordingly (Sharpe 1976). Researchers need to know what the audience knows, or control for differences in audience knowledge.

As discussed in Chapter V, how **R** or **R** may be experienced is important. In particular, when **R** is ideational **P** needs the cognitive tools to grasp it. Research can test the utility of various tools for different **P**'s.

{P R}

The relationship of **P** with **R** has often been used as a dependent variable or control variable when studying interpreting (Chapter VI). Researchers have used, for example, constructs like attitude, liking, familiarity, and sense of importance as measures of **{P R}**. But the relationship, its specific elements, or its aspects may

also be used as independent variables in research, as done by Hammitt (1981) to test whether prior exposure to photographs of a bog or experiencing the real bog made a bigger difference in people's later preference for photographs of the bog.

{PR} could be manipulated by dividing the audience (physically or via research design) into first-time and repeat visitors (well established {PR} versus nascent {PR}) and then looking for differences in effects of interpreting. Another way would be to allow some P's to interact with R, and others not, and then compare their responses (for instance attention) during otherwise identical interpreting.

Capabilities of P

What capabilities P brings to the interpretive setting can be manipulated to study the differences capabilities make in interpreting. As mentioned, Roth and Hodgson (1979) found that the interpreter training P in the use of physical senses for experiencing the environment significantly enhanced the pleasure P felt in an environmental encounter. Besides sensory training, other types of "priming" such as tool usage ("Here's how to steady the binoculars") and background knowledge ("Look around when you feel mud on your shoes. Pipsisewa grow in boggy areas.") might also be explored.

Conditions of {PI}

Research can be aimed at identifying how the validity conditions of truthfulness, rightness, and truth (see Chapter IV) can be effectively established in interpretive settings, and how their acceptance or challenge affects interpreting. Which forms of "thematization" are effective from P's standpoint, and which from I's? What happens if and when P's acceptance of validity conditions varies from that presumed by I? Some possibilities are discussed below.

In a non-feedback situation, once attention and comprehension are attended to, the validity conditions may be established through the setting (being in a national forest, for instance, may lend rightness to official messages). Validity conditions may be thematized symbolically (via uniforms, seals, or official colors); or they may be thematized linguistically, in the wording of a talk, sign or brochure (Istvan 1986).

The condition of truthfulness depends upon P's acceptance of I's good intentions. In text, titles and headlines may serve to thematize truthfulness: they establish expectations which, when met, reflect on truthfulness. Past experience may also play an important role, as with appeals to "common knowledge", or the use of accepted symbols or representatives as purveyors of the message. Who would disbelieve Smokey Bear? On the other hand, to assume general acceptance of government as an honest source may be unsound.

For rightness, past experience, normative roles, and the interpretive context (and their interplay) all may play a role. One obvious thematization of rightness is through official seals, names and titles. In another instance, the presence of a message may in itself imply authority to give that message. Witness "KEEP OUT". Close association with the subject matter ("I live here") also thematizes rightness.

The rightness condition can be a particular source of mis-communication between the interpreter and the public. It may trigger affective and cognitive responses not associated with the interpreting per se, and thus influence {PI} in other ways. For instance, when a person who has been collecting rocks in a park for many years hears an interpreter tell her group to "take nothing but pictures, leave nothing but footprints", she may not focus on the rest of the interpretive message, being too busy thinking "What right does this whippersnapper think he has to tell me what to do?"

The validity condition of truth concerns P's acceptance of what I says about R or r. Studying how P thematizes challenges to such statements (as by picking up a rock to see for himself or asking for a restatement of a fact) could improve the interpreter's skills.

Clarification

Clarification is expected to make a difference in interpreting. Clarification also is a fairly simple factor to study. Researchers can ask whether it was available or not, and whether it was used. Clarification can occur during interpreting, as part of it, and/or after interpreting, as expansion or cementation of {PR}.

The effect of clarification among multiple **P**'s could be studied by encouraging discussion, questioning and answering among **P**s in a group. Specific group activities to encourage such interaction can be introduced. We could study, for example, if clarification within a group leads to more uniform **{P R}** among the group members. Does such interaction lead, for instance, to higher knowledge gain and more uniform **{P R}** among the group members?

Steps by **P** to clarify may be particularly useful to study.

Hypothesis Cognitive theory predicts that interpreting that did nothing more than offer the chance for questions raised by **P** to be answered would be more embraced (more questions asked or higher opinion of the interpretive experience, perhaps) by those moderately familiar with **R**, and less embraced by those entirely new to the subject matter and by those who are "old hands" with it.

People moderately familiar with **R** have established **{P R}** enough to know what they don't know. Those new to **R** have no effective **{P R}** and can't formulate questions; the "old hands" have such a "well tested" **{P R}** that few questions remain. Research design would need to control for some people not liking to ask questions in public.

Researchers can look for, or induce, different opportunities for clarification, and examine what differences each makes to interpreting. Differences might be expected, for instance, between **I** answering a question from **P** and **P**₂ answering that question. Each of these might also be different from the effect of **P** checking his own ideas (r^P , including about r^I) directly against **R**.

Through **P** forming his own ideas and asking them as questions of **I**, **P**₂, or **R**, **P** is able to add considerably to his relationship with **R**. We would expect his relationship with **R**, his feelings toward it and knowledge of it, to be different than when clarification is not available.

Research is needed to see whether clarification using interactive exhibits is effective. Sequencing P's exposure to artifacts or sequencing their content to anticipate questions raised by P, also can be explored.

Researchers can also look at other ways for P get his questions answered and at how I helps P to develop those questions (priming, leading questions, or questions by I during interpreting, for instance).

Communicative Techniques

The use of statements, I -> r versus questions, I ?> r to stimulate learning was studied by Wagar (1976). The application of other communicative techniques as part of interpreting could similarly be explored. Cherem (1977) listed such techniques, divided into two areas. Under "active language" techniques he included metaphor, simile, analogy, active verbs, colorful nouns, powerful adjectives, personal words, theme words, and story. Under "non-verbal languages" he included audio (music, voice tone, sound effects), odor, taste, texture, color, lines (sketches and cartoons), photographs and paintings, real objects, symbols, design (of structures and interpretive elements), space (intimate, personal, social and public), and body language.

Steps

The relative effect of steps in interpreting is a key area in need of research. When steps are studied, not only what steps are taken, but their timing should be considered.

For instance, how is interpreting different if I passes around a sample of glacial ice before rather than after a slide show on glaciers? In which case does P attend more to the slides, or examine the ice more closely? Or if P hears his questions answered while looking through a telescope at a mountain, does he look longer than if he must divert his eyes to read a sign? Such situations, where the independent variable would be a step (or series of steps) by I and the dependent variable would be a consequent step or series of steps by P within the interpreting characterize much of interpretive practice and deserve study.

Steps by **P** toward **R**, for example vandalism, have often been used as dependent variables in interpretive research (see Chapter VI). Their use as independent variables also is appropriate for studying interpreting. For instance, does past contact with **R** predict the number of questions raised during interpreting? Will holding a rock lead to increased learning about rocks? Will making a tracing of a petroglyph avert erosive vandalism of other petroglyphs, or encourage such action?

As pointed out in Chapter V, we may also want to consider steps that **R** takes in interpreting ("...the bunny snuggled right up to Sally, didn't it?..."). Responsive versus unresponsive bunnies could be used to see what difference snuggling makes. We might also ask how the experience of touching (seeing, hearing, smelling, etc.) an animal alters **P**'s reaction to the presentation about the animal (Reames and Rajecki 1988).

MEASURES

Research requires not only manipulation of appropriate variables, but relevant and sensitive measures of the differences being explored. As noted earlier, researchers have used only a limited set of measures to study interpreting. Most have focused on knowledge. But other measures are needed. This section discusses the scope of existing measures and suggests new ones and new applications of existing ones, including measures of knowledge, cognition, steps, and relationships. Some general points about measurement are also discussed.

Knowledge

Information is commonly seen as part of any interpreting. Researchers often test whether information "transfer" has occurred by looking at the degree of congruency between what **I** offered (r^I) and what **P** subsequently "knows" (r^P). But as discussed in Chapter IV, the notion of "transfer" may not capture the many potential sources of incongruence:

- I's expression of r^I
- P's exposure and attention to r^I
- P's making something of it ($P:r^I$, $\{P:r^P\}$)
- P's expression of r^P
- the researcher's exposure and attention to both r^I and r^P
- the researcher's making something of both r^I and r^P

Also, we should be sure not to expect more than the interpreter intended, lest we substitute $r^{\text{Researcher}}$ for r^I , and find few r^P s match it. (The example given earlier of interpreting birds on Tiger Mountain but testing for knowledge of statistics about the state forest, is illustrative).

Even when sources of incongruence are well controlled, testing for specific pieces of information presented by I may still measure only rote learning, tapping only a part of P's knowledge. When research focuses, as it has, on testing rote learning, what often is discovered is something about agency success -- the visitor knows the rules, or knows how many species of salmon live in the park. But such learning may be a poor measure of the interpreter's success in assisting P to better know and appreciate R, because there is much more to know and appreciate than is overtly stated in a message. Revelation implies this. The researcher needs to test for it.

We might, for example, examine P's own version of what he learned. P may certainly have gathered thoughts, ideas, facts, and concepts of interest to himself, different from or in a different form than the specific points intended by the interpreter (and asked by the researcher). As Hammitt points out, that visitors often score low on information retention when quizzed about interpretive displays does "not necessarily indicate that visitors are not benefitting from the interpretive experience, but rather, that we need new approaches for detecting the changes that occur in visitors" (1978:33). A decade later, Moscardo, after reviewing the research literature on exhibits, repeated a similar admonition: "The apparent lack of learning may be due to failure to accurately measure learning" (1988:31).

Five studies have used indirect measures of P's learning, rather than specific measures of "knowledge". These measures include "perceived knowledge" and "recognition".

Research method P's feeling about how much he knows about R can be used to measure knowledge.

For instance, Lime et al. (1978) asked participants in an expedition to listen for wolves howling "How knowledgeable do you feel about wolves?" Researchers could also use the method Stamm et al. (1976) developed for measuring a respondent's perceptions of how much he knew about an issue, rather than measuring against a standard of knowledge defined by an outside observer.

Research method Recognition of content (r) or scenes (R), rather than recall of them, can be used to measure knowledge.

Hammitt (1984) noted that cognitive theory suggests people find it easier to recognize than to "recall outright" the content of a message. Recognition is less demanding than recall. He suggested that recognition more closely matches the "familiarization" mode of interpretation (developing {P R}), while recall matches the "learning" mode of education. He applied recognition to test the effects of signs along a trail.

Similar considerations apply to asking about the R experienced by P. Rather than ask "Is this [picture of a tree species] found on Mount Rainier?", researchers can ask "Do you remember having seen this [picture of a tree species] along the nature trail?"

The measurement of perceived knowledge or learning is a useful, different approach to measuring learning from interpretation, but it does not tap specific knowledge. Researchers can also tap P's specific knowledge independent of what may have been offered by the interpreter.

Research method Specific knowledge can be measured by asking P to mention the three most important things he knows about the R.

Such questioning would tell much about P's knowledge (both factual and conceptual) and about the {PR} relationship. Research design would delineate interpreting's

effects on {PR}. As an additional benefit, such lists of "knowledge" would supply interpreter's with information and insight for structuring interpretive efforts.

Expressions of knowledge may take several forms. Oral or written words may be asked for. Or,

Research method Pictures drawn of R by P or chosen by P from a broad pool of images can be used to measure knowledge.

Research method Knowledge can be measured by asking P to physically select parts or characteristics of R from sets of artifacts or cartifacts (wolf teeth versus deer teeth, for example).

These techniques could be used to explore factual knowledge and/or P's grasp of concepts and relationships.

Research method Knowledge can be measured by asking P to enact behavior appropriate for R.

For example: "Johnny's a deer. You're wolves. Catch him!" (For research purposes, do the 'wolves' form a pack?.) Lime et al. (1978) related how it often was difficult to get visitors to stop howling like wolves, once they learned. Length or strength of howling probably would be measures more of the total experience than of specific learning, but attempts to produce mating versus kill howls, or the ability to discriminate between such howls, would indicate knowledge.

By looking at different modes of expressing knowledge, and at something other than "rote" knowledge, researchers can also control for dissimilarities in the expressive abilities of P.

The concept of matching the mode of information extraction to the mode used by the visitor to process that information may also help better tap learning. Hammitt (1978) successfully used pictures to ask about visually processed information (what was seen on a nature trail). We can extend this principle to other senses as well.

Research method Researchers should test P's knowledge through the same sensory modes that the interpreter used for interpreting.

For instance, someone who learned to recognize spruce trees by "shaking hands" with a sharp needled-branch ("Ouch!") could be expected to show his learning better by his choice of grabbing or declining to grab a proffered branch, or by being asked to voice or act out his reaction when shown a spruce branch, than by being asked to pick-out the spruce tree from a series of written descriptions or fill in the blank in the sentence 'The _____ tree is known for its sharp needles'.

Learning styles and learning modes of visitors offer fruitful ideas for designing research as well as for designing interpretations. Christensen (1985) provided an overview and references to this arena. Interpreters and educators realize we may exclude tactile, auditory or kinesthetic learners if we don't offer opportunities to touch, hear or act out something new. Likewise, reliance of researchers on written or verbal measurement instruments may exclude many people from providing useful information and may confound our research.

Despite the emphasis of current research on knowledge, most interpreters agree with Tilden that "interpreting is not just information" (see Chapter II). In addition, reviews of research in environmental interpretation (Peart 1986), environmental education (Iozzi 1989), and environmental attitudes (Hungerford and Volk 1990) have shown conflicting and inconclusive relationships between knowledge and affect toward the environment. So researchers should not measure just knowledge. There are viable measures of other factors as well, including cognition (and cognizing), steps, and relationships.

Cognition

Interpretation aims to enable and mold {PR}. How P goes about forming {PR}, the cognitive processes for making something of rs and performing P...r, and R...R are all relevant to understanding and investigating interpretation. Measurement methods are needed to assess such cognitive activities. Two psychological constructs have been used in the interpretation literature as measures of cognition. A different type of measurement method, developed for communication research, may also be

applicable. Cognitive capabilities, as evidenced through stages of development, may also be relevant to researchers.

Critical thinking Teachers see critical thinking as an important development in a student's education; it is defined as the ability to recognize a problem, formulate a hypothesis, consider alternative possibilities, and draw conclusions (Skinner 1971 and McPeck 1981, cited in Gamble 1988:65). Gamble investigated the relative effectiveness of outdoor education and computer-assisted instruction in teaching critical thinking about environmental concepts. She used questions reflecting the three upper level objectives (Analysis, Synthesis, and Evaluation) of Bloom's Taxonomy of Educational Objectives (Bloom, et al. 1956) to measure critical thinking.

Mindfulness Mindfulness is a construct from cognitive psychology applied by Moscardo (1988) to evaluating interpretation. Mindfulness can be defined as a state of active mental processing that involves the creation and consideration of new cognitive categories. Moscardo listed indicators that can be used as measures of mindfulness:

- subjective feelings of surprise, interest, involvement, control, and processing of information
- increases in information,
- changes in structure of information
- changes in behavior

Cognigraphics A different measurement method has recently been developed for assessing cognitive activity, not just the "state" of cognition.

Research method Cognigraphics (Carter and Stamm in press) can be used to explore the kinds of ideas people use to develop a sense of a subject, and the affect and emotion related to that subject. Cognigraphics weds word association (What is the first thing that comes to mind when you hear the topic?) and ideation, via the choice of "Pixs", graphic representations of inside/outside,

before/after, and similar/dissimilar relations between the topic and associated word.

Carter and Stamm have found cognigraphics useful for exploring environmental topics.

Development stages Researchers can use findings and ideas from the fields of cognitive and moral development in developing measures for the study of interpreting. Interpreters often consider such development in children's interpretation (Machlis and Field 1978, Frandsen 1985, Fogg and Hartman 1985), but stages of development apply to adults as well. The application of adult moral development stages to interpretation has been discussed by Istvan (1986) and Christensen and Dustin (1986) and applied by Swearingen (1989). Development theories hold that a person's ability to understand a message, and the kind of response expected, are determined by how that person thinks about an issue. For instance, someone at the "law and order" stage of moral development will respond well to a sign stating unadorned rules. For someone at the "good boy" stage, statements of rules carry little import, while appeals to help others through following the rules will be well heeded.

Other Steps by P

Chapter VI discusses steps by **P** (other than cognizing) that have been used as measures of interpreting. These include steps connecting with **R** (vandalism, for instance, or choice of campgrounds).

P's steps to clarify his understanding of **R** also may be used as a measure of interpretive effect and/or of **{PR}**.

No studies have looked at **P**'s actions toward **R** during the interpretation. Did **P** hug the tree or pet the slug when invited to do so? Such variables would be measures internal to interpreting and could be sensitive indicators of what works and what doesn't. Interpreters need to know which techniques work within interpreting and which don't, as contrasted with whether the whole interpretation "works", i.e. its outcome. Much of this knowledge about interpreting's internal workings is now

passed from interpreter to interpreter as part of the "art" of the profession. Such techniques could benefit from scientific research as well.

P's interaction with a live interpreter or use of interpretive materials are valid measures, as is **P's** intention to reuse the interpretation (reread a brochure or attend the same tour again). The latter is particularly attractive for evaluating interpretive success.

Research method Researchers (and interpreters) can learn much about a visitor's views of the interpreting, its perceived value and its effectiveness from asking: "Do you think you will you come back again? Why?", or perhaps, "Would you recommend that your friends take this tour? Why?"

Researchers might also measure whether a particular **P** does, in fact, return. But this measure has not been used in research (and has been controlled for only three times). More attention to **P's** steps with regard to **I** is warranted.

As mentioned in Chapter VI, no studies have measured possible augmentation, through interpreting, of **P's** ability to take steps (regarding either **R** or **I**). **P's** ability to take action and/or his confidence in his ability to take action would be useful to study.

Others' Steps

All of the steps discussed so far as measures pertain to **P**. But there are other actors in interpreting, too; both **I** and **R** may be affected. Steps they take (or don't) that may be studied are discussed under factors to manipulate. Obviously, their use as measures is also appropriate.

Relationships

As discussed in Chapter VI, measures of relationships have been widely used in research on interpreting. Discussed here are additional measures not used in the existing research.

Most measures concerning **{PR}** have been of **P's** perception of the relationship or of **R**. But researchers also could evaluate other peoples' perception

of **{PR}**, such as those of the interpreter, family, friends, or any one who might be a reliable reporter about **P**. In interpreting for groups, the perceptions by group members of each other may be especially useful. Research methods need not be limited to self-report or researcher-observed indirect measures.

Similar arguments apply to the study of **{PI}** and **{PRI}**. Research need not be limited to **P**'s views. Two studies have assessed the interpreter's perception of **{PI}** and/or **{PRI}**, as well as **P**'s perceptions. Distinct differences between **P**'s and **I**'s perceptions were found both times (Ham and Shew 1979, Hayward and Jensen 1981). This argues for more attention by researchers to the perceptions of **I** as well as of **P**. Questions to be answered include what gives rise to discrepant views by **I** and **P** and what steps can be taken to diminish those discrepancies.

The other relationship in interpreting, **{I R}**, has not been used as a dependent variable in research, just as it has not been an independent variable. Apparently, how interpreting affects **I**'s relationship with the subject of the interpretation has not been salient to researchers. Such effects have potential import for subsequent interpretive efforts, though, and would be a legitimate area for study.

Measures of "state" Most of the measures of relationships listed in Chapter VI appear to be attempts to delineate something which I have called a relationship's "state". Terms like *attitude*, *feeling*, *enjoyment*, *satisfaction*, and *liking* are used by researchers to denote this measure of a relationship's state. Differences in what these terms or constructs imply -- such as the difference between attitudes and feelings, or enjoyment and liking -- and what they might imply about interpreting's effects, may be important. Future research can explore this theoretical and empirical arena.

Measures of state other than those related to "attitude" and "enjoyment" exist and could be applied to relationships in interpretation research. Validity conditions to evaluate **{PI}** have already been discussed. For **{PR}** and **{PRI}**, a number of tested and validated instruments from other fields of social research appear applicable. Doran (1979) has reviewed available instruments in both the affective

and cognitive psychological domains, including several non-paper-and-pencil tests. Two that appear in the interpretation literature are mentioned below.

Research method Measurement of mood changes (Nowlis 1965) might be applicable to measuring {PR} changes over sequenced interpretation or changes in visitors spending a number of days participating in a variety of interpretive experiences revolving around one resource.

Ford and Cloninger (1983) discussed the measurement of mood changes and validated the use of Nowlis' Mood Adjective Checklist in outdoor education settings.

Research method The New Environmental Paradigm scale (Noe and Snow 1990) can be used to measure shifts in environmental concerns. The scale would be applicable to any interpretation which has an R encompassing wide ecological or environmental themes.

This simple instrument (only 12 Likert-type items) has been used by the National Park Service to study changes in visitor's environmental perspectives, but not, however, changes related to interpreting. Noe and Snow (1990) presented the history and research support of the New Environmental Paradigm. Caron (1989) and Kuhn and Jackson (1989) provided recent validation of the scale to minority and other visitor groups.

Measures of "boundary" Along with "state", we might also be interested in the "boundary" of a relationship -- the extent, for example, of what is included in P's concept of R, and to what part of P's life or consciousness R is seen as being relevant. In particular, we may want to know the whether I and P share the same boundary. Such boundaries do not appear to have been explored so far in research on interpreting. However, several measurement tools are available to assess the boundary of a relationship.

Research method The concept of drawing "favorite places" (Neperud 1975) can be used to measure the effect of interpreting. Visitors'

drawings are examined for presence or absence of specific features and for their relationships.

P's favorite places and their relationships to each other could serve as measures of the boundary (and perhaps the state) of **{PR}**. For example, trees and Paradise Lodge as a person's favorite places at Mount Rainier would indicate a quite different relationship with **R** than if their drawing consisted of glaciers and waterfalls. Size, position on the paper, and superposition of images give clues to the relative importance or salience to that person of the drawn objects.

Neperud (1977) and Lustbader and Wheatley (1981) have developed and applied similar graphic tools to study children's representations of the environment. Lustbader and Wheatley used such drawings to study interpreting. These graphic measures could be used with adults, as well as children, as measures of **{PR}** and/or **{PRI}**.

Research method The "location task" (Peled 1989) can be used to explore experiences of a place, such as a park, and the visitor's desired spatial organization of that place. The "location task" consists of listing features perceived as "inside" or "outside" of the stated environment and then locating these features at the front/back, left/right, or core/periphery of that environment.

When **R** is a place or landscape, the "location task" would enable researchers to observe the relative importance to **P** of elements of that landscape (including its inhabitants), and the relationships **P** desires for them to have to each other and to himself -- a detailed picture of **{PR}**, or of **{PRI}** should the interpreter be included in the picture.

General Measurement Techniques

Many of the measurement techniques discussed so far have been direct -- **P** (or **I**) is asked something. But indirect measures also are applicable to investigating interpreting.

Research method Instead of tests, questionnaires, or other "direct" measures, ethnographic research techniques, involving observations of behavior, structured and unstructured interviews, and recording of natural conversations may be applied to measure many factors in interpreting.

Trotter (1990), for example, used ethnographic research techniques to study interpretation effectiveness at a National monument. Knamiller and Obeng-Asamoah (1980) applied techniques for listening and coding conversations with children about their environment.

In using indirect techniques to evaluate interpreting, we may be interested in, for instance, what **P** says about **R** in ordinary conversation, how often **R** is mentioned, with what force it is mentioned, and what key words or concepts are used. Indicators such as active versus passive vocabulary (words used spontaneously versus words recognized but not used) could provide clues to **P**'s knowledge and relationship with **R**. Such analyses could be applied to written material done by **P**, and to his drawings, as well as to speech.

As with testing for knowledge, providing different modes of expression for **P** to describe {**P R**} can control for dissimilarities in the abilities of **P**.

Research method Having **P** select icons or symbols to reflect affective state can be use with both children and adults.

Reames and Rajecki (1988), for instance, used selection of happy-, neutral- and sad-face icons to test pre-schoolers' feelings about various animals. Similar techniques could be applied to adults as well, avoiding the need for reading or writing, to simplify measurement, and to make participation in a study more enjoyable for **P**.

Sources of Observed Effects

In discussing the measurement of knowledge, alternative sources of incongruence between r^I and r^P were listed. Similar cautions apply to other measures as well.

Researchers need to consider that they may not see a step for a number of reasons:

- availability of the step(s), stemming from physical and mental capabilities (for example, see the discussion on developmental stages) or from the interpretive situation (for example, **R** being unavailable for **P** to connect with)
- **P**, **I**, or **R**, choosing not to take the step(s)
- the researcher's exposure and attention to the step-taking
- the researcher's making something of the step-taking

Similarly, when studying a relationship, researchers need to consider as potential sources of observed differences:

- exposure and attention between the elements in the relationship
- establishment of the relationship
- a respondent's (**P**, **P**₂, **R**, or **I**) view of the relationship
- a respondent's expression of the measure of the relationship
- the researcher's exposure and attention to the expression of the measure
- the researcher's making something of the expression

Researchers need to be aware of such potential sources of observed differences, regardless of the measures used, and control for them through careful research design and measurement techniques.

CHAPTER VIII

A METAPHOR OF INTERPRETATION

No attempt has been made in this dissertation to define an "ideal form" for interpreting, or to delineate "good" or "poor" interpreting. The possible combinations of factors -- of elements, relationships, conditions, and steps -- are numerous and their interactions complex. Fitting the factors together to do "good" interpreting is part of the "art" of interpretation. Knowing what the factors are and providing a way to think about and study their interactions, are part of the "science". The conceptual framework offered in this dissertation is a way of doing the latter.

But a conceptual framework is only one way of thinking about -- of "knowing" -- a subject. There are other ways, as well. Kaplan (1964:265) pointed out the utility of a "scientific metaphor", or aphorism, that condenses in a phrase a significant relationship.

Within the conceptual framework offered in this dissertation, there is a relationship that incorporates three key elements: **P**, **R**, and **I**. Without one or another of these elements, we may have communicating or experiencing, but we do not have interpreting. It is the many-possibilitied interplay of the three elements, the relationships they can forge and the steps they can take, that distinguishes interpreting and invigorates it. Within the proposed framework, then, **P**, **R**, and **I** need to be considered jointly. Their relationship is, in essence, *interpretation* (as opposed to interpreting). It is, necessarily, what is and comes to be as a result of interpreting.

The diagram of this relationship (Figure VIII-1) is offered as a metaphor of interpretation. The metaphor emphasizes that we must take into account the influence of **I** and **P** and **R** on each other. It forces us to keep in mind what interpretation, as opposed to simple experience or common communication, is all about.

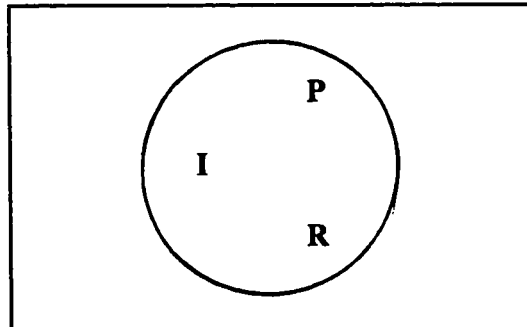


Figure VIII-1 A metaphor of interpretation

The diagram itself is not new. Sharpe (1979) for instance, used three interlocking circles, labeled the public, the resource and the interpreter, to illustrate his correspondence course Interpreting the Environment.

The point here is not novelty, however, but inclusiveness. Not (just) instruction, but provocation. The metaphor is aimed to (keep) present a whole, and to provoke interpreters and researchers to focus on that whole rather than just (some of) interpretation's parts.

As with all metaphors, and all concepts, this is only a way of thinking about our subject -- about interpretation. But how we think about our subject can make all the difference.

EPILOGUE

Four people stand at the rim of The Canyon.

Each has questions they are unable, by themselves, to answer. They must rely on someone else -- an "expert" -- to discover the answers. And to interpret those answers for them.

But the same person need not fill both discoverer and interpreter roles.

The expert's interest is in discovering answers. This may require years of preparatory study and more years of concerted, scientific effort; and the answers may change as more becomes known, or as our views of the universe change. The expert worries about communicating with his fellow experts, not about communicating his findings to any and all who ask for them. Though some experts are surely good at this as well.

Which is why the fourth person on the rim of The Canyon is special.

His interest in The Canyon is not (merely) curiosity, nor practicality, nor husbandry. His goal is to satisfy those interests in others. He must be familiar with their questions and familiar with the experts' answers. And above all he must know how to communicate those answers so other people can understand them.

This is called interpreting.

But the interpreter has, himself, questions which need answering: How do I become familiar with the questions I will need to answer? How do I get to know the answers, or where the answers are? And, critically, how do I provide the connection between people and the answers?

Like the other three, the interpreter can not be expected to answer, by himself, these questions about interpreting. There is a role for experts here, and for scientific practice.

And that is what this dissertation is about.

GLOSSARY OF TERMS AS USED IN THIS DISSERTATION

attention:

Follows exposure. Implies sensing of the something to which exposed. May lead to cognition, including establishing of a relationship.

boundary (of a relationship):

The defined extent of a relationship with regard to physical, temporal, or ideational space, outside of which the relationship no longer holds. Generally, that which is relevant to the interaction of the elements in the relationship.

artifact:

Something made by an interpreter that can be left for use by someone else in the interpreter's absence. Signs, brochures, books, videos, labels, graphs, are all examples of artifacts.

cognition:

Taking-something-into-account; performing a mental task. Memory, ideas, feelings, relations, insights are all cognitions.

comprehension:

Linguistic understanding of a message. This is not the same as understanding the content or implications of the message. "I hear what you say (comprehension), but I have no idea why you want me to stand on one foot and rub my head."

condition:

A "characteristic" of a factor that makes a difference to the capabilities or performance of that factor. For example, age, schooling, and prior experience are some conditions of a person; authorship, graphic technique, and state of repair are some conditions of a sign.

element:

An entity (physical or ideational) that plays a role in interpreting. In the conceptual framework, **P**, **I**, **ℓ**, **R**, **ℝ**, **r**, and **r**.

exposure:

Being in the presence of something, with assumed physical and/or mental capabilities to sense it. Precedes attention.

factor:

A general term denoting something that is posited to make a difference to interpreting; something which researchers should consider for study or control for in research. In the conceptual framework, elements, relationships, steps, complexes, and conditions of each.

interpretation, the profession of:

The body of individuals and groups who practice interpreting, along with all those components of work and business that make interpretation possible (see Introduction to the dissertation).

interpretation:

A general term denoting the form of communication discussed in this dissertation. Also, conceptually, its 'end product'. Thus, with competent interpreting, interpretation occurs.

interpreting:

The act or acts of "doing interpretation", of communicating with someone interpretively: giving the talk, leading the nature walk, writing the sign or the brochure, etc. Can be used as a noun.

living interpretation:

Personal services, including role playing, performances, and craft and skill demonstrations, in which the interpreter becomes part of what is being interpreted.

mode:

The psycho-physiological means for interacting; e.g. spoken, written, visual, graphic, kinesthetic, hands-on, etc.

non-personal service:

An interpreting without the presence of a live interpreter.

personal service:

An interpreting conducted by or involving a live interpreter.

prior conditions:

Conditions, of an element or relationship, brought to interpreting that are posited to make a difference to interpreting.

relationship:

An interconnected, interacting unit composed of two or more elements. The relationship is different from and can be treated separately from the elements which belong to it.

rightness (in pragmatic communication theory):

The validity condition in regard to the communicator having the authority, role, or agreed ability to make statements about the subject at hand.

state (of a relationship):

A mode of existence with respect to structure, form, and circumstance. The "state" of one's health is analogous.

step:

Observing followed by moving. Actions (including mental actions) taken by an element or relationship. For inanimate elements, observing does not apply.

thematize (thematic, thematization):

To bring a validity condition to the fore; to challenge and/or try to establish a validity condition. Generally, to discuss a communicator's truthfulness, rightness, or truth.

transmission:

Term used to describe the sender-message-receiver perspective of interpretation.

truth (in pragmatic communication theory):

The validity condition in regard to the real world and what the real world is.

truthfulness (in pragmatic communication theory):

The validity condition in regard to the communicator not lying or trying to deceive.

validity condition(s) (in pragmatic communication theory):

**The agreements between communicators that permit communication to occur.
Each participant must agree to the other's truthfulness, rightness and truth.
Also, comprehensibility (of language) must be met.**

BIBLIOGRAPHY

Alderson, William T.; Low, Shirley P. 1976: Interpretation of Historic Sites, Nashville:American Association for State and Local History.

Angelo, Mark 1981: Using cassette tapes in interpretive programming on the Yew Lake Nature Trail, Journal of Interpretation 6(2):15-16.

anonymous 1976: Interpretation of Love (sound recording), University of Washington Music Listening Center, Seattle, WA.

anonymous (no date): Interpretive Planning; presented during a series of lectures offered in celebration of the 50th Anniversary of the US National Park Service, mimeograph.

Audi, Robert 1983: The Application of Conceptual Analysis, Metaphilosophy 14(2):89-106.

Austin, J.L. 1962: How to Do Things With Words, Oxford:University Press.

Barefoot, J.C.; Strickland, L.H. 1982: Conflict and Domination in Television-mediated Interaction, Human Relations 35(7):559-566.

Barnlund, D.C. 1962: Toward a Meaning-Centered Philosophy of Communication, The Journal of Communication 12:197-211.

Beck, L. 1989: Conversations with Barry Lopez: Musings on interpretation, Journal of Interpretation 13(3):4-7.

Becker, Robert H.; Dottavio, F. Dominic; MacDonald, Barbara L. 1988: The use of interpretation to gain visitor acceptance of vegetation management. In Noe, F.P; Hammitt, W.E. (eds.) Visual Preferences of Travelers along the Blue Ridge Parkway, Washington, D.C.:US Department of the Interior, National Park Service. 94-104.

Beechel, J.M. 1974: Interpreting for Handicapped Persons, Masters Thesis, University of Washington, Seattle, WA.

Biggs, C.C.; Roth, C.Z. 1985: Interpreting the river resource, Journal of Interpretation 11(2):49-56.

Bloom, B.S.; Engelhart, M.D.; Furst, E.J.; Hill, W.H.; Krathwohl, D.R. 1956: Taxonomy of Educational Objectives, Handbook I: Cognitive Domain, New York:David McKay Co.

Boulanger, F.D.; Smith, J.P. 1973: Educational Principles and Techniques for Interpreters, USDA Forest Service General Technical Report PNW-9, Pacific Northwest Forest and Range Experiment Station, Portland, OR.

Brown, Barbara F.; Cherem, Gabriel J. 1979: Interpretation: A "brain-compatible" way to learn, Journal of Interpretation 4(2):2-12.

Brown, William E. 1971: Islands of Hope, Arlington, VA:National Recreation and Parks Association.

Bultena, Gordon; Field, Donald; Renninger, Renee 1978: Interpretation for the elderly -- A study of the interpretive interests of retired national parkgoers, Journal of Interpretation 3(2):29-32.

Burde, John H.; Peine, John D.; Renfro, James R.; Curran, Kevin A. 1988: Communicating with park visitors: Some successes and failures at Great Smoky Mountains National Park. In Legg, Michael (ed.) National Association of Interpretation 1988 Research Monograph, Fort Collins, CO.

Cable, T.T.; Knudson, D.M.; Theobald, W.F. 1986: The Application of the theory of reasoned action to the evaluation of interpretation, Journal of Interpretation 11(1):11.

Carl, David 1984: Walking the controversy tightrope, The Interpreter 15(4):6-7.

Caron, Judi Ann 1989: Environmental perspectives of blacks: Acceptance of the "New Environmental Paradigm", Journal of Environmental Education 20(3):21-27.

Carter, Richard F. 1985: Things, unpublished manuscript prepared for CMU 500, University of Washington, Seattle.

Carter, Richard F. 1990a: Mass Communication Effects: A Weakness Theorem, unpublished paper submitted to the Communication Theory and Methodology Division, AEJMC.

Carter, Richard F. 1990b: Mass Communication, Mass Cognition, and the Behavioral Molecule, unpublished essay expanded from an invited address to the 1990 American Psychological Association conference on Mass Media and Society, Boston MA.

Carter, Richard F. 1991: Ideational mechanics, unpublished manuscript prepared for CMU 400, University of Washington, Seattle.

Carter, Richard F.; Stamm, Keith R. in press: The 1992 Presidential Campaign and Debates: A Cognitive View.

Chapelle, Alan D. 1980: Tilden's interpretive principles - A neglected legacy, The Interpreter 12(1):17-19.

Cherem, Gabriel J. 1977: The Professional Interpreter: Agent for an awakening giant, Journal of Interpretation 2(1):3-16.

Cherry, Colin 1978: On Human Communication: A Review, A Survey, and A Criticism, Third Edition, Cambridge, Massachusetts: The MIT Press.

Chomsky, N. 1959: Review of Verbal Behavior by B.F. Skinner, Language 35:26-58.

Christensen, Joel 1985: Helping your visitors, your programs and yourself, The Interpreter 15(Fall):24-27.

Christensen, Harriet H.; Dustin, Daniel L. 1986: "Visitor Appeals and Noncompliance: A Review of Kohlberg and Gilligan", paper presented at the First National Symposium on Social Science in Resource Management, Corvallis, OR: National Park Service and Oregon State University.

Cicourel, A. V. 1974: Cognitive Sociology: Language and Meaning in Social Interaction, New York: Free Press.

Corbin, Martin 1959: Theory and Technique of Interpretation, Prentice-Hall: New Jersey.

Coulthard, M. 1977: An Introduction to Discourse Analysis, London: Longman.

Coutant, Gerald C. 1985: Interpretation - The changing role of a profession, Journal of Interpretation 10(2):37-39.

Dance, Frank E.X.; Larson, Carl E. 1976: The Functions of Human Communication: A Theoretical Approach, New York: Holt, Rinehart and Winston.

Dick, Ronald E.; Myklestad, Erik; Wagar, J. Alan 1975: Audience attention as a basis for evaluating interpretive presentations, USDA Forest Service Research Paper PNW-198, Pacific Northwest Forest and Range Experiment Station, Portland, OR.

- Dick, Ronald E.; McKee, David T.; Wagar, J. Alan 1974: A summary and annotated bibliography of communications principles, The Journal of Environmental Education 5(4):8-13.
- Doran, Rodney L. 1979: "State of the Art" for measurement and evaluation of environmental objectives, Journal of Environmental Education 9(1):50-63.
- Dottavio, F. Dominic; McLellan, Robert W. 1985: The effect of clothing on interpreters' credibility, Journal of Interpretation 10(2):7-14.
- Durant, William J. 1970: Interpretations of Life, New York:Simon & Schuster.
- Dustin, Daniel; McAvoy, Leo 1985: Interpretation As A Management Tool: A Dissenting Opinion, The Interpreter 16(2):18-20.
- Edwards, Yorke 1976: Interpretation -- What should it be?, Journal of Interpretation 1(1):no page.
- Feldman, Robert L. 1978: Effectiveness of audio-visual media for interpretation to recreating motorists, Journal of Interpretation 3(1):14-19.
- Field, D.R.; Wagar, J.A. 1973: Visitor groups and interpretation in parks and other outdoor leisure settings, Journal of Environmental Education 5(1):12-17.
- Files, Ross 1986: Sharing is the Keynote of Interpretation, Northwest RAIN Fall:3.
- Fischer, D.W. 1966: The role of interpretation, Park Practice Guidelines: Interpretation 20:1-4.
- Fogg, Christine R.; Hartmann, Lawrence A. 1985: Interpretation for the very young, Journal of Interpretation 10(1):21-26.
- Ford, Phyllis M.; Cloninger, Karl W. 1983: Multi-phasic mood changes in a five-day residential outdoor education experience, Journal of Environmental Education 14(2):29-31.
- Frandsen, Paul (ed.) 1985: Interpreting Our Best, Region 10, Association of Interpretive Naturalists, Discovery Park, Seattle.
- Frome, Michael 1982: "To Sin by Silence...", Journal of Interpretation 7(2):41-45.

- Gamble, Susan Claire 1988: Outdoor education and computer-assisted instruction in teaching critical thinking regarding environmental concepts. In Legg, Michael (ed.) National Association of Interpretation 1988 Research Monograph, Fort Collins, CO.
- Garfinkel, H. 1967: Studies in Ethnomethodology, Englewood Cliffs, N.J.:Prentice-Hall.
- Giglioli, P.P. (ed.) 1972: Language and Social Context: Selected Readings, New York:Penguin.
- Gillies, P.; Wilson, A. 1982: Participatory exhibits: Is fun educational?, Museums Journal 82:131-135.
- Goffman, E. 1967: Interactional Ritual: Essays on Face to Face behavior, New York:Anchor.
- Grater, Russel K. 1976: The Interpreter's Handbook, Southwest Parks and Monuments Association, USA.
- Grossberg, L.; O'Keefe, D.J. 1975: Presumptions, Conceptual Foundations, and Communication Theory: On Hawes' Approach to Communication, Quarterly Journal of Speech 61:195-208.
- Gunn, Giles B. 1979: The Interpretation of Otherness: Literature, Religion, and the American Imagination, New York:Oxford University Press.
- Habermas, Jurgen 1979: Communication and the Evolution of Society, translated by Thomas McCarthy, Boston:Beacon Press.
- Ham, Sam H.; Shew, Richard L. 1979: A comparison of visitors' and interpreters' assessments of conducted interpretive activities, Journal of Interpretation 4(2):39-44.
- Ham, Sam H. 1983: Cognitive psychology and Interpretation: Synthesis and Applications, Journal of Interpretation 8(1):11-27.
- Hammitt, William E. 1978: A visual preference approach to measuring interpretive effectiveness, Journal of Interpretation 3(2):33-37.
- Hammitt, William E. 1981a: A Theoretical Foundation for Tilden's Interpretive Principles, Journal of Interpretation 6(1):9-12.
- Hammitt, W.E. 1981b: The familiarity-preference component of on-site recreational experiences, Leisure Sciences 4(2):177-193.

- Hammitt, William E. 1982: Attention, familiarity, and effective interpretation, Journal of Interpretation 7(2):1-9.
- Hammitt, William E. 1984: Cognitive processes involved in environmental interpretation, Journal of Environmental Education 15(4):11-15.
- Hartmann, Lawrence A. 1983: Directory of Interpretive Curricula in the United States and Canada, Washington, D.C.:USDA Forest Service.
- Hawes, L.C. 1973: Elements of a model for communication processes, Quarterly Journal of Speech 59:11-21.
- Hayward, D. Geoffery; Jensen, Arthur D. 1981: Enhancing a sense of the past: Perceptions of visitors and interpreters, The Interpreter 12(2):4-11.
- Hempel, Carl G. 1952: Fundamentals of Concept Formation in Empirical Science, International Encyclopedia of Unified Science, V.11 No.7, Chicago:University of Chicago Press.
- Herzog, T.R.; Kaplan, S.; Kaplan, R. 1976: The prediction of preference for familiar urban places, Environment and Behavior 8(4):627-645. Quoted in Hammitt, William E. 1981: The familiarity-preference component of on-site recreational experiences, Leisure Sciences 4(2):177-193.
- Hof, Marilyn 1979: What is Interpretation?, The Interpreter 11(1):31-32.
- Horsley, A. Doyne 1988: The unintended effects of a posted sign on littering attitudes and stated intentions, Journal of Environmental Education 19(3):10-14.
- Hungerford, Harold R.; Volk, Trudi L. 1990: Changing learner behavior through environmental education, Journal of Environmental Education 21(3):8-19.
- Hymes, D. 1972: Toward ethnographies of communication: The analysis of communicative events. In Giglioli, P.P. (ed.) Language and Social Context: Selected Readings, New York:Penguin.
- Iozzi, Louis A. 1989: What research says to educators. Part One: Environmental education and the affective domain, Journal of Environmental Education 20(3):3-9.
- Isaac, Stephen; Michael, William B. 1981: Handbook In Research and Evaluation, Second Edition, San Diego, California:EdITS Publishers.

Istvan, Laurence B. 1986: "Moral Reasoning, Communication, and the Control of Vandalism: Some Thoughts from Theory", presented at the First National Symposium on Social Science in Resource Management, Corvallis, OR:National Park Service and Oregon State University.

Jones, Pamela E.; McAvoy, Leo H. 1988: An evaluation of a wilderness user education program: A cognitive and behavioral analysis. In Legg, Michael (ed.) National Association of Interpretation 1988 Research Monograph, Fort Collins, CO.

Kaplan, Abraham 1964: The Conduct of Inquiry: Methodology for Behavioral Science, New York:Harper & Row.

Kaplan, S.; Kaplan, R. (eds.) 1978: Humanscape: Environments for People, Belmont, CA:Duxbury Press.

Keatinge, M.W. 1910: The Great Didactic of John Amos Comenius, London:Adam & Charles Black.

Keyes, Brian E.; Hammitt, William E. 1984: Visitor reaction to interpretive signs on a destination-oriented forest trail, Journal of Interpretation 9(1):11-17.

Kim, Hak Soo 1986: Coorientation and Communication. In Dervin, Brenda; Voigt, Melvin J. (eds.) Progress in Communication Sciences, Volume VII, Norwood, NJ:Ablex. 31-54.

Knamiller, Gary W.; Obeng-Asamoah, John 1980: The child in the community -- Ghanaian children's perceptions, Journal of Environmental Education 10(4):21-27.

Knotts, David 1984: Beyond the physical: A new twist on the "old" sensory theme, The Interpreter 15(2):20-21.

Kohlberg, L. 1969: Stage and sequence: The cognitive-developmental approach to socialization. In Goslin, D.A. (ed.) Handbook of Socialization Theory and Research, Chicago:Rand McNally.

Kohlberg, L.; Levine, C.; Hewer, A. 1983: Moral Stages: A Current Formulation and a Response to Critics, Basel; New York:Karger.

Krippendorff, Klaus 1980: Content Analysis: An Introduction to Its Methodology, Volume 5. The Sage CommTEXT Series, Beverly Hills:Sage Publications.

Kuhn, Thomas S. 1970: The Structure of Scientific Revolutions 2nd Edition, Chicago:University of Chicago Press.

Kuhn, Richard G.; Jackson, Edgar L. 1989: Stability of factor structures in the measurement of public environmental attitudes, Journal of Environmental Education 20(3) 27-32.

Lashley, K.S. 1951: The problem of serial order in behavior. In Jeffress, Lloyd A. (ed.) Cerebral Mechanisms in Behavior: The Hixon Symposium, New York:Baliantine.

Lime, D.; Lucas, R. 1977: Good information improves the wilderness experience, Naturalist 28(4):18-21.

Lime, David W.; Anderson, Dorothy H.; Mech, L.David 1978: Interpreting wildlife through guided expeditions, Journal of Interpretation 3(2):10-16.

Lime, David W. 1988: Observing visitors as a method of studying use in information centers: Comparisons from a 1973 and 1983 study in Minnesota. In Legg, Michael (ed.) National Association of Interpretation 1988 Research Monograph, Fort Collins, CO.

Lovelady, Gregory W. 1977: An Interpretive Plan for the Puyehue National Park, Masters Thesis, University of Washington, Seattle, WA.

Lustbader, Sara; Wheatley, Jack 1981: Children's drawings -- An evaluation tool for nature interpretation, Journal of Interpretation 6(1):23-24.

Machlis, G.E.; Field, D.R. 1978: Interpreting parks for kids -- making it real, Trends, 11(2):19-25.

Machlis, G.E.; Field, D.R. (eds.) 1984: On Interpretation: Sociology for interpreters of natural and cultural history, Corvallis:Oregon State University Press.

Malandro, L.A.; Barker, L.L. 1983: Nonverbal Communication, Reading, Massachusetts:Addison-Wesley Publishing Company.

Maupin, Gordon T.; Witter, Daniel J.; Bassett, Barbara 1980: Missouri's eagle day interpretive program, Journal of Interpretation 5(1):3-9.

McAvoy, Leo H.; Hamborg, Roland 1984: Wilderness visitor knowledge of regulations: A comparison of visitor contact methods, Journal of Interpretation 9(1):1-10.

McKinney, John C. 1966: Constructive Typology and Social Theory, New York:Appleton-Century-Crofts.

McKroskey, J.C.; Young, T.J. 1981: Ethos and credibility: The construct and its measurement after three decades, Central States Speech Journal 32:24-34.

McPeck 1981, quoted in Gamble, Susan Claire 1988: Outdoor education and computer-assisted instruction in teaching critical thinking regarding environmental concepts. In Legg, Michael (ed.) National Association of Interpretation 1988 Research Monograph, Fort Collins, CO. 65.

Mendelsohn, H. 1974: Behavioralism, Functionalism, and Mass Communication Policy, Public Opinion Quarterly 38:379-389.

Moscardo, Gianna M. 1988: Toward a cognitive model of visitor responses in interpretive centers, Journal of Environmental Education 20(1):29-38.

Mullins, Gary W. 1985: The changing role of the interpreter, Journal of Environmental Education 15(4):1-5.

Neperud, Ronald W. 1975: "Favorite Places", Journal of Environmental Education 6(3):27-31.

Neperud, Ronald W. 1977: The development of children's graphic representations of the large-scale environment, Journal of Environmental Education 8(4):57-65.

Nielsen, Cynthia; Buchanan, Thomas 1986: A comparison of the effectiveness of two interpretive programs regarding fire ecology and fire management, Journal of Interpretation 11(1):1-10.

Noe, Francis P.; Snow, Rob 1990: The New Environmental Paradigm and further scale analysis, Journal of Environmental Education 21(4):20-26.

Nowlis, Vincent 1965: Research with the Mood Adjective Checklist. In Tomkins, S.S.; Izard, C.E. Affect, Cognition, and Personality, New York:Springer Publishing Company. 352-389.

Oliver, S.S.; Roggenbuck, J.W.; Watson, A.E. 1985: Education to reduce impacts in forest campgrounds, Journal of Forestry 83(4):234-236.

Owens, Joseph 1968: An Interpretation of Existence, Milwaukee:Bruce Publishing.

Pearce, W.B. 1976: The coordinated management of meaning: A rules-based theory of interpersonal communication. In Miller, G.R. (ed.) Explorations in Interpersonal Communication, Beverly Hills, Ca.:Sage Publications.

- Peart, Bob 1986: Interpretation in informal learning, Journal of Interpretation 11(1):33-40.
- Peled, Arie 1989: The exploration of meaning in environmental education, Journal of Environmental Education 21(1):19-25.
- Piaget, J.L. 1974: The Language and Thought of the Child, New York:New American Library.
- Platt, J.R. 1964: Strong inference, Science 146:347-353.
- Reames, Judi; Rajecki, D.W. 1988: Changing preschoolers' attitudes toward animals: A zoo program and evaluation. In Legg, Michael (ed.) National Association of Interpretation 1988 Research Monograph, Fort Collins, CO.
- Robinson, E.S. 1928: The behavior of the museum visitor, AAM Monograph, new Series, No.5, Washington D.C.:American Association of Museums. Quoted in Moscardo, Gianna M. 1988: Toward a cognitive model of visitor responses in Interpretive centers, Journal of Environmental Education 20(1):29-38.
- Roggenbuck, Joseph W.; Hammitt, William E.; Berrier, Deborah L. 1982: The role of interpretation in managing for recreational carrying capacity, Journal of Interpretation 7(1):7-20.
- Roth, C.Z.; Hodgson, R.W. 1979: The contribution of perception training to interpretation effectiveness: An experiment, Journal of Environmental Education 9(1):23-30.
- Roy, S.B. 1973: Interpretation of Taxing Statutes: A Study, New Delhi:Taxation Publishers.
- Ruitenbeek, Hendrick M. 1973: The Interpretation of Death, New York:J. Aronson.
- Samuelson, Merrill 1984: unpublished class notes prepared for CMU 409, University of Washington, Seattle.
- Sargent, Leslie W. 1965: Communicator image and news reception, Journalism Quarterly 42:35-42.
- Schegloff, E.A. 1972: Notes on a conversational practice: Formulating place. In Giglioli, P.P. (ed.) Language and Social Context: Selected Readings, New York:Penguin.

- Schenkein, J. (ed.) 1978: Studies in The Organization of Conversational Interaction, New York:Academic Press.
- Schramm, W.; Lyle, J.; Parker, E.B. 1961: Television in the Lives of Our Children, Palo Alto:Stanford University Press.
- Searle, J. 1972: What is a speech act? In Giglioli, P.P. (ed.) Language and Social Context: Selected Readings, New York:Penguin.
- Shannon, C.; Weaver, W. 1949: The Mathematical Theory of Communication, Urbana, Ill.:University of Illinois Press.
- Sharpe, Grant W. 1976, 1982: Interpreting the Environment 2nd Edition, New York:John Wiley & Sons.
- Sharpe, Grant W. 1979: brochure for the correspondence course Interpreting the Environment, University of Washington, Seattle.
- Shimanoff, S.B. 1980: Communication Rules: Theory and Research, Beverly Hills, Ca.:Sage Publications.
- Simpson, Steven 1987: Are naturalists' own values restricting the educational experience?, The Interpreter 18(2):16-18.
- Skinner, B.F. 1957: Verbal Behavior, New York:Appleton-Century-Crofts.
- Skinner, B. 1971: The myth of teaching for critical thinking, The Clearing House 45(6):372-376. Quoted in Gamble, Susan Claire 1988: Outdoor education and computer-assisted instruction in teaching critical thinking regarding environmental concepts. In Legg, Michael (ed.) National Association of Interpretation 1988 Research Monograph, Fort Collins, CO. 65.
- Stamm, Keith R.; Dervin, Brenda; Laing, Robert 1976: Communication research and environmental policy decisions: Seattle's solid waste planning, Journal of Environmental Education 8(2):26-36.
- Swearingen, Thomas C. 1989: Moral Development and Environmental Ethics, Doctoral Dissertation, University of Washington.
- Taylor, Charles 1971: Interpretation and the Sciences of Man, The Review of Metaphysics 25(1). Republished in Rabinow, P. and Sullivan, W.M. (eds.) 1979: Interpretive Social Science: A Reader, Berkley:University of California Press.

Tedeschi, James T.; Gaes, Gerald G.; Riordan, Catherine; Quigley-Fernandez, Barbara 1981: Social Psychology and Cumulative Knowledge, Personality and Social Psychology Bulletin 7(2):161-172.

Thayer, Lee 1987: On Communication: Essays in Understanding, Norwood, New Jersey: Ablex Publishing Company.

Tilden, Freeman 1957, 1967: Interpreting Our Heritage, revised edition, Chapel Hill: University of North Carolina Press

Trotter II, Robert T. 1990: Ethnographic research at Wupatki National Monument: A new tool for interpretation, Journal of Interpretation 14(1):R1-R6.

Toulmin, S. 1974: Rules and their relevance for understanding human behavior. In T. Mischel (ed.) Understanding Other Persons, Oxford: Blackwell.

Vander Stoep, Gail A.; Gramann, James H. 1988: Use of interpretation as an indirect visitor management tool: An alternative to regulation and enforcement. In Legg, Michael (ed.) National Association of Interpretation 1988 Research Monograph, Fort Collins, CO.

Veverka, J. 1978: Pacing interpretive services -- A concept for interpretive planners, Journal of Interpretation 3(1):20-26.

Wagar, J. Alan 1972: The Recording Quizboard: A device for evaluating interpretive services, USDA Forest Service Research Paper PNW-139, Pacific Northwest Forest and Range Experiment Station, Portland, OR.

Wagar, J. Alan 1976: Cassette tapes for interpretation, USDA Forest Service Research Paper PNW-207, Pacific Northwest Forest and Range Experiment Station, Portland, OR.

Wagar, J. Alan; Lovelady, Gregory W.; Falkin, Harlan 1976: Evaluation techniques for interpretation: Study results from an exhibition on energy, USDA Forest Service Research Paper PNW-211, Pacific Northwest Forest and Range Experiment Station, Portland, OR.

Wallin, Harold E. 1963: Interpretation: A Manual and Survey on Establishing a Naturalist Program, Management Aids Bulletin No. 22, American Institute of Park Executives, National Recreation and Park Association.

Warder, Donald S. 1988: A management goal: Effective interpretation. In Legg, Michael (ed.) National Association of Interpretation 1988 Research Monograph, Fort Collins, CO.

Washburne, Randel F.; Wagar, J. Alan 1972: Evaluating visitor response to exhibit content, Curator 15:248-254.

Washburne, Randel F. 1972: Visitor Response to Interpretive Facilities at Five Visitor Centers, Masters Thesis, University of Washington, Seattle, WA.

Wendling, Robert C.; Wuensch, Karl L. 1985: A fifth-grade outdoor educational program: expectations and effects, Journal of Interpretation 10(1):11-20.

Wiemann, John M.; Bradac, James J. 1989: Metatheoretical Issues in the Study of Communicative Competence: Structural and Functional Approaches. In Progress in Communication Sciences, Volume IX, Dervin, Brenda; Voigt, Melvin J. (eds.), Norwood, NJ:Ablex. 261-284.

Woodcock, Steve 1977: Value free Interpretation? Impossible!, The Interpreter 9(2):11-12.

APPENDIX A

INTERPRETATION IS: A LIST OF DEFINITIONAL PHRASES

Interpretation is:

... an attempt to create understanding.

Alderson and Low 1976:1

... [a] particular type of communication which delicately combines the principal elements of entertainment and education.

anon. (no date)

... the communication of information about our natural, cultural, human and scientific heritage.

Beechel 1974:3

... a process of explaining the "hows" and "whys" behind something.

Biggs and Roth 1985:53

... that body of communications, devices, and facilities that conveys environmental knowledge, stimulates discourse on environmental problems, and results in environmental reform.

Brown 1971:77

... built around first-hand, sensory experiences, is holistic in its approach, is creative, and often involves experiences that tug at the human emotions.

Brown and Cherem 1979:2

The ideal is to need no interpretation, to have the experience stand before us unmediated by anyone or anything.

Brown and Cherem 1979:11

Your role is as facilitator to the visitors' self-experience rather than as interpreter of the "facts" to them.

Carl 1984:7

... senses which await to be aroused by the interpreter.

Chapelle 1980:17

[Interpretation] offers firsthand experiences with that site or with subject matter and real objects found at that site.

Cherem 1977:6

... an experience in which you, the interpreter, excite in others a response to a work ... comparable to your own response.

Corbin 1959:6

... able to communicate an idea or clarify an issue, expand a horizon, or provoke a response by individuals not previously aware of the situation.

Coutant 1985:37

... people talking, one to one, over something real and made overwhelmingly interesting by the skill, and understanding, and magnetism of the interpreter.

Edwards 1976:(no page)

... attractive communication, offering concise information, given in the presence of the topic, and its goal is the revelation of significance.

Edwards 1976:(no page)

... sharing of an experience or idea ...

Files 1986:3

... the media by which a greater knowledge and perception of the resource, including its perpetuation through the park's management objectives, is related to the visitor.

Fischer 1966:1

"Interpretation", by contrast with information, conveys the meaning of something, through exposition or explanation.

Grater 1976:5

... concerned with aiding people in perceiving and experiencing an environmental resource that they might not otherwise experience without interpretation.

Hammitt 1981:9

... the facilitation of a relationship between an individual and his or her environment.

Hof 1979:32

[M]y job as an interpreter is not to establish communication between *you* and *me*, but between *you* and *Yosemite Valley*.

Hof 1979:32

... a person who creates the atmosphere in which wisdom reveals itself.

Inuit word for storyteller; quoted in Beck 1989:6

... applied to technical jargon and its translation into the language of the people.

Lovelady 1977:13

... taking scientific facts and figures and relating them to things that we know.

Lovelady 1977:13

... the art of revealing meanings and relationships in natural, cultural and recreation resources.

National Association for Interpretation (NAI) mission statement 1988

... to assist the visitor in developing a keener awareness, appreciation, and understanding of the area he or she is visiting.

Sharpe 1976:4

... communicating ideas to visitors in outdoor recreation settings.

Sharpe 1976:22



Sharpe 1979: brochure for correspondence course Interpreting the Environment

... experience to encourage future experiences.

Simpson 1987:18

... an attempt to make clear, to make sense of an object of study. ... The interpretation aims to bring to light an underlying coherence or sense.

Taylor 1971:25

An educational activity which aims to reveal meanings and relationships through the use of original objects, by first hand experience, and by illustrative media rather than simply to communicate factual information.

Tilden 1967:8

... the revelation of a larger truth that lies behind any statement of fact.

Tilden 1967:8

... not instruction, but provocation.

Tilden 1967:8

... the helping of the visitor to feel something that the Interpreter feels -- a sensitivity to the beauty, complexity, variety and interrelatedness of the environment; a sense of wonder; and a desire to know.

Wallin 1963:7

... to translate or explain that which is seen or heard at a level of understanding of the person learning.

Wallin 1963:7

This effort to interest, inform and stimulate [visitors] is known as interpretation.

Washburne 1972:1

APPENDIX B.
CLASSIFICATION OF PUBLISHED RESEARCH

Study	Research type ¹ perspective ² context ³			Independent variable ⁴	Dependent variable ⁴	other variables controlled for ⁵	Exposure to R ⁶
	1	2	3				
Wagar 1972	3	T	16	exhibits and quizboard ¹	knowledge, use of device		R
Washburne & Wagar 1972	3	T	3	media, subject, communication strategy	interest	conditions of P	R
Dick et al. 1975	1	T	5	viewing programs	attention		N, R, R
Wagar 1976	5	T	21	audiotape vs signs vs leaflet, interpretive technique on tape	short-term knowledge, enjoyment,	conditions of P, group size {P P ₂ }	R
Wagar et al. 1976	1	T	9	view exhibits	attention, liking, use of exhibits (testing these as evaluative measures)		R
Lime & Lucas 1977	3	T	15	brochure	intention to use brochure, choice of entry to wilderness	read brochure	N
Bultena et al. 1978	2	S	24	interpretive programs	likes and dislikes, participation,		R
Feldman 1978	4	T	21	brochure vs. audio tape	knowledge, use of trails	conditions of P	R

Study	Research type ¹ perspective ² context ³			Independent variable ⁴		Dependent variable ⁴	other variables controlled for ⁵		Exposure to R ⁶
	1	2	3						
Hammitt 1978	1	E	9	signs at site	PI ₁	preference for site, familiarity w/site,	{P:R} P ₁ > R	-	R
Lime et al. 1978	3	E	24	guided expedition to hear wolves	PI PR	intended further attendance of tour, feeling of increased knowledge, satisfaction, enjoyment,	P- < I ₁ (intent) {P: {P:r:P}} {P: {PRI}}	conditions of P, exposure to R as artifact or real	R, R ₁
Ham & Shew 1979	3	S	24	visitor experience vs. interpreter experience	PI	likes and dislikes	{P:I} {I: {PI}}	-	R
Roth & Hodgson 1979	6	E	11	perception training	I- > :	pleasure, awareness, use of senses	{P:R} P: {PR} P: P ₁ ...P ₂ ...	time to absorb, prior exposure to R, exposure to R, DV interactions	R
Maupin 1980	3	E	24	cage viewing	PI PR	satisfaction, enjoyment of the experience	{P: {PRI}}	conditions of P, group effects, exposure to R	R
Angelo 1981	4	E	9	audio tape vs. signs to interpret nature trail	I ₁ vs I ₂	interest, attention, enjoyment,	{P: I ₁ } P: I ₂ {P: {PR I ₁ }}	prior use of trail, listening to tape	R
Hammitt 1981b	3	E	9	site visit vs. photograph vs. prior site visit	R vs R ₁ vs {P:R}	preference for scene, recognition of scene	{P:R} P ₁ > R ₁	degree of prior exposure	R

Study	Research type ¹ perspective ² context ³			Independent variable ⁴		Dependent variable ⁴		other variables controlled for ⁵		Exposure to R ⁶
	1	2	3					time with I	time with I {PI}	
Hayward & Jensen 1981	3	S	24	visitor experience, interpreters' experience	PI	importance, effectiveness of sense of the past	{P: {PRI}} {I: {PRI}}	time with I, prior exposure to I	{PI}	R
Hammit 1982	6	E	9	preferences for scenes	{P:R}	recognition of scenes	P: > I	-		R
Roggenbuck et al. 1982	4	T	15	brochure	PI	choice of campground	P: < R (after)	prior exposure to camping area	{PR}	N
Roggenbuck et al. 1982	4	T	15 18	brochure vs. interpreter handing out brochure	(I+II) vs II	choice of campground	P: < R (after)	prior exposure to camping area, liking of brochure, group effects	{PR} {P:II} {P P _{2}}}	N
Hammit 1984	1	T	9	signs on trail	PI	recognition of content, liking of signs as part of hiking trail	P: > I {P: {PRI}}	prior information, reading of signs	{P: I} P: II	R
Keyes & Hammit 1984	5	E	9	exposure to signs	PI	liking of signs as part of hiking trail	{P: {PRI}}	reading of signs	P: II	R
McAvoy & Hamborg 1984	5	T	15 17	source of information (brochures vs visitor center vs outfilters vs organizations vs friends vs news media)	I vs II vs {P P _{2}}}	knowledge of rules	P: > I	prior exposure to R, viewing media, contact with agency staff	{PR} PI PI	R
Dotavio & McLellan 1985	4	T	5	interpreter's dress	I	perceptions of authoritativeness, character, credibility	{P: I}	-		N

Study	Research type ¹ perspective ² context ³			Independent variable ⁴	Dependent variable ⁴	other variables controlled for ⁵	Exposure to R ⁶
	1	2	3				
Oliver et al. 1985	4	T	21 brochure vs 24 brochure + interpreter vs brochure + interpreter + request to report	vandalism	P- < R (after)	-	R
Wendling & Wuensch 1985	4	T	13 field trip vs. 18 hands-on class, 24 vs. class lecture	attitudes, knowledge, perceived learning, enjoyment	{P:R} P! > r! {P: {P:r:P}} {P: {PRI}}	prior exposure to subject	R, R
Nielsen & Buchanan 1986	4	T	21 guided tour vs. 23 slide show	attitudes, knowledge	{P:R} P! > r!	conditions of P, content, perceived credibility, r! {P:I}	R
Becker et al. 1988	5	T	15 interpretive message	preference for scenes managed in different ways, preference for different management types	{P:R}	-	N
Burde et al. 1988	4	T	18 source of information (personal familiarity, friends, park literature, park staff)	knowledge	P! > r!	conditions of P	R

Study	Research type ¹ perspective ² context ³			Independent variable ⁴		Dependent variable ⁴		other variables controlled for ⁵		Exposure to R ⁶
	1	2	3							
Gamble 1988	3	T	22 outdoor education 24 vs computer- assisted instruction	I vs II	knowledge, thinking	Pi > r ¹ P-> r ¹ _{new}	-		R	
Horsley 1988	4	T	9 wording of signs	r ₁ ¹ vs r ₂ ¹	comprehension, littering	{P:r ¹ } P-<R (after)	-		R	
Jones & McAvoy 1988	4	T	18 interpretive program	PI	attitudes, knowledge, intentions toward R, beliefs	{P:R} Pi > r ¹ P-<R (intent) {P:R r}	conditions of P, prior exposure to R, prior knowledge,	P {PR} {P:r ¹ }	N	
Lime 1988	1	T	3 exhibit content	R ₁ vs R ₂	attention	P:II	-		R	
Moscardo 1988	6	E	15 conditions of visitor, interpretive techniques, facts, complexity	P II ₁ vs II ₂ r ₁ ¹ vs r ₂ ¹ II-> r ¹	impressiveness of exhibits, mindfulness of visitors,	{P:II} P:II...{P:R}	conditions of P, interaction of variables	P	R	
Reames & Rajecki 1988	5	E	12 interpretive program with exposure to animals	PI PR	liking of animals, knowledge	{P:R} Pi > r ¹	-		R	
VanderStoep & Gramann 1988	6	T	24 message + ask to participate, message + ask + incentive	r ₁ ¹ vs r ₂ ¹	vandalism	P-<R (after)	-		R	

Study	Research type ¹ perspective ² context ³	Independent variable ⁴	Dependent variable ⁴	other variables controlled for ⁵	Exposure to R ⁶	
Wardner 1988	1 2 3	personal vs. non- personal interpretation	attitudes, attention, knowledge, use of interpretive facilities, beliefs, satisfaction	prior visits to site and visitor center	R	
	3	21 personal vs. non- 23 personal interpretation	I vs II	{P:R} P:I P:I > I ¹ P-<I (during) {P:{R r}} {P:{PRI}} {P:{PRU}}		R

NOTES

- 1 Research types adapted from Tedeschi et al. 1981. See Chapter II for a full description.
1. Methodological studies
 2. Typological studies
 3. Exploratory studies
 4. External validity studies
 5. Intuitive - demonstration studies
 6. Intuitive - associated theories
 7. Hypothetical-deductive
 8. Strong inference

- 2 Conceptual theme or perspective. See Chapter III for a full description.

- T Transmission
- S Shared understanding
- E Assisted experience

- 3 Interpretive context. See Chapter III for a full description.

P	P (alone)												P with P ₂																	
	not present						R present						not present						R present											
	none			I			none			I			none			I			none			I								
Interpretive service	-	+	-	+	-	+	-	+	-	+	-	+	none	+	-	+	-	+	none	+	-	+	-	+	none	+	-	+	-	+
interaction	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
CONTEXT	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30

Interpretive service = The type of interpretive service: none; II non-personal; I personal.
 Interaction = Interaction of P with the lowest element present in the context hierarchy (from lowest to highest, I or II, R, P₂).

- 4 The terms *independent variable* and *dependent variable* may not be strictly applicable to all research included in the analysis -- correlational analysis, typology development, or a multifactor design, for instance. The terms are used in expectation that they are the most familiar of the possible designations for what was expected to make a difference (independent variable) to which outcome (dependent variable).

- 5 Variables controlled for -- statistically or through research design -- may have been only partially controlled for.

- 6 Exposure to R between interpreting and measurement of dependent variable(s).

APPENDIX C

NOTATION USED IN THE CONCEPTUAL FRAMEWORK

Notation for Elements

P	a person for whom the interpreting is done
P₂	another person or persons in the same interpretive context
I	personal service(s) provided by an interpreter or interpreters
II	non-personal service(s), created by interpreters to act in their stead
R	what is being interpreted; the subject of the interpreting
ℝ	cartifact(s) representing R
r	concept(s) about R (ideas, information, "facts", feelings, etc.)
r	cartifact(s) representing r

Authorship of cartifacts and concepts is shown by adding **I** or **P** as a superscript: r^I or r^P , \mathbb{R}^I or \mathbb{R}^P .

Notation for relationships

{X Y}	a relationship (the equivalent of an encircling line). Order within the brackets is irrelevant, for a relationship.
{X:Y}	what the left-hand element makes of the right-hand one. In denoting this aspect of a relationship, order within brackets is relevant.

Notation for Steps

XY	exposure
:	attention (with the element on the left of the colon attending to the one on the right, thus P attending to R is P:R)
::	two elements attending to each other (thus I::P)
-<	connecting (such as touching, handling or manipulating)
->	offering
?>	asking
!>	remembering or "knowing"
{X:Y}	cognizing
→	actions or "steps", in a general sense, taken to influence someone or something
,	between steps, indicates related steps, in the sequence taken
...	between steps, indicates unlisted steps in a sequence

Steps can be used as constituents of other steps. For example, **-<** can be used as a symbol for a connecting tool. **I ->-<** is the interpreter offering, for example, a butterfly net. **I ->:** is the interpreter offering a tool for attention, like a pair of binoculars or a mental analogy.

VITA

LAURENCE B. ISTVAN

Laury's career has focused on the interface between people, technology, and natural resources: transferring new technologies into everyday resource management operations; designing and managing applied research and environmental programs; facilitating sound, implementable management decisions through public involvement processes; interpreting science, technology and policy issues for decision-makers and the public.

The hallmark of Laury's work is innovative solutions to difficult technical and policy problems, achieved by directly involving those who have a stake in the results. Three projects illustrate the scope of Laury's work.

- 1) He led a multi-national scientific team to design an ecosystem monitoring program for the Sahel region of Africa. The program incorporated both the latest satellite imagery and on-the-ground observations from itinerant herdsman. Four African nations helped develop the program; eight subsequently implemented it.
- 2) He designed the system used by agencies and businesses in Washington State to measure and report progress in pollution prevention. Quantitative measures were developed both for pollution that doesn't exist and for social progress in avoiding pollution. Acceptance of the system as a valid policy tool was gained by involving industry, environmental groups, regulators, and legislators in its development.
- 3) He prepared a guiding interpretive plan for Weyerhaeuser's 200,000 acre Snoqualmie Tree Farm. Local business, education, recreation, environmental, and community leaders were surveyed to determine interests, levels of knowledge and constraints on visitation that would affect the interpretive program and its messages.

Through his work, Laury has focused on society's increasing reliance upon scientific and technical information as the basis for problem-solving and decision-making, leading to his doctoral research on the communication of such information.

Laury received a bachelor of science in Natural Resources Management from the University of Michigan in 1974; worked from 1972 to 1978 at the Environmental Research Institute of Michigan, heading the 12 person Integrated Projects Group from 1976 on; and since 1979 has worked as an independent consultant to government, private firms and international agencies.