

THE WHORF THEORY COMPLEX

**AMSTERDAM STUDIES IN THE THEORY AND
HISTORY OF LINGUISTIC SCIENCE**

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Volume 81

Penny Lee

The Whorf Theory Complex
A critical reconstruction

THE WHORF THEORY COMPLEX

A CRITICAL RECONSTRUCTION

PENNY LEE

The University of Western Australia

JOHN BENJAMINS PUBLISHING COMPANY
AMSTERDAM/PHILADELPHIA



The paper used in this publication meets the minimum requirements of American National Standard for Information Sciences — Permanence of Paper for Printed Library Materials, ANSI Z39.48-1984.

Library of Congress Cataloging-in-Publication Data

Lee, Penny.

The Whorf theory complex : a critical reconstruction / Penny Lee.

p. cm. -- (Amsterdam studies in the theory and history of linguistic science. Series III, Studies in the history of the language sciences, ISSN 0304-0720; v. 81)

Includes bibliographical references (p.) and index.

1. Sapir-Whorf hypothesis. 2. Linguistic analysis (Linguistics) 3. Whorf, Benjamin Lee, 1897-1941. I. Title. II. Series.

P35.L44 1996

401'.9--dc20

96-21119

ISBN 90 272 4569 X (Eur.) / 1-55619-618-0 (US) (Hb; alk. paper)

CIP

ISBN 90 272 4570 3 (Eur.) / 1-55619-619-9 (US) (Pb; alk. paper)

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John Benjamins Publishing Co. • P.O.Box 75577 • 1070 AN Amsterdam • The Netherlands
John Benjamins North America • P.O.Box 27519 • Philadelphia PA 19118-0519 • USA

Dedicated to the memory of Janet Keeley
kind teacher, guide, and friend

Benjamin Lee Whorf (1897–1941)

CONTENTS

Acknowledgments	vii
Preface	xi

Chapter 1. *Introduction and Overview*

1.1 The Early Work: 1924–1930	1
1.2 1931–1941: The Final Years	9
1.3 Misread, Unread, and Superficially Treated	14
1.4 The Theory Complex — An Overview	23
1.5 Elements of the Complex Summarized	30

Chapter 2. *Linguistic Thinking: Points, Pattern, Linkage, and Rapport*

2.1 Patternment	34
2.2 Points in the Pattern	42
2.3 Emergent from a Field of Causes	53
2.4 Linguistic Thinking	65
2.5 Form and Substance, Process and Content — Cutting through the Dichotomies to Linguistic Thinking	72

Chapter 3. *The Logic and Development of the Linguistic Relativity Principle*

3.1 The Linguistic Relativity Principle	84
3.2 Raw Experience	89
3.3 Isolates of Experience — the Nonlinguistic Configuration of Experience	96
3.4 A Canon of Reference, the Same for all Observers	109
3.5 The Biological Segmentation of Reality	118
3.6 Different Essentials from the Same Situation	122
3.7 The Yale Report and Configurative Linguistics	128

3.8	An Analysis of Hopi Stems — Gestalt Theory in the Service of Linguistics	136
3.9	Overview of the Yale Report	143
Chapter 4. <i>Of Covert Categories, Cryptotypes, and the Internalized Linguistic System</i>		
4.1	A Whorfian Psycholinguistics	160
4.2	Marking and Grammatical Classes	165
4.3	Terminological Anomalies	168
4.4	Grammatical Meaning and The Problem of Levels in Linguistic Description	172
4.5	The Data of Utterances	186
Chapter 5. <i>Abstractive Processes and the Question of Universals</i>		
5.1	Abstractive Processes in Cognition	193
5.2	Experiential, Conceptual, and Linguistic Universals.	211
Chapter 6. <i>Metalinguistics: The Intercalibration of Agreement through Language Awareness</i>		
6.1	Introductory Comments	224
6.2	Three Kinds of Agreement	225
6.3	Metalinguistics	228
6.4	Language Awareness as an Augmentative Function in Cognition	238
6.5	Different Order Systems, Different Logics, and the Progress of Science	245
Appendix: “The Yale Report”		251
References		281
Index of Names		301
Index of Subjects		304

ACKNOWLEDGMENTS

Although one labors largely alone in writing, the network of human relationships within which one exists is as much part of the matrix from which the book ultimately emerges as is one's own intellectual and creative strivings. One grows and changes with the maturing manuscript, absorbing the wealth of contributing influences into one's own being as well as into what is finally shared in the finished work. In these acknowledgments it is inevitable that some of the more subtle debts to others remain unsaid. If some have been overlooked altogether I apologize.

It is appropriate to thank Toby Metcalfe first for alerting me to the existence of Whorf's ideas in 1984 when I was struggling to express feelings of cultural and linguistic dissonance after a sojourn in North East Arnhemland, Australia. From Canada, Louis Buchanan in a serendipitous act of kindness later let me know of the existence of the unpublished Whorf papers held in the Yale archives. For this I will always be grateful as the material was very little known at the time.

Then there are the playmates of my childhood who made me bilingual in Fijian and English, and my indigenous Australian friends and confidantes who shared their language and culture with me during two crucial years in later life. It seems right to think of these people now.

Without Michael Herriman, whose gentle promptings and ongoing support from 1987 ensured that philosophical and psycholinguistic implications of Whorf's ideas were at least grappled with as they unfolded, the work might never have been carried through to this stage of completion. Susan Kaldor has been there also for most of these years, a good friend and mentor especially in difficult times. Thanks too to those other colleagues in Australia at various times — Ian Malcolm, Peter Mühlhäusler, Gerhart Bickers, Paul Healy, Gedda Aklif, Graham McKay, Terry Williams, Margaret Sharpe, Michael Booth, Bernard Mageean, and Barry Maund who read sections of my work and provided useful feedback and encouragement. Also Ruqaiya Hasan and Michael Halliday for some early incisive questioning in relation to central concepts. Michael Clyne gave crucial advice and support during a crisis and Keith Allen helped keep the project going by inviting me to Monash to talk about Whorf. Much appreciated opportunities to work in university environments have been provided by The

Western Australian College of Advanced Education (now Edith Cowan University), The University of Western Australia (UWA), and The Flinders University of South Australia (FUSA) .

E. F. Konrad Koerner, my indefatigable editor in more recent times, has been a source of much appreciated advice and guidance since 1990. I owe sincere thanks too to Regna Darnell and John E. Joseph whose efficiency, advice, and personal support beyond the call of duty helped greatly during the rewriting process. To Yola de Lusenet and Anke de Looper of John Benjamins too, thank you for being so approachable, helpful, and understanding. None of the debts acknowledged in these pages, however, remove the final responsibility for the book from me — the usual disclaimers apply.

It is difficult to find appropriate words to thank those contemporaries of Whorf who responded to my letters or allowed me to visit them and who shared memories and insights with me. I feel deeply privileged to have been able to meet Whorf's daughter, Celia Lee W. Wheeler and her husband, Robert G. Wheeler, who were very kind during my visit to the United States of America in 1990 and who have continued to encourage me since. Of Whorf's friends and associates, Mary R. Haas, George L. Trager, Charles F. Hockett, and Henry M. Hoenigswald shared memories with me when I visited. Chas Hockett later also provided extensive critical input and corresponded regularly, generously sharing his insights, advice, and lively sense of humor. John B. Carroll was interested and supportive from 1989 and in the course of a sustained email interchange during 1993 and 1994 contributed invaluable encouragement and assistance, critically needed during a difficult time. I was also moved by the interest in and responsiveness to my letters of Frank T. Siebert, Norman A. McQuown, Fred Eggan, and Murray B. Emeneau, all of whom knew Whorf. In addition, I thank James S. Perkins, a former president of The Theosophical Society in America, who put me in touch with the Whorf family through his daughter, Torre P. Taggart, formerly married to one of Whorf's sons. (Both sons are now deceased).

Others who helped me understand the academic milieu of the decades following Whorf's death are M. Estellie Smith and Edith Trager Johnson, both of whom also provided hospitality, transport, valuable reminiscences, and much appreciated personal support when I visited the US. Estellie has remained a stalwart mentor and counselor since, several times bullying me energetically out of states of acute discouragement. Nor will I forget the kindness and understanding of John and Elsie Trager when I visited Pasadena in ill health and late summer heat. An interview with Henry Sustakoski at Buffalo was also very interesting. Others who helped with information are Dell Hymes, Kenneth L. Pike, Ives Goddard, Mary Ritchie Key, and Philip Sapir. I thank them all. I am

grateful also to John A. Lucy for his input and thank James V. Wertsch for putting us in contact.

There was a time when valuable critique and support from cognitive linguists and anthropologists was part of the enterprise which has become this book. I thank Ronald W. Langacker, René Dirven, Eve Danziger, Melissa Bowerman, Claudia Brugman, David P. Wilkins, Pierre Swiggers, George Lakoff, and Stephen P. Levinson for their interest and advice. Ron was particularly patient and generous when my plans for the book changed.

A study like this cannot be done without the expertise and assistance of librarians. I thank Audrey Black, En Koh, and the other UWA library staff for their endurance and good humor between 1987 and 1991. Also Judith Ann Schiff at Yale University, Roger Berry and Jackie M. Dooley at University of California, Irvine, Beth Carroll-Horrocks at the American Philosophical Society, Rebecca J. Bates at Harvard University, Margaret F. Sax at the Watkinson Library, Trinity College, Hartford, and Ruth S. Freitag at the Library of Congress, Washington.

Between 1988 and 1991 my research at UWA was significantly financed by Commonwealth Postgraduate and Australian Postgraduate Research Awards for which I am grateful. Research funds were also provided through the university research budget at FUSA in 1994. I thank my research assistants of the time, Carolyn Turner and Jenni Thomas, for their help. At UWA, in the last stages of revision, Judith Rochecuste provided valuable advice and assistance, as did Jenny Foo, Zan Blair, Robin Wilson, Carol Thomason, and Gail D'Souza. Generously offered and much appreciated assistance from Shan Callow and Marie-Eve Ritz also helped to bring the project finally to a close.

Finally there are those other friends and relatives who maintained an active interest in my research and provided the social and emotional environment needed to generate the intellectual energy required over the years. I thank Margaret Gray, Ann Howard, Audrey Bolger, Claire Nutter, Helen Soerink, Calvin Cook, Denise Mulligan, Bronwyn Wallace, Michael Lawson, and Jenny Barnett especially, and members of my family, especially my aunt, Rene Dade, for walks along the beach and my son, Peter Marsh, just for being there all that time. I wish my brother, whose amused tolerance of my writing helped sustain me, and Janet Keeley, to whom the book is dedicated, could have been here to see it finally done.

Perth, Western Australia
July 1996

P.L.

PREFACE

Of linguistic scientists working in the decade 1931–1941, Benjamin Lee Whorf (1897–1941) is probably the most widely known today. References to his ideas about relationships between language, mind, and experience are often made in texts written for students of language, psychology, education, intercultural relations, and philosophy. And yet for most people knowledge of what he said is either second hand, or limited to a few frequently quoted statements, or perhaps to one or two of his published papers. Often Whorf's treatment of what he called 'the linguistic relativity principle' has been discussed only in the context of a famous paragraph by Edward Sapir (1884–1939) which Whorf prefixed to the paper entitled "The relation of habitual thought and behavior to language" which he wrote as a memorial to his mentor. The term 'linguistic relativity principle' as such is not mentioned in this paper, which predates other articles where definitions and more explicit explanations are provided.

Whorf's investigations of the role of language in cognition and the precise nature of relationships between linguistic thinking and human experience are of enduring interest because people like to think about what is involved in thinking. We are reflective beings and our capacity to think about our own behavior, including our own cognitive behavior, is crucially involved in what makes our species distinctive and powerful in the ecology of the world as a whole. It is quite possible that this capacity is a direct outcome of our ability to talk; that talking, as Whorf claimed, with its unique repercussions for our species' cognitive development, is what gives our thought processes their distinctive character and directs their reflexive potential. Certainly it is language in all its forms (including mathematical) which allows the most precise communication of thought, whether at the level of mundane personal and community interaction or in the most sophisticated reaches of science and philosophy. Awareness of the way we talk is at the heart of our ability to refine or extend the way we think and to focus our thinking for greater clarity and power. Awareness of other ways of talking can help us expand our conceptual repertoire, and in doing so, broaden our experiential universe.

Whorf's theorizing ranged over far more ground than has usually been acknowledged. Although most discussion of his ideas has been limited to consideration of what commentators have often preferred to call the 'Sapir-

Whorf' or the 'Whorf hypothesis' rather than 'the linguistic relativity principle' (which was Whorf's own term) this element is only one aspect of a complex of interweaving theoretical strands which I call 'the Whorf theory complex'. The more important insight, which provides the theoretical context for the notion of linguistic relativity itself, is that much of human thought is linguistic in character. It is a product of socialization — of linguistic enculturation. In the realm of linguistic thinking there is little point in arguing about whether language influences thought or thought influences language for the two are functionally entwined to such a degree in the course of individual development that they form a highly complex, but nevertheless systematically coherent, mode of cognitive activity which is not usefully described in conventionally dichotomizing terms as either 'thought' or 'language'.

Of course we remain capable of nonlinguistic thinking also as we mature and some of Whorf's theorizing deals directly with this issue. Taking what we would now regard as an essentially 'experientialist' stance, he examined the relation of language to experience in some detail, carefully differentiating between linguistic and nonlinguistic 'interpretations of experience'. His thinking in this regard is compatible in broad terms with that of psychologist, Jean Piaget (1896–1980), whose reasoning about the role of nonlinguistic cognitive development has provided foundations for important work in child language acquisition which is very compatible with Whorf's insights (e.g., Bowerman 1988, 1989). There are affinities too with philosopher Mark Johnson's (1987) current 'body in the mind' arguments about the grounding of concept formation and reasoning in the primary experiential interface of the human body with the rest of the world. Continuing work in cognitive linguistics suggests that, in contrast with philosophical assumptions that reasoning has an essentially mathematical character, much of it is imagic or metaphoric and elaborated from patterns involved in processing primary experiential data.

There is a danger that in thinking of the conceptual system (in either its mathematical or imagic dimensions) as something which underpins language — as it certainly does in some fundamental respects — we may find it difficult to think of it also as interpenetrating language and being directed by it over time in the course of ontogenesis. Too many linguists today, just as philosophers, psychologists, and linguists have generally done in the past, continue to dichotomize language and thought, taking the fact of their separability in some respects as unnecessarily fundamental to their operation in others. But if patterns of imagery used in reasoning are significantly acquired in the course of linguistic enculturation and constantly reinforced in the most mundane as well as the most esoteric talking done in daily life, then there are good arguments for understanding these patterns as elements of systems of linguistic thinking where what

is conceptual is inseparable from what is linguistic. The point is, that without the imagery and the patterns of conceptualization which it constitutes, the associated language is meaningless. Human language is essentially meaningful and formalistic use of the term ‘language’ to mean something divorced from that languaging activity¹ which constitutes the bulk of mature understanding, imagination, and reasoning, goes against the way the word is used ordinarily.

Certainly some kinds of thinking, such as practical problem solving, remain largely or perhaps even entirely nonlinguistic in character throughout life and may be thought of as operating with limited connections to linguistic thinking. The patterns of understanding we acquire before language through our primary interface with the world and continue to consolidate in the mind/brain throughout life are also nonlinguistic in essence even after they have been incorporated into systems of linguistic thinking. But Whorf argued that what is distinctive in a species specific sense about our thinking taken as a whole is its linguistic character. And in providing something very much like what we would now call a connectionist explanation of linguistic organization in the mind/brain he made it clear that any mental activity which activates any linguistically acquired linkages or connections at all must be considered part of the overall function of linguistic thinking.

When it comes to classical conceptions of reasoning, philosophers themselves have observed that patterns of grammar are involved in structuring reasoning processes. Whorf, with others of his day, emphasized that the kind of thought which Westerners have traditionally considered most typically human is (whatever else it may be) very much a cognitive elaboration of grammatical patterns acquired in the course of linguistic enculturation.

In this book I try to present something of the scope and detail of the Whorf theory complex, showing where the linguistic relativity principle fits into the whole and suggesting where further theoretical and practical work needs to be done to validate or clarify Whorf’s insights. My conclusions are based on investigation of a much wider range of original writings than has been dealt with in previously published work. As well as Whorf’s published papers, mainly in the collection edited by John B. Carroll (b.1916) in 1956 as *Language, Thought, and Reality: The selected writings of Benjamin Lee Whorf*, I have also

¹ I use the term ‘language’ as a verb in order to deal lexically with speech and thought as a single function when such a concept is logically required by the rest of what is being said. According to this way of talking we have the capacity to language and are languaging beings, or beings who language. Whorf (1940i:2) set a precedent for the nonnominal use of the word when he referred to what is “languageable”, putting the word into inverted commas. I have followed Humberto R. Maturana (1987) who writes of “languaging”, “our languaging”, “the domain of languaging”, “manners of languaging”, “operational relations in languaging” and so on (as well as being “in language”), all without inverted commas. If we can say that we breathe, talk, think, walk, or sing, there is no reason why we should not also say that we language.

referred to a large selection of his unpublished correspondence, notes, and other writings held in the Yale University archives. Additional letters and notes have been located in collections of papers left by several of his contemporaries. But the work of reassessing Whorf's ideas has only just begun. Not only is there much more work to be done on papers currently available to scholars but additional documents retained by the Whorf family may also prove important in revealing the detail of his thinking when these eventually become available to researchers.

What is offered here is not a biography of Whorf, although glimpses of his personality and private life are sometimes included where they seem pertinent to his intellectual work. The best current biographical introduction is still Carroll's introduction to the collected writings. It is the source generally used in summaries of what is known of Whorf's personal life and rather than draw from it as others have done I would rather refer readers to the original.

Ben Whorf, as he was known to his peers, remains in some respects an enigma to us today. Well accepted as a scholar in his own day by linguists, anthropologists, and archeologists, he was, nonetheless, something of a maverick from the point of view of many — a member of the *avant-garde* according to Frank T. Siebert (1990, p.c.), an elegant business man according to Henry M. Hoenigswald who met him in Trager's office at Yale in the late 1930s (1990, p.c.) and, in his daughter's words, 'a free thinker'. When other linguists were afraid that the excesses of what they called 'mentalism' would seduce them from real science (by which they often meant behaviorism), Whorf was able to think more clearly about what was involved and argue for a more moderate stance while at the same time accepting most of their basic empiricist premises. He could do this because his thorough training in the physical sciences gave him a more broadly informed understanding of scientific inquiry than most of his linguist contemporaries. He also seems to have had a more comprehensive conception of the mind than most linguists and psychologists.

In contrast with most of their colleagues who went on to prominence in the 1940s and 1950s, neither Whorf nor Sapir was afraid to read nonbehaviorist psychology, both incorporating ideas from gestalt theory, for instance, into their own work. In Whorf's case this produced some of his most thought provoking constructs: the notions of 'isolates of experience' and 'isolates of meaning' and arguments associated with the use of these terms which are crucial to his experientialist stance and central to his understanding of linguistic relativity. Being a chemical engineer by training and profession, Whorf's understanding of the world and the human mind was also strongly influenced by his knowledge of chemistry and physics. For instance, he once called a talk on linguistics devised for a lay audience "The chemistry of thought". His interest in modern physics

was strong throughout his life and, like the philosopher, Alfred North Whitehead (1861–1947), whom he evidently read, and the physicist, David Bohm (1917–1992) in more recent times, Whorf drew conclusions about the structure and organization of the mind/brain which have strong affinities with concepts in Eastern philosophy as well as modern physics. This was no accident. As a theosophist Whorf was familiar with patterns of explanation and reasoning originating in Asia and incorporated these into his own particular blend of physics inspired psycholinguistics. The result was an emergent science of the mind which, while fundamentally empiricist in orientation, is also deeply philosophical and humanist in temper and firmly grounded throughout in the science of linguistics.

Whorf's theories were emergent rather than fully developed mainly because of his personal circumstances. Although he had begun the study of language as an independent scholar and a young man in the 1920s, his work only really took off in directions which were acceptable to linguistic science after he met Sapir in 1928 and began to study part time under him in 1931. Details of this early influence are summarized briefly below and provided in more detail in chapter one. Whorf's conventional linguistic studies during the years that followed were focused on Hopi and Aztec, complementing earlier work he had done on a range of languages, especially Hebrew, Nahuatl, and Maya. Although he maintained and developed his interest in the role of language in cognition throughout this time, he tended to share his most revolutionary ideas only with close colleagues. In 1938 however, at the height of a phase of intense intellectual activity, he discovered he had cancer. After the setback of a major operation followed by the primitive form of radiotherapy available at the time, he eventually began to write again, producing five of his best known papers before succumbing to the disease in mid 1941².

Whorf himself did not talk about his work in terms of a complex of interweaving strands of theme and theory in the way I do, although he certainly had a focused 'research program' in the sense used by Imre Lakatos (1927–1974) in 1970. Its broad goal was to find out more about the human mind through study of language. He also had a strong sense of his own innovativeness and a sometimes desperate passion to share his insights. In his last highly productive years his primary goal seems to have been to get his ideas out into the public domain in whatever form he could. It is for this reason that some of his most perceptive, clearly stated, and subtle insights are to be found, not in papers for linguists but

² Details of Whorf's final illness were given to the author by medical doctor and linguist, Frank T. Siebert Jr. who was acquainted with Whorf in the late 1930s and who was told the details of his operation by Charles F. Voegelin in 1939. Whorf also mentioned his operation and the debilitating treatment which followed in a letter to George L. Trager (Whorf 1938e).

in articles written for scientifically trained graduates of his alma mater, The Massachusetts Institute of Technology, Cambridge, Mass. (MIT), or for readers of the Indian journal *The Theosophist*. In spite of the constraints he worked under, Whorf's writing is coherent and often elegant, with range and depth that have been acknowledged and respected by some commentators but too frequently ignored by many. Hasty and inadequate reading of his work, or readings which fail to take into account the intellectual climate and assumptions of his day, have too often led to unwarrantedly superficial interpretations of his ideas. In an attempt to at least partially redress this situation I have tried to bring relevant historical background information to the fore as well as pulling strands of thought together from scattered sources, many of which may be difficult for readers to locate independently.

The history of Whorf's debt to Sapir, for instance, is an interesting one. Many of the ideas about the nature of the human mind which Whorf elaborated in his last years occur in embryonic form in his earliest work, before he came under Sapir's influence. Examples include interest in semantic 'connection', mental 'rapport systems', 'psycholinguistic patterning', and (within a theory of 'oligosynthesis') a chemical explanation of conceptual structure and organization. To these ideas Whorf added Sapir's 'points in the pattern' insight about the organization of systems of information acquired in the course of socialization, the paradigm case being that of the internalized phonemic system which we can now appreciate more fully in the light of its affinity with systems and connectionist thinking. An explicitly Einsteinian use of the term 'relativity' in relation to language is found first in Sapir. (The phrase 'linguistic relativity' comes into Whorf's currently accessible writings only eighteen months before his death). When Whorf learned about gestalt phenomena in human perception the interest in pattern and configuration which he shared with his contemporaries in linguistics and anthropology seems to have taken on a new character for him and provided the impetus for the development of a comprehensive approach to the study of all aspects of language which he called 'configurative linguistics'. This methodology, which is yet to be fully evaluated or developed, includes much that is of value to modern investigators, particularly those who wish to study language in the context of culture or whose primary interest in language is conceptualist.

In summary, Benjamin Whorf was an extraordinary person whose theories about linguistic thinking developed more than half a century ago anticipated in several respects ways of talking and thinking about language in cognition which are only now gaining currency in cognitive science. His linguistics, from his earliest investigations through to the work influenced by Sapir and gestalt psychology, was always conducted as a means of finding out more about the way

we think. It was also profoundly humanistic in a way which has much to offer science in general and which needs to be central to the human sciences.

At a time when awful conflicts involving struggles for food, territory, and power overwhelm some people while others play at an ever accelerating rate with technology which is both the product and instrument of human intellectual development — or use that technology to shift intra species conflict into yet more horrific dimensions — we do well to take a closer look at Whorf's ideas. Our survival as a species, he argued, may depend on "future developments of thinking". These in turn have to do with relational operations "on the mental or intellectual plane", operations which are "inescapably bound up with systems of linguistic expression" (Whorf 1937c[LTR]:83-84)³.

The study of language provides us with our most immediate and challenging access to the study of those aspects of cognition which are distinctively human. Just as talking provides a basis for all science and human development, understanding the way we talk can help us understand and, where necessary, redirect the way we think.

³ Page numbers for all of Whorf's writings which were reprinted in 1956 in *Language, Thought, and Reality* are indicated by the initials LTR in the citation. The date in all citations and the first date in bibliographical listings is the date of writing except where a question mark indicates that the year is not certain. Whilst this may lead to some discrepancies in relation to other works on Whorf, my purpose in using the date of writing in this book is to make it easier for readers to track developments and changes in his thinking.

CHAPTER ONE

INTRODUCTION AND OVERVIEW

1.1 *The early work: 1924–1930*

By his own account Benjamin Whorf had been interested in linguistics from youth (Whorf 1928h:1). A childhood interest in secret codes mentioned by his biographer (Carroll 1956:3) hints at something of the nature of his mature investigations. From his earliest (and today largely unknown) studies of Hebrew and Nahuatl to the well known papers on relationships between language, mind, and experience written just before he died aged 44 in 1941, Whorf seems to have regarded linguistic investigation as a code breaking activity with the power to reveal aspects of the character of human thought.

For instance in 1927 he argued that “a common stock of conceptions, possibly possessing a yet unstudied arrangement of its own [...] seems to be a necessary concomitant of the communicability of ideas by language; it holds the principle of this communicability, and is in a sense the universal language, to which the various specific languages give entrance” (Whorf 1927a[LTR]:36). He used the term ‘connection’ to differentiate what he had in mind from ‘association’, saying that idiosyncratic associations developed as a function of personal experience were different from “the social or collective experience which is embodied in the common linguistic stock of concepts”. Notice that what he conceived as being operationalized linguistically is social experience. Notice too that it is implied that whilst these operationalizations of experience are drawn from a stock universally available to people, different languages give (presumably different) entrance to it.

At the time these remarks were made Whorf was undertaking a painstakingly detailed study of Hebrew based on principles originally enunciated by Antoine Fabre d’Olivet (1768–1825) whom he admired immensely. Although these principles have rarely been taken seriously by other linguists Whorf regarded his predecessor as “The real originator of such ideas as rapport-systems, covert classes, cryptotypes, psycholinguistic patterning and language

as part and parcel of a culture” (Whorf 1937c[LTR]:74)⁴ — all of which he developed himself in challenging detail. They are important elements of what I call ‘the Whorf theory complex’, a set of theories about the way language operates in cognition as a product of linguistic enculturation with far reaching ramifications into individual and social behavior.

The use of the term ‘psycholinguistic’ is particularly interesting in the quotation above as, according to the Oxford dictionary ‘psycholinguistics’ was first used in a publication only in 1936. But as early as 1932 Whorf had used the term (hyphenated) in an essay on Athabaskan for Sapir (1884–1939) with whom he had begun to study the previous year. He may indeed have acquired it from him for Sapir certainly regarded the study of psychology in relation to language as a legitimate pursuit. Whorf wrote that “Fascinating psycholinguistic questions arise” when a particular feature of the grammar is studied and that “Psychologists should make more study of the curious mechanisms of language” (Whorf 1932a:18). Reporting on his progress with Hopi a year later he told Sapir that there was more which he “could add about the great psychological interest of the processes of expressing ideas” which he was discovering but requirements of brevity precluded this (Whorf 1933c:1). Years later, when he came to offer a paper for a memorial volume to Sapir in 1939 he told the editor, Leslie Spier (1893–1961), that he wanted to write an article of about twenty five pages on “Psycholinguistics” which he would define “as the study of the relation of habitual thought and behavior to language patterns studied successively and contrastingly in culturally different linguistic communities” (Whorf 1939h:1). His psycholinguistics, had he lived to develop it, would no doubt have been very different from the discipline which did emerge in the 1950s. Whether or not the term was originally Sapir’s, Whorf’s usage developed as much out of his own early work as it did out of Sapir’s input. And although Carroll (1951:41) was responsible for formally introducing the term into American linguistics in its present sense, it seems likely that he had heard it used by Whorf decades earlier.

The kind of psycholinguistics we would have had (and still could have, if we are prepared to adopt Whorf’s way of thinking about language, mind, and society) is focused not only on behavioral and cultural repercussions of

⁴ Carroll estimated that this article, “A linguistic consideration of thinking in primitive communities”, which he found undated in handwritten form among Whorf’s papers, was written in late 1936. However what appears to be a first mention of the paper (“Ling. thinking paper”) by Whorf, is his own note dated November 1937 on a letter from Voegelin (1937:2). The paper is also mentioned in a letter to Boas (Whorf 1937e) where it is described as: “An article of 26 MS pages, not typed” and the title is given as “A linguistic consideration of thought and thinking in primitive and other communities”. The article apparently circulated among some of Whorf’s friends around this time. The draft which Carroll edited for LTR is quite rough and very possibly less finished than the paper Voegelin, at least, was sent.

linguistic enculturation but also the internalized cognitive concomitants of overt linguistic behavior. Although his findings with regard to Hebrew have not been accepted, what he said about them is worth examining for the interest in conceptual organization it reveals and for the distinctive mode of reasoning which he used and sustained into his later work. It is also possible that these hundreds of neat, closely written pages should be examined in more detail; in their attention to “persistence of pattern” (Lehmann 1985) at least, the work does not look all that different from data and arguments about contemporary English as a continuation of Proto-Indo-European published posthumously in 1983 by Theodore M. Lightner (1930–1980). So much of Whorf’s research turns out to have value when re-examined that the possibility that he was on to something, even if different from what he imagined, cannot be totally excluded. In Semitic roots Whorf thought he had found the embodiment of a “root vocabulary” with “the likeness of a code of signals”, the laws of which related “not to inanimate nature but to human nature — to the social heritage and the social thought-forms of language”. He surmised that “these phenomena of regularity are the expression of laws and principles which perhaps have to do with the very fundamentals of the speech faculty” (Whorf 1929c:12).

He believed even at this time that his work had “opened up a new scientific frontier” and “that while the comparative philology that was built up by Bopp and others may be said to have investigated the physics of speech, the region which I am entering through ancient Hebrew might be termed that of the chemistry of speech” (Whorf 1927b). He considered that he had discovered “relationships uniting hundreds of root words that have always been supposed to be entirely separate and unrelated and indeed are so in the sense of ordinary linguistics.” Although his motivation to study language was initially religious to a significant degree, as Carroll (1956:7-13) relates, he nevertheless had a strictly empiricist attitude to his data, telling another one of his early mentors, Charles C. Torrey (1863–1956) of the Department of Semitic Languages at Yale, that his work was “in an empirical rather than a theoretical or explanatory stage, as it consists essentially in marshaling these facts, working out a methodology to deal with them, and trying to assemble them under a few general statements or ‘laws’” (Whorf 1928f:2).

Whorf went from Hebrew to Nahuatl using a similar conceptual frame for investigating the language but elaborating his notion of connection in more detail through a theory of ‘oligosynthesis’. He argued that some languages could be broken down to a very few roots or “elements” (35 in Nahuatl) each standing “for a certain general idea, including something of the surrounding field of related ideas into which this central idea insensibly shades off” (Whorf 1928i:1). He also regarded Nahuatl stems as being “built up out of the few

elements by the same processes seen in the formation of words from the stem” and explained that:

The formation of the many ideas of the vocabulary from the few elementary idea-centers is a traceable process of semantic differentiation by stages in most cases well preserved, and still more a process of combining the elementary ideas to modulate and shade one another, much as two or more Chinese characters are combined to express a meaning. A common process is the convergence of two broad ideas upon their common characteristic or common implication; as when the element tlā, meaning set, but also put, fix, and rest, being combined with the element mī, meaning pass, but also vanish and cease, forms the stem and verb tlamī, to end or terminate. This process of building up a large vocabulary out of a few elements I call oligosynthesis. Parallel with the organization of speech-behavior in such a synthesis is of course a corresponding organization of the field of ideas which is partitioned out among and between certain elementary conceptions. These, like landmarks, serve to map out the ideational field in a way very interesting from semantic and psychological standpoints. (Whorf 1928h:2; original underlining)

In a letter to North American elder statesman of linguistics of the time, Franz Boas (1858–1942), Whorf argued that “development and particularization of fields of thought by a conventional apparatus of derivational affixes seems to be only a special case of a more fundamental process [...] the direct combination of roots”. Emphasizing that “the products of the composition of roots are mainly, however, not names of things but abstract ideas, usually embodied in verbs” he added that binary compounds were the most common type. His examples give an idea of the kind of reasoning he was using. For instance he saw an abstract connection in the linkage of *co* (interior) with *chi* (form, vision) to create *cochi* (sleep) and between *a* (distance) and *zi* (join) to form *azi* to reach, arrive, attain (Whorf 1928g:6). Examples from other languages were also given in support of the theory.

Whorf emphasized that oligosynthesis was of interest “not only to formal linguistics as hitherto conceived but also to psychology and the little-known field of the mind dealing with meaning and thought”. The “analysis of form” which was “also an analysis of idea” (original underlining) opened up an area of investigation “something like that which appeared when chemistry showed the various substances of nature to be understandable as varied combinations of a small number of elements.” He said that oligosynthesis offered “a new method of study that has the advantage of not being introspective and of being based on constructions in which an actual way of talking (and hence of thinking) has framed a system of ideas out of rudimentary elements of glottal

behavior.” He saw “systems of stems, words, and concepts [...] radiating out from [...] centers of thought” (Whorf 1928g:6-7). Later in the year he explained to one of his patrons of the time, Sylvanus G. Morley (1883–1948) of the Carnegie Institute of Washington, D.C., that:

The oligosynthetic constitution of [certain] Middle American languages seems to me to correspond to something in the social psychology of these people. They had a way of thinking in terms of the various combinations and permutations of a few elements. In other words they attained a great range of expressive power from a relatively few units of meaning — call them signs, symbols, elements, characteristics, basic notions, or what not — by working with them in combinations, in which each unit was permitted to vary its complexion and nuance as suggested by the other units and the arrangement of the whole combination. (Whorf 1928j:1-2)

When Whorf turned his attention to Maya (and his work in this area was always more widely known during his lifetime than any other, including that on Hopi) he again saw support for oligosynthesis. From the beginning he was convinced that there was a phonetic element in Mayan writing and this general conviction has been borne out by recent research against an almost overwhelming rejection of the idea by most experts for most of this century. However, according to Michael D. Coe (1992:139), Whorf’s specific arguments are today “regarded as little more than intellectual curiosities” although his

efforts were worth making in the first place, and [...] kept open an avenue of investigation that would otherwise have been hermetically shut off by the powers that be. [...] There is almost no way to defend Whorf’s readings — they are almost all wrong. But his real message — that Maya writing must phonetically record one or another Maya language — lives. Whorf’s Maya research was a tragedy with an ultimately happy ending.

One of Whorf’s earliest discussions of Maya included the following remarks:

It looks increasingly to me as though the hieroglyphic writing were linguistic and analytic in type and not merely symbolic. The test of an analytic type of writing (as opposed to e.g. Chinese-like ideograms) is the same as one of the indications of oligosynthesis in a language, viz. the continual recurrence of the same elements in varied combinations with each other. This combination and recurrence in a system of writing is strong presumptive evidence of phoneticism of some grade or other. The degree of recurrence and combination in e.g. the Dresden Codex text looks to me like considerable phoneticism on the grade of a syllabary approaching alphabeticism at times, but with a high

degree of polyphony (different phonetic values for the same element, distinguished by the context and especially by being reinforced by the other elements with which the element in question is combined). Do I make myself clear? Babylonian cuneiform is also highly polyphonic, but there the method of combination is simple juxtaposition of the signs in the linear order of writing whereas in Maya the method of combination tends more to fusion or merging of the elements into a single design. If a text is prevalingly phonetic and the language is known it can be worked out, by sufficient patience, even from very slight leads; but of course only in linguistic manner, that is a manner understanding and capable of recognizing various common stems, roots, particles, prefixes, suffixes, etc. even when they appear in very strange dress, simply by their manner of occurrence in combination. Hence the importance of Maya linguistics. (Whorf 1929d:1-2)

Whorf went on to share his conviction, later expressed in several articles, that “the Maya stems naturally group themselves in series characterized by prevailing ideas and by the initial phonetic element of the stem, consonant plus vowel”. He thought these stems “an important find” arguing that they were not “roots” as much as “combinations or fusions” (Whorf 1929d:2).

Whether or not Whorf’s specific arguments from this early phase of his development can be supported by more recent research on the languages concerned, the tenor of his general approach to linguistics was well established at this time and understanding it is crucial to appreciating his later development. His childhood interest in code breaking (parts of his mature diaries are also in some kind of secret writing) had provided him with a valuable preparation for analyzing linguistic data. His training in chemistry (in which he had also been interested from childhood according to Carroll) was similarly important. It not only reinforced his patient and systematic approach to complex data but the patterns of reasoning and explanation it offered were also productive when imported into linguistic science. Throughout his life Whorf typically turned to analogies and metaphors from chemistry or modern physics when trying to communicate his complex insights about linguistic or cognitive processes. He tended to avoid the more mechanistic analogies which come from the understanding of reality embodied in classical physics.

A response to a query from an acquaintance about his interests is worth quoting at length for the insights it provides into Whorf’s motivation and personality:

As to how I became interested in these studies, I have had for a long time an intense interest in linguistics. Its coming about could be described by saying that it simply grew, and grew out of a certain amount of early aptitude and taste for such subjects. I could make such a reply and it would be strictly true,

and also quite useless information, for any one could perceive as much without being told; so I shall try to be less non-committal in telling you something about a matter in which you have done me the honor of expressing an interest.

You are wondering what made such an interest grow, and that means you are wondering what idea made it grow. One does not take up such a subject as linguistics unless the dry bones of it have been transfigured by some living idea. My interest became serious when I began to be persuaded of a certain idea, and that this idea was what the anthropologists call a “lead”, that is a means of bringing to light and exploring new ranges of phenomena. What was this idea? I am afraid that within the limits of a letter like this I can only suggest or hint at it. To explain a new idea usually means at least writing a book on it. Suppose for instance a man had an inkling of totemism before anyone else had dreamed of the existence of such a thing, how could he tell of it convincingly in less than a volume? Yet I might hit it off by saying that the reason I am interested in every phase of linguistics is that I am primarily interested in something that might be styled “intra-atomic” linguistics.

For the best part of a century the science of chemistry flourished and won its greatest triumphs with every man jack in the trade firmly convinced that matter was composed of absolutely indivisible and unitary atoms. At that time to have expressed a curiosity about seeing the atom itself subjected to analysis would have been to excite serious doubts as to one’s sanity. Yet at last the scrutiny of certain phenomena showed that they had to do with the inside of the “atom” rather than the outside of it, and now we know that the so-called atom is a complex domain of its own, and this discovery has been the greatest “lead” in modern chemistry and physics. In this respect the firmly held doctrine of the greatest chemists and physicists of the past century has turned out to be nothing but “hokum”. Now it appears to me that linguists show an inhibition with respect to what are called “stems” and used to be more often called “roots” akin to that of those chemists about “atoms”. They are concerned only with relations between and outside of stems and to me seem to show (with exceptions) either no awareness of or no interest in the fact of relations and orderly structure within stems. But I am all for subjecting the stem to analysis.

Briefly, I am interested in those languages or those cases within a language where we can write formulas for stems — formulas connecting the parts of the stem with one another or with the meaning or some definite “consideration”. [...] I am particularly interested [...] in languages as show themselves to be largely pervaded by and as it were under the influence of such stems that fit a formula. Such languages are not common — neither are radioactive elements — but they exist. Nahuatl happens to be one of the few [...]. (Whorf 1930b:1-3; original underlining)

I have quoted at some length from the early work in this section because it is not dealt with in detail in the rest of the book although it provides the

backdrop for discussions throughout. In technical competence and theoretical daring Whorf had already accomplished a great deal between the ages of 27 (when he started serious linguistic investigation) and 34, when he began to study with Sapir in late 1931. Although he had built up a remarkably wide network of associates and sponsors with whom he corresponded by this time, he had very little formal instruction in linguistics. By his own account he had taken French and German as well as Latin at high school, read everything he could find on philology, and studied grammars of Greek, Hebrew, and other languages, including Hungarian, in libraries. He had also “amused” himself “by constructing an artificial language” and recalled later that “his interest extended to other languages as to various ingenious pieces of apparatus”. This early fascination with linguistics was then eclipsed during four years in which he was enrolled in chemical engineering at M.I.T., but after graduating in 1918 and commencing work in a “quasi-technical position in the fire insurance business as inspector and engineer for the Hartford Fire Insurance Company”, he soon began to do the research described above, much of it while traveling on the trains he used frequently in the course of his employment (Whorf 1928f:1). In early 1930 he obtained leave to take up a Social Sciences Research Council grant for a brief period in the field in Mexico where he collected materials he was able to work from for several years.

As a young adult, Whorf also spent many hours working with an extensive collection of language texts in the Watkinson Library in Hartford. It was here that he met with his young friend Jack (J. B.) Carroll (1990, p.c.) who, at the age of about thirteen, and already interested in linguistics, had in 1929 attended one of Whorf’s talks for children, entitled “The Aztec and Maya Indians of Mexico”. The two met regularly over the next four years or so, working together to translate Nahuatl texts for instance. After 1931 Whorf would also pass on details of what he was learning from Sapir (Carroll 1980:32-34). Carroll’s (1956) introduction to Whorf’s collected writings and his personal account of his own life (Carroll 1980) are both worth looking at for more details of this early period of Whorf’s life, including his work on Maya which will not be discussed in detail in this book.

To summarize: As Whorf came into the decade 1931–1941 in which he was to write the papers for which he is mainly known today, he was essentially self-taught. His interest in “intra-atomic linguistics”, “centers of thought”, “fields of ideas”, and the notion that linguistic or ideational elements might fuse (rather than join in ways which left their identities unchanged) was largely incomprehensible to scholars whose model of the world, including the realm of linguistic and psychological phenomena, was essentially one derived from common-sense understandings about the way things are — understandings which are

also operationalized as theoretical constructs in classical physics. To some degree what we might now regard as his connectionist way of talking and thinking about language in cognition is still alien to those linguists and cognitive scientists who predominantly conceptualize the phenomena they deal with in terms of objects and their linear or sequential relationships. It is both familiar and attractive, however, to those of us who are comfortable with imagery which connotes fluidity or diffusion.

As we will see in exploring his theory complex in more detail, Whorf's mature ideas effectively constitute *a field theory of mind* in which connections are paramount and entities at any analytical 'level' are both indeterminate and functions of the relationships in which they are embedded. That this approach to the study of mind was firmly anchored in the notion of language as a social phenomenon is fundamentally important to understanding his thinking. Indeed a central problem for those who have attempted critical assessments of his ideas may be the way he fused what are understood today to be two different approaches to the study of language. Although his research program could be described as sociolinguistic in that he took it for granted that investigation must begin with culturally generated configurations of language data, and also in that he argued that meaning is a matter of social agreement, his investigative goal was nevertheless unequivocally mentalist. This was in spite of the fact that mentalism was anathematized by linguists of the day and was to become increasingly so in the period immediately following Sapir's death in 1939 until a major about-turn on the question occurred with the emergence of Noam A. Chomsky (b.1928) in the early 1960s (cf. Koerner 1977).

The details of Whorf's mature ideas are the subject of this book. An overview of the various themes which constitute his theory complex is given in the penultimate section of this chapter, while each of the chapters following this one deals with particular features of the theory as a whole. The various elements are also summarized for convenient reference in the final section of this chapter. Section two below is a brief sketch of Whorf's place in the American linguistic and anthropological scene of the 1930s and early 1940s. Although historical evidence drawn together by Regna Darnell (b.1943) in her 1990 study of Sapir establishes that Whorf was a key figure in the development of 20th century linguistics, this fact was often lost from view in decades that followed.

1.2 1931–1941: *The final years*

According to Carroll (1956:16) Whorf first met Sapir briefly at an International Congress of Americanists in 1928. Notes he made from Sapir's

Language (Whorf 1929b) indicate that he knew that work by the following year at least, whilst another reference to “patterns of points” (Whorf 1929c:4), and associated discussion in a publication on Semitic roots of the same year also makes it clear that even at this stage of his development he was incorporating a crucial Sapirean concept about linguistic organization into his own theorizing. Whorf’s use of Sapir’s ‘points in the pattern’ construct will be dealt with in detail the next chapter but, again, the affinities between his own early theories and influences from Sapir are indubitable.

Although Whorf originally met Sapir in 1928 he may not have had further contact with him until late 1930 when another of his mentors at the time, Alfred M. Tozzer (1877–1954) of the Peabody Museum at Harvard University, sent a Whorf paper on Nahuatl tones and saltillo to Sapir, arranging for him to meet Whorf (Tozzer 1930). Sapir replied less than a fortnight later thanking Tozzer and remarking that he had enjoyed reading the paper very much, that “It should by all means be published”, and that he would return the paper to Whorf when he met him (Sapir 1930). In a note on the part of the letter passed on to Whorf Tozzer commented: “This is high praise from a severe critic. I am very glad for you”. Tozzer was one of several influential patrons Whorf had acquired by this time, as Darnell (1990:375-382) describes in some detail.

By February of the following year Whorf was writing to Sapir himself, asking for his comments on some enclosed work and ending his letter with the remark: “I am looking forward to seeing you at Yale” (Whorf 1930a:3). A reply in August informed Whorf that the Nahuatl paper had been sent on to the editor of *Language* and that although Sapir had fully expected it to be accepted it had been rejected on the grounds that it was handwritten, too long and that the editor considered funds were insufficient for the publication of “records of languages”. Sapir added that it seemed to him that “the last reason is hardly applicable in your case, as you do deal with recorded material and throw a good deal of light, as a matter of fact, on its interpretation. The first two reasons seem valid enough, however.” He suggested that Whorf try Boas, as editor of the *International Journal of American Indian Languages*, but that he wait until after Sapir had spoken to him in September (Sapir 1931b).

In the meantime Tozzer had passed another paper on Mayan glyphs on to Sapir in July and wrote again in October commending Whorf on his work and telling him that he thought that he “could get a very great deal out of Sapir” (Tozzer 1931a). Three days later he wrote again to say that an attempt he had made to get funding for Whorf to study had fallen through because the Social Sciences Research Council did not have funds for training. He suggested that Whorf try for a research fellowship for the following year as it would give him a better opportunity to secure further training than attending a few classes at

Yale in 1931. He stressed that Whorf should only consider this alternative if he was serious about linguistics and wanted to engage in it as his “major activity” and “not merely as a sideline” (Tozzer 1931b). A note from Sapir (1931e) in November letting Whorf know that the meeting time for the linguistic class was to be changed from the usual hour of 4.30–5.30 to 2.30–3.30pm suggests that the latter was attending classes anyway. A letter of the following day from the Yale Graduate School informed Whorf that he had been accepted into the degree of Doctor of Philosophy and that his program of studies had been considered and “accepted as work that may count towards that degree” (Furniss 1931).

Whorf never did leave his regular employment nor take out the degree but there is no doubt that he soon became an integral part of the Yale linguistics scene. Not only is it evident that he came into the group with well established professional expertise but Darnell shows that in later years he “had a central role in the communication network of the First Yale School as its members dispersed for fieldwork and employment”. She states that “When Sapir’s illness made it more difficult for him to draw the group back to its center, Whorf — who remained in the New Haven area — increasingly filled this role” (Darnell 1990:375). Darnell provides an informative account of his relationships with other linguists and anthropologists of the day and gives details of the linguistic projects he was involved in during the decade. Carroll (1956:16-23) offers a rather more intimate version of events over the same period.

During the second half of the decade in particular, Whorf was a respected and sought after participant in meetings and discussions held by linguistic groups affiliated with the Linguistic Society of America and the American Anthropological Association, the pre-eminent professional groups in his field of study. He was published in their journals and maintained professional contact not only with his colleagues of the informal Sapir linguistic circle, including George L. Trager (1909–1992), Mary R. Haas (b.1910), and Morris Swadesh (1909–1967) in particular, but also with the pre-eminent linguists of the time, including Franz Boas (1858–1942) and Leonard Bloomfield (1887–1949) as well as Edward Sapir and many other scholars including Alfred L. Kroeber (1876–1960), Charles (‘Carl’) F. Voegelin (1906–1986), Clyde Kluckhohn (1905–1960), Charles F. Hockett (b.1916), Frank Siebert Jr. (b.1912), Edward Kennard (b.1907), Wayne Dennis (1906–1976), and Fred Eggan (1906–1991). In 1936 Whorf was invited by Boas and Sapir to participate in the formation of a Society of American Linguistics, subsequently serving on its first committee. He was appointed an honorary fellow in anthropology by Yale University in 1936 and received the Sterling Fellowship in 1937 when he was also elected a

faculty and research fellow by the Yale chapter of Sigma XI, a national honorary scientific fraternity.

In 1938 Whorf lectured on *Problems of American Indian Linguistics* at Yale while Sapir was on sabbatical leave. Apparently there was some difficulty finding a replacement for Sapir, particularly as the class in question included ethnology students who were not always happy about the compulsory linguistics topic built into their course. In a letter to Sapir quoted by Darnell, Spier argued that Whorf would be ideal for the job as he “has a very stimulating way, I think, and I would like to take advantage of his interest in hooking up language and ethnology, for I think it would take with many of our students. They might thus be encouraged to give serious attention to linguistics, when a ‘straight’ linguistics course might leave them cold” (Darnell 1990:381). This facility to communicate technical insights to nonspecialists remained a distinctive characteristic of Whorf’s overall skill as a communicator. He also corresponded with Nikolaj Trubetzkoy (1890–1938) in Prague on Hopi phonemics after the former wrote requesting some of his offprints. According to Darnell (p.379) “This is one of the few documented contacts between Sapirean and Prague School linguists in the 1930s”.

By the time he died Whorf was well published although he had not been able to write the book (or books — he seems to have had both a textbook and a book for the lay reader roughed out in his mind) he had planned. He had made a name for himself in Aztec as well as Mayan linguistics, publishing in these fields into the last years of his life (Whorf 1928a, 1928b, 1928c, 1929a, 1931a[1932][LTR], 1933a, 1933b 1935b, 1936a, 1936b[1943][1947], 1938a, 1940c[LTR]). He regularly gave talks to professional and lay audiences on linguistic matters and maintained contact with protagonists in the Maya debate and with amateurs who wrote to him for advice. He had also investigated genetic relationships among Native American languages (Whorf 1935a, 1937a, Whorf & Trager 1937). An article on Aztec grammar (Whorf 1939b) was included posthumously in Harry Hoijer’s (1904–1976) 1946 collection *Linguistic Structures of Native America* as was his only published Hopi grammar (Whorf 1939a). A 1937 letter from Whorf to Clyde Kluckhohn (1905–1960) about Hopi and notes on Hopi phonemes were published together with additional research by Kluckhohn and Denneth MacLeish in 1955. A previously unpublished manuscript on Nahuatl (Whorf 1931b) was published with commentary by Lyle Campbell and Frances Karttunen in 1993.

By 1941 Whorf had become the foremost authority on the Hopi language and had been successful in gaining the pages of *Language* (Whorf 1936d[LTR], 1938b[LTR]) with articles on Hopi as well as contributing definitive notes to Elsie C. Parsons’ (1875–1941) *Hopi Journal of Alexander M. Stephens* (Whorf

1936c). Other work written at this time includes “Linguistic factors in the terminology of Hopi architecture (Whorf 1940b[LTR]) which was first published in 1953. Whorf’s studies of Hopi are still providing scholars like Catherine A. Callaghan (1981), Ekkehart Malotki (1983), and Alexis Manaster-Ramer (1986) with source material for further research.

Whorf also wrote appendices to works on Sonoran languages and Shawnee (Whorf 1936e, 1939d[LTR]) and an article on his own dialect of English (Whorf 1940e). In addition, he made an impact in theoretical linguistics by circulating among close associates a paper he referred to in a jotting on a letter from Voegelin (Voegelin 1937:2) as his “Ling. Thinking paper” (Whorf 1937c[LTR]). The item later to be partially published as “Language: Plan and conception of arrangement” in the Carroll collection (Whorf 1938c[LTR]) was also known informally among his colleagues. There may have been another paper on semantics, similar perhaps to the second part of an important unpublished report to the Yale anthropology department on the topic of “configurative linguistics” (Whorf & Trager 1938) and known to Voegelin at least, but no copy has been located to date. Three papers for nonprofessionals published in M.I.T.’s *Technology Review* (1940a[LTR], 1940d[LTR], and 1941a[LTR]) were very well received and a fourth (1941b[LTR]) in *The Theosophist* was published posthumously. It was in the first two of these papers that Whorf defined linguistic relativity, although related discussions which predate it occur in other papers written between 1938 and 1941, including the memorial to Sapir.

Illness made the last years of Whorf’s life very difficult, although in terms of his theorizing they were immensely productive. After his operation for cancer in late 1938 there were several months of recuperation and depression during which time he found it hard to sustain interest in linguistics. Sapir’s death in early 1939 was deeply felt by those linguists who had been close to him and war was soon to break out in Europe. These matters weighed heavily on Whorf in his depressed state. It was not until later that year that he began his last intense burst of writing. In his final months he felt that science faced an “impending darkness” (1941b[LTR]:270) but he was still writing professionally into the first quarter of the year. He died on 26 July 1941 at Wethersfield, Connecticut where he had lived all his working life after moving there from Boston to take up his job in Hartford.

In the obituary in *Language* Trager drew attention to the influence of Whorf’s training in the physical sciences on his ability “to see that linguistic analysis is a scientific discipline employing all the methods of mathematicological investigation, and what is more, that correct analysis of linguistic material is absolutely essential to the pursuit of any science”. He commented on

his “boldness of spirit based on the deepest kind of scientific insight” and “his daringly brilliant and sound views on linguistic theory and practice”. Regretting that “no university found it possible to appoint Whorf to a post where linguistics would have been his occupation instead of a spare-time pursuit, so that more of his valuable work could have found its way into print”, he concluded by expressing the hope that “guided by these all too few writings” it would be possible “not to misquote or misuse his ideas too badly” (Trager 1942:305).

Unfortunately Whorf was often to be misunderstood and his theories denigrated on the basis of superficial readings of his work or lack of familiarity with the primary documents. Some of the reasons for this are considered in the next section.

1.3 *Misread, unread, and superficially treated*

Although Whorf is so often mentioned in such a wide range of discipline areas in relation to the ‘hypothesis’ associated with his name, remarkably little attention has been given to the matrix of theory in which the linguistic relativity principle is embedded as a logical part. Whilst lack of access to his unpublished writings is part of the story, it is not the whole of it. Some of the reasons have to do with his personal circumstances. Others have to do with historical or cultural contingencies of his time. Some are the outcome of scholarly trends or intellectual emphases which have arisen during the last half century and which, by the very cast of their associated modes of inquiry, have been unable to come to grips with the intent and focus of his thinking. Some of these matters are dealt with below while others are explored in later chapters.

Even within his own lifetime few, if any, of Whorf’s colleagues seem to have been aware of the range and conceptual versatility of his thinking or of the nature of his early work. Much of that work could not be published and correspondence reveals that he was generally judiciously circumspect about what he said about his more unconventional ideas and to whom he said it. Some of the topics he investigated would have been regarded with suspicion by his professional peers just as they have been since Carroll revealed their existence in his brief biography. This is possibly why so few of the articles in the anthology are regularly quoted. Many scholars have concentrated their analytical attention almost exclusively on what was consequently to become the best known paper — the Sapir memorial article. Apart from the fears of some scholars that certain aspects of Whorf’s research fall into one or the other of the generally suspect categories — ‘religious’ or ‘esoteric’ — his background in the physical sciences has also made some of his claims and explanatory analogies obscure for many readers. And yet, as we have seen, it was that scientific

training which gave him the theoretical foundations and operational systematicity and rigor which were so important in all his linguistic investigations.

Although Boas, Sapir, and Bloomfield are rightly credited with bringing scientific linguistics into existence as an academic discipline in America, Whorf's approach was anchored in a more comprehensive scientific background than theirs, going well beyond Bloomfield's reliance on stimulus response interactions to explain language behavior, to take the extreme case. It was, however, grounded in the belief that observable data provide the essential materials for investigation and theory development, a stance which was fundamental for scientific credibility. In relation to Bloomfield's limited view of mental activity, it is useful to remember too that it is not unusual for models originally developed as a means of explaining the gross behavior of objects to be imported into the human sciences from commonsense understandings and classical physics. As John Haugeland (b.1945) pointed out in a discussion about cognitivism: "The most familiar scientific explanations come from classical mechanics" (Haugeland 1978:245). The problem is that in the mind sciences, including linguistics, such explanations are often inadequate to cater for the complexity of the phenomena involved.

The differences in training and intellectual background between Whorf and most of those who have studied his ideas have also been exacerbated by other practical difficulties which have prevented scholars from being able to come to terms with his work as a whole. A major impediment to appreciating the full subtlety, detail, and indeed quite revolutionary significance of his ideas is the fact that his overall theory is not explicated as such in any one place in his writings. Also his research was always fitted in around his full time business activities which left him relatively little time to write. It is also possible that he had not reached the point where he could synthesize the various strands of his thinking and state them as an integrated theory. New terminology and concepts were being introduced into his writing into the last months of his life and very often the sense of excitement or urgency we find in his work seems that of a person achieving unexpected new insights and, in the process, exploring how they might mesh with more well established ones.

Even the work which did conform to prevailing scholarly paradigms in the decades following his death was sometimes hard to obtain. During his lifetime and until 1949 only the memorial article, several papers in descriptive linguistics (still referred to by Americanists), and the articles written for nonlinguists were accessible. When the last of these were popularized by followers of Alfred H. S. Korzybski (1879–1950), the General Semanticists, there were benefits in that Whorf's name became known to a wide general public but the negative effect was that this popularity tended to consolidate the wariness with

which many mainstream linguists and psychologists have regarded the material to the present day. Whorf's links to General Semantics are explored in some detail by John E. Joseph who argues convincingly (Joseph 1996) that the linguistic relativity principle owes as much to contemporary trends with which Whorf was familiar, including analytical philosophy and semantics, as it does to the Humboldtian tradition to which it is more frequently connected.

Whorf was very doubtful about what kind of use the General Semanticists would make of his work when they first showed an interest in it in 1940, although he was willing to accord a certain amount of credibility to their ideas about the therapeutic value of language awareness. In particular he was dismayed by what he considered to be the lack of a sound basis in scientific linguistics for much of their reasoning. He even singled out for specific disapproval Stuart Chase (1888–1975?) who, ironically, fifteen years later, was to be invited to write the foreword of the Carroll collection. Explaining why he had chosen a rather serious title “Science and linguistics” for his first *Technology Review* article instead of a lighter, or more flippant alternative in the current fashion, Whorf (1940i:1) told his M.I.T. editor, Frederick G. Fassett Jr. (1901–1991), that he wanted to avoid having “the point of the argument” confused “with various popular bromides about the misleading nature of words, which amounts to going off entirely on the wrong track”. He said he did “not want to have the article confused with things like the recent popular stultification of a similar subject by Mr. Stuart Chase, whom I should consider utterly incompetent by training and background to handle such a subject.” He also (Whorf 1941c:8) remarked prophetically to Robert A. Leshner, an ardent admirer of Whorf's late papers, that: “For the immediate future, probably the loose-thinking ‘semanticists’ à la Stuart Chase, will introduce many popular clichés and make [the] term ‘semantics’ a hissing and byword, so that it will cease to be used by serious scientists”. Chase was a great admirer of Whorf and quoted him copiously, which is presumably the reason why he was asked to write the foreword to LTR. Perusal of his foreword, in particular what purports to be a summary of Whorf's essential ideas, reveals immediately that he was no more competent in 1955 to assess what Whorf had said than Whorf had judged him to be in 1940. And yet, remarkably, Trager (1957:422), who was arguably Whorf's closest linguist friend at one time and a professional collaborator in native American linguistic research, described Chase's comments as “lively, incisive, and thoroughly appropriate” in a review of the collection.

In 1949 Trager arranged for the publication by the Foreign Service Institute (FSI) of the *Technology Review* articles, the memorial paper, and then in a new edition in 1952, the article “An American Indian model of the universe”. These collections (which were used in what is now called intercultural or cross

cultural training) seems to have been readily available during the early 1950s and their contents were debated strenuously. For instance, as a consequence of recommendations Carroll had made in 1950 in his Carnegie report (later modified and published in 1953 as the popular *The Study of Language*) “a small workshop on linguistics and psychology [...] took place at Cornell University in the summer of 1951”. The purpose was to have an inter-disciplinary exchange to investigate “the interface between psychology and linguistics, namely the development of a field or subspecialty of language psychology” (Carroll 1980:47). Stanley S. Newman (1905–1984) (who of all Sapir’s students perhaps remained most Sapirean into the next era) and Carroll himself, attempted to give the meetings a Sapir-Whorf focus. A brief report was published (Carroll 1951).

One of the projects of a committee on linguistics and psychology set up after this workshop was a much larger seminar held at Indiana University in conjunction with the Linguistic Institute of 1953. Here the *Weltanschauung* (or world view) question was raised again, among other topics. In another project, a series of largely disappointing experimental studies were conducted in the American Southwest during the summers of 1955/56. Designed to test what was by that time well known as the ‘Sapir-Whorf Hypothesis’, they involved attempts to operationalize Whorf’s ideas in forms amenable to the kind of research which was then fashionable. This was a lost cause from the beginning, as Robin Ridington (1991) explains in an interesting exploration of Whorf’s writing style, because Whorf had not made his formulations in ways which could be easily transposed into the psychological investigative paradigm of the time. Dell H. Hymes (1983[1970]:174) said of the outcome of these projects that “In general, recognition that the problem was complex and not amenable to ready experiment, criticism of Whorf’s faults, both real and imagined, and a reluctance among many linguists themselves to entertain notions of world view, effectively ended serious investigation”. John A. Lucy provides a very thorough account of this era in his (1992a) discussion of linguistic relativity; an account which should be required reading for anyone interested in the history of the empirical linguistic relativity research tradition.

Prior to these developments a major International Symposium to assess the state of anthropology had been held at the Wenner-Gren Foundation for Anthropological Research in New York in June 1952, the results being published as *Anthropology Today: An encyclopedic inventory* the following year. A paper which included long extracts from Whorf’s writing and which was to become deservedly well known as an authoritative exposition of his ideas was presented by Harry Hoijer and some excellent discussion true to concerns expressed by Whorf and Sapir took place (reported in Tax et al. 1953).

Immediately following, there was another conference in July, jointly sponsored by the Wenner-Gren Foundation and Indiana University and organized by Voegelin (Hymes 1970) who had known Whorf well and had corresponded regularly with him. The results, reported in Lévi-Strauss et al. (1953), indicate that Whorf's ideas as well as those of Trager and Henry ("Haxie") Lee Smith Jr. (1913–1972) on metalinguistics, came in for vigorous debate. Hockett presented a paper on "Idiolect, common core and overall pattern" which in retrospect can be seen to bear very directly on issues crucial to the Whorf complex.

The following year in 1953 a special *Language in Culture* conference (reported in Hoijer 1954) took place in Chicago with the primary aim of investigating "problems raised by the attempt to interrelate language and other aspects of culture, particularly in reference to the hypothesis suggested in Benjamin L. Whorf's *Collected Papers on Metalinguistics*" (p.vii). Participants included two philosophers and a historian as well as linguists, psychologists, and anthropologists but the tenor of much of the debate was negative and deeply disappointing to some of those who were confident that Whorf's writings were still relevant to the study of relations between language, thought, and culture. After the Chicago conference (the report of which seems to have become well known) a tendency to read Whorf's work superficially or to rely on others' interpretations and judgments of its worth escalated. The existence of the unpublished papers remained almost completely unknown until recently although they were placed in the Yale archives in 1979 and some of the material was also referred to by Peter C. Rollins in his slim but much referred to monograph of 1980.

There are also other factors which may have encouraged misinterpretation or superficial reading of Whorf. For instance, there seems to have been a rather puzzling and rapid fading of awareness of Whorf's scholarly status in his own day. Scattered through the literature are comments about his training in engineering, his insurance background, and his religious beliefs which suggest that some critics find these impossible to reconcile with genuinely scholarly activity. Perhaps Carroll's sketch of Whorf's life has been read too superficially by some. Or perhaps too much weight has been given to the arresting account in the memorial paper of the way industrial fires often seemed to have their causes in carelessness deriving from unexamined, habitual ways of talking and thinking about situations. Whatever the facts of the matter it seems reasonable to assume that statements like those quoted below may have encouraged generations of undergraduate students to feel that they did not need to study the original papers with the kind of attention required for the subtlety of Whorf's thinking to be appreciated or even understood. For instance, in a popular text on language and culture Herbert Landar (b.1927) had this to say:

Whorf came to the study of American Indians from the study of the secrets of the Book of Books, which he hoped to unlock with a linguistic key. As a chemical engineer employed by a fire insurance company in Hartford, he traveled to Yale to undertake formal linguistic studies, to tool the key which the lock still resisted. He sat at the feet of Edward Sapir [...] Sapir steadied Whorf's hand, but not enough. (Landar 1966:25)

Eleven years later, in an influential article in *Language* on directions in modern linguistics, Einer Haugen (1906–1994) pontificated:

For those who are still learning about linguistics it might be well to recall that Benjamin Whorf was an insurance adjuster who came under the influence of Edward Sapir and made a name for himself by relating the grammatical and lexical structures of certain Indian languages [...] to the supposed modes of thinking of their speakers [...]. (Haugen 1977:11-12)

While such comments may be superficially grounded in details of Whorf's life their tenor is another matter. Ann Berthoff's assessment below is just plain wrong, as the review of Whorf's early writing above makes clear and the rest of the book will also demonstrate:

Trained as an engineer, Whorf had a hard-headed, mechanistic sense of causality and an impatient disregard for the metaphysical aspects of language. [...] Whorf was uninterested in the context of situation or in experiential constraints on interpretation. (Berthoff 1988:4-5)

A still more recent perpetuator of what seems at core to be a sadly elitist prejudice against the possibility that Whorf could have been a serious scholar is Steven Pinker who, like so many other detractors seems to have relied primarily on secondary literature and one or two startling (and in his case completely unsourced) quotations in his 1994 evaluation of Whorf's ideas. Two errors of attribution occur within as many pages in the heart of a diatribe on the question of the relationship of language to thought. The book is a popular work designed to impress the lay reader with the remarkable claim that "cognitive scientists know how to think about thinking" (p.59) and, furthermore, that they have completely solved questions relating to all or most of the essential aspects of the nature and function of language. It is implied that the ideas Whorf explored can be summarized as dealing with the question of whether "thought is the same thing as language" (p.57) an oversimplification which would be laughable if it were not so terribly damaging to readers'

appreciation of the immense difficulty of the issues Pinker refuses to engage with in a serious way.

The point is that Whorf's thinking is far more complex and interesting than Pinker wants his readers to believe. It challenges assumptions about aspects of our conceptual lives we may not have thought about previously. Pinker writes as though he has an obligation to ridicule Whorf for the ideas he erroneously attributes to him, giving the impression, like so many others, of someone running scared from the possibility that the 'truths' they hold to be self evident about the role of language in human mentation may yet require further study. Julia Kristeva is similarly disappointing with her fleeting and misleadingly formulated dismissal of Whorf in a book purporting to be "an initiation into linguistics" (Kristeva 1989[1981]).

There are others scholars, however, who share George Steiner's (b.1929) wholehearted appreciation of Whorf's brilliance. Writing of the collection of papers in LTR he remarked that:

they constitute a model which has extraordinary intellectual elegance and philosophic tact. They are a statement of vital possibility, an exploration of consciousness relevant not only to the linguist but also the poet and, decisively, to the translator. Whorf was an outsider. He brought to ethno-linguistics a sense of the larger issues, of the poetic and metaphysical implications of language study such as is rare among professionals. He had something of Vico's philosophic curiosity, but was a chemical engineer with a distinctively modern awareness of scientific detail. The years in which Roman Jakobson, I.A. Richards and Benjamin Lee Whorf were active simultaneously must count among decisive moments in the history of the investigation of the human mind. (Steiner 1975:88)

In a more recent book which includes a careful and perceptive chapter on Whorf, John M. Ellis (b.1936) comments that the debate around Whorf's ideas has been a strange one "in which even the most prominent detractors seem to have had great difficulty in putting their finger on and formulating just what their objections were, and even in spelling out the position they were objecting to" (Ellis 1993:55). He comments further that "the Whorf hypothesis seems to bring out the worst in those who discuss it" (p.57) and that "the nature of his original contribution does not really lie in what is commonly attacked in his work" (p.63). To demonstrate the range of respects in which this is certainly the case is my principal objective in the chapters which follow.

Rollins' (1972, 1980) descriptions of Whorf as a 'transcendental linguist' have certainly been influential in discouraging serious study of his work. Rollins attempts to illuminate Whorf's life in relation to "lost generation

America” by analyzing some early writings (written around 1925) which aimed to reconcile religion and science and proselytize Christianity. Focusing mainly on “an unmarketable novel of ideas” entitled *The Ruler of the Universe* Rollins argued that Whorf’s later linguistic work constituted a continuing expression of these early objectives and that, for instance, the final articles “were designed to be persuasive statement about the place of religion in an age of science” (Rollins 1980:76). Although I am not competent to judge Rollins in his area of expertise — popular culture — his limited knowledge of linguistics is disconcerting to say the least, especially with respect to his treatment of Whorf’s best known papers. It is very difficult to see how his sweeping claim quoted above could be considered to apply to most of these except perhaps in the broadest sense in which religion is taken to refer to the feeling of awe which can arise as one contemplates the intricacy and complexity of existence.

In the intellectual climate in which the humanities bathed during the 1970s Rollins could, however, correctly emphasize a fact which Carroll had been forced to underplay in the 1950s — Whorf’s long standing association with The Theosophical Society, a nonsectarian international society with headquarters in India which was founded in 1875 and which draws on the teachings of Hinduism and Buddhism and promotes a world view in which the universe and everything in it is regarded as an interrelated and interdependent whole. As Whorf’s religious convictions are quite regularly mentioned in the literature in the context of judgments about the validity of his ideas it is pertinent to note that when he wrote his final article for a theosophical readership he was careful to state:

My purpose in developing this subject before a Theosophical audience is not to confirm or affirm any Theosophical doctrines. It is rather that, of all groups of people with whom I have come in contact, Theosophical people seem the most capable of becoming excited about ideas — new ideas. (Whorf 1941b [LTR]:247)

Celia Lee Whorf Wheeler, Whorf’s daughter (who was nine when her father died) told me in response to questions about the nature of his religious beliefs that she has no recollection of her father as a “fundamentalist Christian” (to use George Lakoff’s (1987:324) term). In fact, she said, she felt disadvantaged at school because she knew so little about the Bible and did not attend Sunday school. By contrast, her memories of Theosophical Society summer camps and her family’s association with other free thinkers of the day is vivid. Although, there is no doubt that Whorf was significantly influenced, not only by early theosophist F. Max Müller (1823–1900) of Oxford, as Rollins details, but probably also by Petr D. Ouspensky (1878–1947), the degree of this influence

has yet to be traced with any finesse. One may note some evidence for it, to give just one example, in Whorf's use of Ouspensky's term 'culture of consciousness' in his final paper.

Whatever mix of religious beliefs Whorf may have had in his maturity they were complex and unconventional, incorporating aspects of Christianity (at least initially), a sound familiarity with some core assumptions about the world and the place of human beings in it found in Asian philosophies, and a fundamentally physicalist conception of even the most elusive dimensions of human existence. They also included a passionate belief in the power of scientific linguistics to bring about insights with the potential to lead to improvements in thinking of a kind which might facilitate the survival of the species into the future. It was this belief in the power of a rigorous linguistic science to penetrate the mysteries of human conceptual organization which gave his work the integrity it has as a whole.

1990 may prove to be the turning point in Whorf studies. In this year Emily A. Schultz (b.1949) published an interesting study arguing that "Whorf is eminently worth rereading and pondering in these poststructuralist times" and that "early relativists like Whorf might be seen as precocious 'deconstructors'" (Schultz 1990:5). Like Hoijer deploring what he considered to be "a vulgarization of Whorf's work" at the Language in Culture conference in 1953 and urging participants to return to the original material (Hoijer 1954:230), and like Steiner by implication, Schultz stresses the importance of scrutinizing the writings themselves. Describing them as "polyphonic prose" and comparing them with Dostoevsky's work analyzed from a Bakhtinian perspective, she attempts to track "the direct authorial word" found in the various "voices" taken together (Schultz 1990:123). Unfortunately some of her conclusions are revealed as ungrounded in the light of evidence in the unpublished papers (see Lee 1992b for more detail) but she evidently did not know of the existence of these in the Yale archives when she wrote her book. Greater attention to historical context would also have eliminated some of the more surprising conclusions drawn in this otherwise thought provoking study.

Lucy was similarly inconvenienced by not having access to the Yale collection but his work is more substantial and his review (1992a) of empirical research on the linguistic relativity question is timely and useful, as is his empirical research on Yucatec Maya (Lucy 1992b). His understanding of Whorf is also excellent in most respects although his failure to take full account of the implications of the notion of linguistic thinking is problematic in my opinion, leading to an interpretation of the logic of linguistic relativity which I argue is not compatible with Whorf's original definitions (see Lee 1994 for a critique

and further discussion in this book on these matters). Useful reviews of the Mayan work are provided by Goddard (1995) and Burns (1994).

As with the work of any important thinker, proper appreciation of the ideas explored requires careful study of the original texts as well as reflection on the range of interpretations which may emerge over the years. Whorf's writings have a freshness about them which makes them immediately accessible to readers more than half a century after his death. But like all work from a previous era, preparedness to understand the intellectual climate in which the writings were generated enhances the reading. Understanding Whorf's personal circumstances is also useful in that it helps us appreciate why some of the explanatory concepts he struggled with are best regarded at as less than fully articulated in the state in which he left them.

The main purpose of this book is to further the return to the original Whorf documents, both published and unpublished, which is already under way. Much previously commentary on Whorf has been heavily circumscribed by attitudes in vogue during particular periods. For instance, the hegemony of behaviorism in psychology and linguistics during the 1950s meant that Whorf's writings generally had to be reinterpreted before they could be discussed or tested. The result was that his more subtle points tended to get lost in the process. With the rise of Chomsky, commitment to the search for universals precluded many investigators from taking Whorf seriously although, as we will see in chapter five, his overall scheme includes a place for universals within the more predominantly relativistic framework. It is in the nature of the exploration I offer that I will sometimes need to look back at the historical circumstances of a particular document or statement in order to clarify it. It will also be necessary to return time and again to the influence of Sapir on Whorf's thinking, for just as Whorf's ideas themselves form a complex interweaving whole, so Sapir's influence penetrates every strand of his thinking in a way which makes it impossible to describe separately from a study of the ideas themselves. For the moment, however, we need to return to the ideas we found in Whorf's early work and see how they developed.

1.4 *The theory complex — an overview*

Whorf's earliest explorations of intra atomic linguistics and his field theories of linguistic and conceptual organization were not abandoned when he joined the Yale linguistic circle. Although these ideas were highly unconventional and would no doubt have seemed alien to many of his colleagues, they remained integral to the theory complex as it developed. The linguistic relativity principle is simply a logical component of that larger whole which forms a

significantly greater contribution to the human sciences than does the question of linguistic relativity alone. The principle is not in itself a theory so much as the name of a law like generalization formulated on the basis of observations of relationships between linguistic activity and certain invariants of human existence. Danny (Moonhawk) Alford has expanded on this notion in a spirited discussion of the question of whether Whorf's relativity is Einstein's relativity (Alford 1981), a matter which is also dealt with in chapter three below and in Lee (1994).

The more focally central concept in the complex is that of 'linguistic thinking' which is principally elaborated in the paper entitled "A linguistic consideration of thinking in primitive communities" (Whorf 1937c) — the important "Ling. Thinking paper" mentioned above. Here Whorf refers to "the linguistics of thinking" (LTR 66n) and to "thought insofar as it is linguistic" (pp.67-68) in a fascinating discussion of neurolinguistic organization which will be explored in detail in the next chapter. It is also possible that the text he planned to write under the title *Language, Thought* (or *Mind* — the alternative was penciled in below) *and Reality* would have been focused quite consciously on linguistic thinking because the term (abbreviated again to "ling. thinking") occurs in another jotting where it is contrasted it with "non-ling. thinking" (1940i:1). These phrasings, together with the general thrust of his reasoning in many parts of his work, support my claim that his primary interest was in the role of what we may otherwise think of as 'language in cognition'. Indeed, when writing about his proposed text he told Nathan Miller of the Carnegie Institute of Technology in Pittsburgh that it would deal with "language as an intellectual tool with special reference to science and technology" (Whorf 1940o).

It was this mode of cognition which Whorf continued to conceptualize in terms of chemical structure and processes during his later years, using reasoning quite different from that which assumes propositional structure and algorithm based organization and which has been foundational in most thinking about cognition until recently. In conceptual terms his thinking anticipates to an interesting degree the current interest in parallel distributed processing, connectionism, and the use of what are called 'neural nets' in computing which is sweeping cognitive science and beginning to have an impact in linguistics. Sapir's 'points in the pattern' model of the way culturally generated and sustained patterns of behavior may be internalized in an enculturated person is also integral to the theory complex. Sapir's formulations in this respect are central to the notion of linguistic thinking as Whorf developed and explored it and (within the tradition of American linguistics proper) also has affinities with

Hockett's (1987) 'resonance theory'⁵ of morphology. It is not irrelevant that Hockett was a student of both Sapir and Whorf although Hockett remembers himself at the time as having "a striking degree of intellectual and social immaturity" (1990, p.c.) and was not aware as he wrote *Refurbishing Our Foundations* that his theory might be regarded as a re-emergence of ways of reasoning about the internalized linguistic system which he had been exposed to half a century earlier.

Whilst Whorf did not deny the existence of nonlinguistic thinking and non-linguistic communication, his particular interest was in that domain of cognition which is largely a matter of the linguistic organization of conceptual activity — a function of 'linguistic patterning operations' which are physically entrenched in a broad sense in the human mind/brain. This does not mean that he thought that words (or sentences) are represented neurologically as discrete entities in some sense isomorphic with the forms of spoken language. On the contrary, he argued in a crucial statement which we will come back to more than once as we explore his ideas that:

It is not words mumbled, but RAPPORT⁶ between words which enables them to work together to any semantic result. It is this rapport which constitutes the real essence of thought insofar as it is linguistic [...] The non-motor processes that are the essential thing are, of their nature, in a state of linkage according to the structure of a particular language, and activation of these processes and linkages in any way, with, without, or aside from laryngeal behavior, in the forefront of consciousness, or in what has been called "the deep well of unconscious cerebration," are all linguistic patterning operations, and all entitled to be called thinking. (Whorf 1937c[LTR]:67-68)

Clarification of what he said about the nature of this 'state of linkage' or 'rapport' is offered in the next chapter. But the theoretical significance of Whorf's idea that a range of different kinds of cognitive operations tap into the state of rapport which characterizes a person's linguistic competence can be considered briefly here by way of orientation.

Evidently linguistic thinking, according to Whorf, ranges from totally unconscious and automatic activation of one's linguistic system to operations of a

⁵ The term 'resonance theory' was also used by Vandamme (1976:74) in reference to Thom's (1968:224) reductionist argument from mathematics that "all interaction can be reduced to a phenomenon of resonance" (Vandamme 1976:71). He argued that Thom's thinking is relevant to Whorf's ideas. Hill (1988:23) has also drawn attention to Gatewood's (1985:216) discussion of "flows, contours, intensities, and resonances" which, Gatewood says, characterize certain kinds of talk in contrast to those which may be described in terms of "ideas, concepts, categories, and links".

⁶ All capitalizations in Whorf, Hockett, Hall, and Haugen quotations are as in their originals.

highly conscious kind ‘in the forefront of consciousness’. He noted elsewhere, for instance, that “the ability to conceive theories” i.e. to reason and explain, is largely a matter of “acquaintance with linguistic devices” (Whorf 1940i:2). The normal working of this ability is automatic. The processes by which linguistic reasoning occurs (as functions of logical organization embodied in the systematic patterning of relational processes in the grammar) operate automatically whenever we speak or think. But Whorf also argued that learning about a wider range of relational or logical devices than are found in one’s own language can augment conceptual ability and play a role in the advancement of science (Whorf 1941a). He considered that one does not necessarily have to be able to speak other languages for this to happen (Whorf 1940i, 1941b[LTR]); it is sufficient to be alerted to the different patterns of logic embodied in other grammars. Today we might also include awareness of different patterns of imagery embodied in language. Such awareness may also have the capacity to throw our own automatic processes into conscious relief and, in rendering them more accessible, assist us to make them more precise and thus efficient.

What these discussions amount to is the remarkable claim that active attention to processes of thinking (achieved through metalinguistic awareness) can have a reflexive impact on the overall state of rapport of an internalized linguistic system, providing a different kind of adjustive input to the system than that which occurs ordinarily and automatically when feedback from communicative situations and reflexive feedback from our own speaking and thinking activity remains unmonitored. In this context, Mark Turner’s (1994) arguments about the reflexive impact on our own conceptual ability to bring unconscious patterns of language and ‘conceptual thought’ into consciousness have much of the flavor of Whorf’s passion about them and could perhaps be pursued in a development of Whorf’s ideas today. Whorf himself did not use the term ‘metalinguistic’. He did, however, write of ‘multilingual awareness’ when expressing concern about moves to foster the use of Basic English as an international language (1941a[LTR]:244). Such a move he regarded as having the potential to impoverish the species intellectually.

Neither the scope nor the significance of Whorf’s innovative orientation to the study of language has been fully appreciated in the past. All his linguistic investigations were directed at the ultimate aim of coming to a better understanding of what bearing “the subject of linguistics” has “upon thinking from the standpoint of the whole human species” (Whorf 1937c[LTR]:83). His contrastive study of language differences and linguistic relativity served the larger preoccupation. He was also interested in working for improved communication between people on the basis of understandings about the way language works in thinking. As Carroll (1956:26) pointed out: “Whorf’s whole outlook in

linguistics, apart from his early religious concerns, stemmed from his concern with fundamental problems of meaning, or, as I like to think, with fundamental intellectual operations”.

The debate about Whorf's ideas has, until now, been mostly conducted in the context of the psycholinguistic empirical research tradition which grew out of anthropological inquiry into relationships between language and other aspects of culture in the 1940s and 1950s. It has also been taken up by philosophers. In both cases discussion has been grounded in the operational separation of language and thought as distinctive human functions. A methodological, conceptual, and logical decision to categorize some elements of behavior as having to do with language and others as having to do with thought is taken for granted and the consequent tendency to regard these as two separate domains of human functioning allows the formulation of a hypothesis that language may influence thought. The hypothesis is thus largely an artifact of a research decision, admittedly a largely implicit and unexamined decision grounded in centuries of speculation about language and mind.

However if “language and our thought grooves” can be conceived as being “inextricably interrelated” and “in a sense, one and the same” as Sapir (1921: 217-218) postulated and Whorf evidently accepted, the grounds for the hypothesis are removed, again by methodological decision. It should be noted that Whorf wrote primarily about *relationships* between language and thought and not about influences. There are many kinds of relationship. For instance, a relationship may be one of identity or of interpenetrativeness; the first case renders talk of influence irrelevant and in the second such talk is at least imprecise. Again I would stress that to believe that one of our cognitive capacities is for linguistic thinking is not to deny either the possibility or actuality of other kinds of thinking nor the fact that we may sometimes deploy linguistic processes in communicative or other activities which seem to involve very little thought. These matters are considered in more detail in the chapters to follow.

When we come to look in detail at the original definitions of ‘the linguistic relativity principle’ in chapter three it will become evident that Whorf's notion of relativity does not in any way undermine realist acceptance of an independent world beyond our senses. What it does rely on however, is the understanding that our experiential world (which is the only reality we can say we *know*) is a function of the human perceptual interface with both the external and internal environment of the human body.

Like some interesting recent work in linguistics (e.g. Talmy 1985, 1988, Lakoff & Johnson 1980, Langacker 1987, 1991, Johnson 1987), Whorf's experientialism was grounded in insights derived from gestalt theory. He argued that all groups of humans perceive the environment in essentially the same way

as a function of external and internal perceptual processes (taking perception in its broadest sense). These provide an invariant basis for comparing human experience. All human experience thus involves the same potential range of “isolate[s] of experience” (Whorf 1939d[LTR]:164) abstractable from the flux of primary experiential data by perceptual activity. Lived experience, or what Sapir called “social reality” (1929[SW]:162)⁷ is however a function of “isolates of meaning (thoughts)” (Whorf 1940a[LTR]:208) which are selectively segregated out from the range of experiential isolates available to a person. This latter process Whorf considered to be largely an operation of linguistic enculturation in that he regarded acquisition of a particular language as fostering a distinctive way of selecting isolates of experience and making them meaningful. Taken together, those isolates which have been operationalized as shareable meanings within a particular speech community constitute an overall “picture of the universe” (Whorf 1940a[LTR]:214 or “view of the world” (Whorf 1940d[LTR]:221) which differs from community to community relative to the fundamentally invariant world of perceptually processed data from which they have been abstracted.

In either the ‘external’ or ‘egoic’ (internal) fields of experience (Whorf 1939d[LTR]:164) isolates are experienced as either ‘figure’ or ‘ground’ abstracted from the ongoing flux of perceptual stimulation. In either case they constitute units of experience which become personally salient when incorporated into the matrix of accumulated information which provides the basis on which individuals operate coherently in their environment. In certain important respects, Whorf seems to have had a rather Lockean conception of the relationship of mind to experience. To the degree that this is the case the seemingly intransigent problem of how a cognizant mind develops in a being who receives impressions from the environment, but who does not enter life equipped with an already particularized conceptual apparatus to process that input, applies also to his theorizing. Whilst Whorf did not address this question directly, his thinking is illuminating with regard to it and has dimensions lacking in much work that followed. However, Melissa Bowerman’s recent (1988, 1989) data and thoughtful reasoning about the balance between nonlinguistic cognitive development as an input factor in child language acquisition on the one hand, and the role of linguistic input from the child’s speech environment on the other, suggest some useful starting points for thinking about these matters. Francisco J. Varela, Evan Thompson & Eleanor Rosch (1991) offer a comprehensive and wide ranging discussion in which they argue that cognition is

⁷ Page numbers for all of Sapir’s writings which were reprinted in 1949 in *Selected Writings of Edward Sapir* edited by David G. Mandelbaum (1911–1987) are indicated by the initials SW in the citation. The date in each case is the date of first publication.

essentially embodied and that the nature of the human body interface with the rest of its environment should be of central concern to cognitive science.

A feature of the theory complex which is easy to overlook is the polysemous importance of Whorf's use of the word 'agreement'. He argued that ordinary agreement is something we take for granted, unaware of the processes involved in achieving it. In fact the possibility of ordinary human agreement — which he said could only be achieved in a precise sense though linguistic means (Whorf 1940a[LTD]:211-214) — is predicated on prior agreement or 'calibration' of extrapolations of isolates from experience and the social operationalization of these isolates in languages. A further degree of agreement is required in the calibration of resonances which operate within each of the internalized linguistic systems of individuals.

Taken as a whole, Whorf's claims amount to the assertion that phylogenetically the extension of human communicative activity into language has been the factor that gave human cognition itself the impetus which set it apart from that of other species. Ontogenetically the claims amount to the assertion that it is the acquisition of language in childhood which mediates the emergence of higher intellectual functioning in human beings through the incorporation of linguistic processes in cognition in the course of socialization. These claims have much in common with some of the ideas of Lev. S. Vygotsky (1896–1934). Whorf's claims about metalinguistic awareness (which by the logic of his reasoning must also be metacognitive) amount to assertions about the augmentative power of reflexive consciousness in cognition. His theories of language and mind thus give centrality not only to language in the kind of cognition which is distinctively human, but also to conscious cognitive reflexivity. As such they invite quite different investigative orientations to the many questions involving the nature, emergence, development and articulation of human cognitive behaviors and suggest a far more exciting Whorfian research program than discussions to date have generally allowed for.

The several interweaving and interdependent themes which made up the theory complex are either explicitly stated in Whorf's work or implicit in what he said and analytically abstractable from it. The ontological commitments at its core are: a) the fact of patternment in linguistic and indeed all cultural behavior and: b) the unequivocal treatment of language as a cognitive activity, albeit one which may be regarded in any of its manifestations as significantly a product of linguistic socialization.

The presence of these focal commitments in the theory does not mean that Whorf discounted the innate human predilection to become a languaging being which is a species specific genetic characteristic nor does it preclude the possibility of linguistic universals. The hard core does however make the theory as

a whole incompatible with the argument that organizational features of linguistic activity are mainly or entirely biologically determined i.e. that grammar is primarily inherent rather than contingent upon linguistic experience.

In section five below I offer a list of the elements I have extrapolated from Whorf's writings — a kind of advance organizer for the rest of the book. Twelve elements of the theory complex are identified and also to some degree dealt with separately in the chapters that follow. But like life itself or thinking in general, Whorf's theorizing is only artificially unraveled and segmented into components. The various strands of theme and theory which make up the complex interpenetrate and even merge and must frequently be treated as flowing together in a way which may be difficult for readers who are used to thinking predominantly in terms of clearly differentiated entities and causal relations. Elements which might seem primarily cognitive only come into existence on the basis of a social phenomenon — linguistic enculturation. Others which seem to have essentially social import are totally dependent on neurolinguistic impresses brought about by nonlinguistic experience — either genetically inherited, culturally conditioned, or idiosyncratically experienced in the course of an individual life. Whorf's approach to investigating relations between language, thought, and experience was a holistic one; it was not an accident that one of the earliest groups to acknowledge the far reaching implications of his unfinished explorations were the systems theorists of the 1940s and 50s. To read his work most profitably it is important to try and keep all the elements of the complex within mental reach as it were, even as particular aspects are studied in finer detail. The summary which follows is designed to facilitate this.

1.5 *Elements of the complex summarized*

1) The theory as a whole is about 'linguistic thinking'. It is a theory of language in cognition focused on the domain Whorf was most interested in — that of conceptual activity. Within this domain he argued that language and thought are not always or necessarily separable phenomena. The theory is only by extension about language in general (including its noncognitive aspects) and thought in general (including its nonlinguistic aspects). Whorf considered that socially generated and sustained patterns of language use become physically entrenched in cognition and in doing so condition physiological (including neurological) structures, processes, or associated energy fields and bring about adjustments to the overall patterning of mental behavior. He did not claim that all conceptual activity is linguistic in origin or character nor did he claim that the sole function of language is to facilitate conceptual activity.

He did, however, claim that it is the species specific ability to talk that characterizes what is distinctive about human cognition.

2) The themes of 'patternment', 'configuration', and 'linkage' are pervasive in Whorf's writing. They mediate the notion that what is essential to conceptual activity (the activity of making meaning) is connection and inter-relationship on a large and complex scale. With respect to linguistic thinking we can think of this as relational mental activity of a kind which is languageable.

3) The idea that what language does (both in cognition and in human experience) is to sustain a complex matrix of mental interconnections in a 'state of linkage' or 'rapport' is central to the concept of language in cognition. Sapir provided a cognitive model of this holistic conceptualization in his discussion of the "points in the pattern" of the sound system of a language, a model which Whorf took up and elaborated. The model provides a way of conceptualizing how socially generated and sustained patterns of behavior may be internalized as a genuinely generative basis for an unlimited range of activity which can be recognized as systematic and meaningful by members of a social group.

4) Whorf argued that human beings selectively elaborate, as 'isolates of meaning', a part only of the range of 'isolates of experience' universally available as functions of perceptual processes. He said that linguistic operations are significant in determining which 'bits of experience' count and which bits are backgrounded. Human meaning making is a matter of selectively abstracting patterns of salience or coherence from presented data. It also involves creative but selective generation of mental and communicative behavior out of the generative state of rapport which characterizes a person's internalized system for making meaning. Meaning making is essentially a matter of the 'configuration' and 'segmentation of experience'.

5) The notion that to abstract patterns of salience from experiential data is a basic cognitive function is implicit in much of Sapir's and Whorf's writing. Because abstraction mediates the transfer of (meaningless) isolates of experience into a matrix of connections or state of rapport which constitutes internalized knowledge of a system of social behavior, 'abstractive processes in cognition' can therefore be postulated to exist as facilitators of learning. Whilst their existence may be implicit in much talk about category or concept formation, it is possible that making the processes themselves a more explicit focus of theoretical attention could be productive in the mind sciences.

6) The outcome of the culturally patterned segmentation of experience in conceptual and experiential terms is that each language fosters in its users a particular way of understanding what happens — a particular subset of identification patterns and logical processes extracted from the full range available to the species for use in the process of making sense of reality. Whorf called each of these selections ‘a picture of the universe’ or ‘view of the world’ — cultural and individual systems composed of subsets of concepts abstracted from the totality of what is languageable. Thus the linguistic relativity principle states that ‘the same physical evidence’ does not necessarily lead to the same conceptual framework for constructing experience from presented data. This is the case even though the character of our physiology and its interface with the rest of the world is (apart from pathology) essentially invariant across the species.

7) Within a given speech community the possibility of the kind of communication which is sufficiently precise to lead to agreement is predicated upon prior ‘agreement’ about meanings. No linguistic communication at all can take place without the ‘calibration’ of meanings between people in this way. Processes of agreement may be explicit in those situations where interlocutors negotiate clarifications or refinements of what they are saying in order to facilitate better understanding between themselves. In most speech situations however, including situations where languaging involves writing rather than speaking, this agreement is implicit and is a function of the degree to which any individual’s knowledge of language (as a system) overlaps with the cognitively entrenched matrix for making meaning of any interlocutor or reader. What is agreed on in a key sense meant by Whorf, is which ‘bits of experience’ count and which bits don’t in a particular picture of the universe and how these bits are logically related. The process is unconscious (or implicit) and largely unattended to in the normal course of thinking and speaking.

8) It follows that conscious awareness of the nature and operation of patterns of meaning utilized in sharing ideas or information with other people or in thinking privately should sharpen our capacity to use language with precision. As all science is a matter of the ‘use of language upon data’, working to consciously improve our capacity to talk in a way which is predicated on explicitly clarified shared meanings should further the progress of science. Furthermore, knowledge of alternative systems of logic achieved by consciously fostering ‘multilingual awareness’ has the potential to ‘increase ability to conceive theories’ and thus expand the range of inquiry available to us by augmenting our conceptual capabilities.

9) Studying as wide as possible a range of different ways of making meaning as are represented by the diversity of languages which are or have been used has the potential to facilitate study of human thought on a planetary scale, to come to a better understanding of what it might be in respect to the species as a whole. Such research has the potential not only to reveal (by processes of aggregation and elimination) the core of human conceptual capacity, but also the range of its infinitely varied periphery, all of which is potentially accessible to anyone. Whorf thought that this kind of multi language investigation of cognition is also capable of illuminating the nature of reality in a way inquiry conducted from within the conceptual parameters of a single language cannot. This is because reality understood through the frameworks of many languages is revealed as conceptually and experientially more complex and many faceted than the lens of a single language can show.

10) Multilingual awareness also has the capacity to increase intercultural understanding by engendering respect for other logics and other pictures of the universe represented by different ways of speaking. Whorf stressed that it is not necessary to be able to speak another language for this to occur; it is sufficient to know about the principles people use to make meaning and to reflect on these. He said that inherent in the human capacity to language — in what he called the ‘higher mind’ — is an immense capacity to systematize available to all. Awareness of this, Whorf believed, alerts us to “a great fact of human brotherhood” (Whorf 1941b[LTR]:257).

11) In the personal lives of individuals, becoming consciously aware of the linguistic (including logical) processes that we employ automatically in the use of languages we know can help to free us from illusions about the nature of reality which we have been conditioned by our speech community to regard as facts having the same conceptual character and salience for all people. Such metalinguistic awareness can also assist in liberating people from compulsive behaviors fostered by unexamined habitual language use.

12) On a planetary scale, developments in thinking which result from increased language awareness and greater precision in talking are an essential factor which “may even determine the duration of human existence on the planet earth or in the universe” (Whorf 1937c[LTR]:83).

CHAPTER TWO

LINGUISTIC THINKING: POINTS, PATTERN, LINKAGE, AND RAPPORT

2.1 *Patternment*

A proper understanding of Whorf's thinking about language begins with an appreciation of the importance of notions of 'pattern', 'patterning', and 'configuration' in Sapir's writing and 'patternment', 'configuration', 'linkage' and 'rapport' in his own. Awareness that they were seeking pattern and configuration was typical of the style of linguistic and anthropological investigation in the 1930s and suggests perhaps a greater awareness of the importance of locating analytical findings within an overall appreciation of system than occurs in some more recent work. Judith T. Irvine, in the 1994 introduction to her painstaking reconstruction of Sapir's lecture notes of the 1930s, points out that Sapir's "conception of cultural patterning and configuration, and their relation to function" (Sapir 1994[1930s]: 7) were developed prior to the appearance in 1934 of Ruth F. Benedict's (1887–1948) *Patterns of Culture*. Sapir's brilliant article of 1927 on "The unconscious patterning of behavior in society" will perhaps never be equalled for the lucidity and succinctness with which the complexity and subtlety of socially patterned behaviors of all kinds are introduced and explained. His lecture notes provide fresh insights into the way he presented his ideas to those, including Whorf, who attended his lectures.

Sapir consistently drew his students' attention to the fact that: "All cultural behavior is patterned" (Sapir 1927[SW]:546) and, defining a pattern as "an assemblage of significant things, with a terminological key", pointed out that "language is the most massively unconscious pattern in all cultures" (Sapir 1994:53). In his terms,

a pattern is a theory of activity having meaning in terms of the typical event of a given society. (We may distinguish a pattern from the total configuration.) A pattern is form, seen functionally. Things which seem the same are not, unless they function similarly. [...]

The problem of form and the problem of function are very much more subtle than is generally envisaged. (Sapir 1994[1930s]:106; original emphasis)

Kluckhohn (1941:109) used the term ‘configuration’ differently, distinguishing between overt culture patterns which are relatively easy to bring to awareness, and “patterns of the *covert* culture” which he called “*configurations*” to distinguish them from the others. He argued that: “A *configuration* is reducible to a ‘principle’ which is, so to speak, ‘behind’ the structural regularities of the overt culture, which ‘accounts for’ two or more specific patterns” (p.114; original emphases). In spite of these examples of more precise use of the two key terms, however, there was a tendency among linguists and anthropologists of the Boasian tradition to use them fairly interchangeably much of the time.

Zellig S. Harris (1909–1992) would later recall that: “Sapir’s greatest contribution to linguistics, and the feature most characteristic of his linguistic work, was not the process model but the patterning of data” (Harris 1951:73). He added that: “From de Saussure to the Prague Circle and Sapir and Bloomfield, the fact of patterning was of overshadowing interest”, and although “attempts to analyse and classify these patterns” are found “in the later work of this period”, the “big result was still the very existence of structure” (p.78). He pointed out that Sapir was not simply interested in “bland distributional arrangements” but “in the fact of patterning and what could be derived from the discovery that language was so patterned a bit of human behavior” (pp.77-78). Although the term ‘structure’ itself may have been relatively little used before the 1940s, Dell Hymes (b.1927) and John Fought (b.1938) in their comprehensive (1975) review of “American Structuralism” remind us that the contents of Sapir’s (1921) and Bloomfield’s (1933) books, both entitled *Language* and widely used as texts, make it clear that these leaders in the field did employ the term in ways fundamentally continuous with later usage. They also note that Bloomfield, like Sapir, also used the term ‘system’ and referred to ‘pattern’ and ‘configuration’ although he used the last of these terms in a more restricted way than Sapir (Hymes & Fought 1975: 910n).

Harris stressed the significance to Sapir of the fact that patterning in human behavior is largely unconscious and socially produced, and noted that the “importance of recognizing the purely analytic status of the pattern” lies in the fact that individuals are not aware of their “participation in culture patterns” (Harris 1951:105). Newman expanded on this point saying that

it was the evidence of form in language which impressed Sapir as having the deepest implications for an understanding of human behavior. Linguistic form was a patterned phenomenon; in the individual or the group

these formal configurations were adhered to or recreated unconsciously and intuitively. Sapir unceasingly hammered at this theme in his articles, whether written for linguists, psychologists, or social scientists. (Newman 1951:63)

Sapir (1924[SW]:152) himself said that: "The psychological problem which most interests the linguist is the inner structure of language, in terms of unconscious psychic processes, not that of the individual's adaptation to this traditionally conserved structure". He further asserted that: "The outstanding fact about any language is its formal completeness" (p.153), a completeness characterized by systematic organization which provides structure, although it is also essentially dynamic or fluid in operation, as we will see in more detail below.

Given that, according to Trager (1942:1) Whorf's association with Sapir "was, in his own opinion, the most important influence on his linguistic thinking" it is not surprising that references to pattern and configuration may be found everywhere in his later writing. The key assumptions which characterize this influence are:

- a) the fundamental importance of acknowledging the relational status of any specific element of behavior abstracted for analysis to the whole system of which it is a part
- b) the generally habitual and unconscious character of socially patterned behaviors such as those involved in linguistic thinking
- c) the unique organization of patterns which characterize the way a particular group speaks
- d) the functional character of any element as an outcome of those relationships in which it is embedded

There are two further respects, however, in which Whorf took his thinking about what he called 'patternment' (Whorf 1941b[LTR]:258, 1940i:5) somewhat beyond Sapir's conceptions. The first was his explicit articulation of the notion of a 'state of linkage' or 'rapport' as a feature, in a broadly physiological sense, of the cognitive state of a person who has acquired patterns of socially systematized behavior. This development is anticipated in Sapir. However when Whorf conceptualized linguistic patternment as participating in, being a particular expression of, and providing access to an autochthonous trend to patterning intrinsic to all existence he ventured into realms of reasoning which may not have been congenial to his mentor.

This all embracing conception of patternment will be considered first, however, because Whorf's predilection to try and place human experience in a cosmic or planetary frame is characteristic of so much of his work. His discussions

of the way linguistic entities may be regarded as being “emergent from a field of causes” (Whorf 1941b[LTR]:269) were dually grounded in concepts from Eastern philosophy and from modern physics. The notion of ‘emergence’ is vital to understanding the mode of operation which he attributed to Sapir’s “points in the pattern” model of cognitive organization which is discussed in more detail below. It also bears in an interesting way on Hockett’s (1987) ‘resonance theory’ of linguistic morphology. Use of the construct in cognitive linguistics (e.g. Langacker 1987, 1991) also seems similar to Whorf’s usage in some respects at least.

My central purpose in this chapter is to show that talk of pattern, configuration, and linkage in American linguistics during the first half of this century, if taken together with Whorf’s insights into the indeterminate nature of the ‘points’ in linguistic patterns, and also Hockett’s more recent explication of resonance theory, constitute a viable alternative way of talking about language in cognition (linguistic thinking), a way which has been ignored for decades by most linguists while the more familiar mode of analysis characterized by a linear and algorithm based logic held sway and grew in ascendancy. There is, in other words, a conceptual continuity in the work of Sapir, Whorf, and Hockett with respect to ideas about the nature of internalized linguistic knowledge, a continuity which is not surprising given that Hockett was also a student of Sapir. What is of considerable interest is the recency with which Hockett has reformulated and presented his ideas in essentially Sapirean terms after a lifetime of having his name primarily associated with Bloomfield’s. The fact that the logic which informs much of the theorizing examined in this chapter can now be described as ‘connectionist’ or ‘holographic’ in general character may be of interest to cognitive scientists unaware of this alternate, if submerged, paradigm in linguistic science. It should certainly be of interest to linguists.

We will start with some of Whorf’s more esoteric notions drawn from his study of Hindu cosmology and move from these into realms more familiar to Western science. Whorf regarded the various levels of patterning in language as forming a hierarchical series of wholes, each ‘plane’ containing those preceding it within itself (Whorf 1941b[LTR]:248-249). He noted that Sanskrit had no term for “‘language’ in the broad sense of the linguistic order” embracing “all symbolism, all symbolic processes, all processes of reference and logic,” but rather, various terms referring to linguistic subgrades. He said that “*Nama*, ‘name,’ is not language or the linguistic order, but only one level in it, the level of the process of ‘lexation’ or of giving words (names) to parts of the whole manifold of experience, parts which are thereby made to stand out in a semi-fictitious isolation.” He said that these activities take place in a “manasic plane”, “*Manas* in a broad sense [being] a major hierarchical grade in the world

structure” and the term which is perhaps the closest Sanskrit comes to naming the “linguistic order” as a whole. He regarded the “English ‘mental’” as “a word whose function in our culture is often only to stand in lieu of an intelligent explanation, and which connotes rather a foggy limbo than a cosmic structural order characterized by patterning” (p.252). Like ‘mind’, however, he noted that *Manas* can also be used to refer to “the personal psyche” (p.253). He explained that:

in the plane of *Manas*, there are two great levels, called the *Rupa* and the *Arupa* levels. The lower is the realm of “name and form,” *Nama* and *Rupa*. Here “form” means organization in space (“our” three-dimensional space). This is far from being coextensive with pattern in a universal sense. [...]

Thus the level of *Rupa* and *Nama* — shape-segmentation and vocabulary — is part of the linguistic order, but a somewhat rudimentary and not self-sufficient part. It depends upon a higher level of organization, the level at which its COMBINATORY SCHEME appears. This is the *Arupa* level — the pattern world par excellence. *Arupa*, ‘formless,’ does not mean without linguistic form or organization, but without reference to spatial, visual shape, marking out in space, which [...] is an important feature of reference on the lexical level. *Arupa* is a realm of patterns which can be “actualized” in space and time in the materials of the lower planes, but are themselves indifferent to space and time. Such patterns are not like the meanings of words, but they are some-what like the way meaning appears in sentences. They are not like individual sentences but like SCHEMES of sentences and designs of sentence structure. Our personal conscious “minds” can understand such patterns in a limited way by using mathematical or grammatical FORMULAS into which words, values, quantities etc., can be substituted. (Whorf 1941b[LTR]:253)

In these remarks Whorf was making a clear differentiation between manifest occurrences of linguistic phenomena in the world of shape and form — occurrences which are measurable in a spatio-temporal sense — and the patterned matrix of relationships which generates such events. The traditional Oriental notion that the data of objective existence are precipitations or actualizations out of an implicit order of patterned relations has much in common with certain concepts from physics, as we will see below. This concept of emergence is a causal one, part of an alternative way of thinking about causation which offers us a way of conceptualizing linguistic competence differently from the dominant paradigm.

Though he wrote of ‘levels’ and ‘serial planes’ in the realm of patterment, if one looks carefully at a delightful analogy he used to explain his thinking it is clear that Whorf did not envisage these as separate in the sense that each one can

be peeled off leaving an intact underlying layer exposed to view. Rather, they were conceptualized as interpenetrative, yet existing at the same time as fully self contained systems. The analogy demonstrates Whorf's capacity to hold complex patterns of interconnections in mind all at once and demonstrates his predilection to thinking in terms of wholes rather than parts.

In the science of linguistics, the facts of the linguistic domain compel recognition of serial planes, each explicitly given by an order of patterning observed. It is as if, looking at a wall covered with fine tracery of lacelike design, we found that this tracery served as the ground for a bolder pattern, yet still delicate, of tiny flowers, and that upon becoming aware of this floral expanse we saw that multitudes of gaps in it made another pattern like scrollwork, and that groups of scrolls made letters, the letters if followed in a proper sequence made words, the words were aligned in columns which listed and classified entities and so on in a continual cross-patterning until we found this wall to be — a great book of wisdom! (Whorf 1941b[LTR]: 248)

Elsewhere, in a review of a theory of 'manifolds of fluxions' which bears on the concepts in this analogy, he explained that the "gamut of vibratory orders" hypothesized in that theory "may be said to establish a series of grades or sub-planes of existence, for each gamut degree would be a wave field of its own just as the little ripples on the big ocean waves establish a wave field of their own". He thought that

each wave-field might be expected to contain (a) orders of phenomena almost entirely confined to its own domain, (b) phenomena that take in "vertically" a column down through the gamut. "People" would be a phenomena of the b class. (Whorf 1941d:10; original underlining)

According to this way of thinking, language too is presumably a phenomenon of class (b).

Whorf said that just as one is unaware of the intricate laws of phonemic patterning with which we comply whenever we speak or even make up nonsense words in our own language (p.254)⁸, so in the selection of words, the

⁸ Whorf was very well aware of these intricate phonetic patterns, having developed a model of the English monosyllable "which was at that time an original synthesis of facts about English sound clusters" (Carroll 1956:32) and (Whorf 1940d[LTR]:220-232). According to Darnell (1995:p.c.), Sapir also "played with nonsense words pretty seriously for a stretch during his Ottawa years". She considers it quite possible that his Yale students would have done class exercises of this kind as a means of encouraging them to explore the intricacy of their own unconscious pattern systems.

“personal mind” is also under sway of “a far more intellectual mind which [...] can systematize and mathematize on a scale and scope that no mathematician of the schools ever remotely approached” (p.257). This “higher mind” is not “conscious on the personal level,” except perhaps when “dreams and exceptional mental states” may give conscious access to it (p.258). “Caught in a vaster world inscrutable to its methods,” Whorf said, the “lower mind”[...] “uses its strange gift of language to weave the web of Maya or illusion, to make a provisional analysis of reality and then regard it as final” (p.263). And yet through that same “gift of language,” because of its intrinsic links with a “realm of PATTERNED RELATIONS, inconceivably manifold and yet bearing a recognizable affinity to the rich and systematic organization of LANGUAGE, including *au fond* mathematics and music, which are ultimately of the same kindred as language” (pp.247-248), Whorf believed that: “a noumenal world — a world of hyper-space, of higher dimensions — awaits discovery by all the sciences, which it will unite and unify” (p.247).

In these remarks Whorf took Sapir’s interest in “the fact of patterning and what can be derived from the discovery that language is so patterned a bit of human behavior” (Harris 1951:78) beyond the discovery that we build and sustain the experiential reality we live in through our capacity to language. He also took it beyond the notion that because this conceptual structuring of existence becomes automatic and habitual as it is internalized neurolinguistically we are very largely unaware of its activity. His remarks about the potential of the ‘gift of language’ to lift human existence beyond the conditioned mundane into an enhanced state of functioning may seem extravagant here, but dealt with more soberly in other places they are, as we will see in chapter six, credible and suggestive of interesting cognitive implications for language awareness.

Certainly, the kind of remarks quoted above, as Rollins (1980:50) pointed out, were probably derived at least in part from his reading of Müller, in particular the latter’s *Science of Language* which Whorf read in 1925 (Whorf 1928e). It is also important to remember that they were directed at a theosophical readership which would have been quite comfortable with the terminology and concepts involved. But it is a mistake, I believe, to treat the discussions based on Eastern ideas superficially as some have done. Although Whorf was engaged in an ambitious conceptual enterprise his mode of reasoning has become more, rather than less, accessible in recent times.

Physicists like Bohm (1980) and Fritjof Capra (1975), for instance, have demonstrated that drawing a link between traditional Eastern philosophy and conceptualizations derived from modern physics can expand the range and flexibility of the way we are able to think about interconnections between events and about reality at large. Similarly, the work of Whitehead and also Henri

Louis Bergson (1859–1941), with which Whorf was familiar, encouraged readers in his own day to experiment philosophically with alternative ways of talking and thinking about existence.

As patternment is inherent in all energy or matter, “the configurative or pattern aspect which is so basic in language” (Whorf 1941b[LTR]:250) is also a reflection of universal laws of existence in which human beings participate directly through their capacity for linguistic thinking. Whorf seems to have conceptualized individual and social mental activity as projections of a larger phenomenon, mind in general, imagined as pervasive through the universe. Alternatively, he may have thought of individual mind activity as a matter of *participation in* the larger phenomenon. These ways of thinking about cognition need not seem as strange as they may sound at first.

If we conceptualize individual mind activity as a matter of being in a state of neurological ‘linkage’ or ‘rapport’ sustained by physiological structures and processes in the way he conjectured, then it can also be thought of as a physical field in the same way as fields are talked about in connection with electricity and other phenomena studied in the physical sciences. Within the logical constraints of this way of thinking, we can imagine different energy fields interpenetrating, overlapping, and being subsumed by others. We might, for instance, wish to reconceptualize human communication as a matter of mind fields intermeshing or setting up resistances in relationship to each other, linguistic activity being a significant mediator of these effects. A field theory of mind also allows us to imagine individual mind activity as a manifestation of social, or even universal mind activity, or perhaps a participation in it, without any logical inconsistency. Whorf’s remarks about relationships of “orders of phenomena” to “wave-field[s]” quoted above, and a concept of “grades or sub-planes of existence”, each with its own wave field nested in or overlapping with others (Whorf 1941d: 10), would seem hospitable to such suggestions.

Whorf (1941b[LTR]:254) applied the same kind of thinking about wave field systems to patterns within a language, arguing that:

Mathematics is a special kind of language, expanded out of special sentences containing the numeral words, 1, 2, 3, 4, [...] x, y, z, etc. But every other type of sentence of every language is also the potential nucleus of a far-reaching system.

This way of thinking about a sentence or utterance as the transient nucleus of “a far-reaching system” is just a different way of saying that any utterance implicates the entire system, being the focal projection of it for the duration of its occurrence. When it fades from attention, whether this be the attention of a hearer, reader, speaker or writer, it returns to a state of potentiality in that

person's internalized system, becoming less accessible as an item of attention or manifest occurrence for the time being. In more restricted terms, Hockett refers to the "grammatical 'aura' or 'field'" as part of the total "form" or "packet" which constitutes a linguistic entity, its "shape" being regarded as the nucleus of the field. He specifies that

The grammatical field in a packet is not the form's syntactic ties in a particular occurrence, but a range of POTENTIALS extracted (by experience) from the environments in previous occurrences, by virtue of which the form is felt to be likely to occur with certain syntactic ties and less likely, or unlikely, to occur with others. (Hockett 1987: 110-111)

As field theory may be applied to all aspects of existence, we need access to its logic if we are to attempt to evaluate the validity of Whorf's opinions about our involvement in universal patternment through our species specific capacity for linguistic thinking and linguistic communication. What is important for our explorations here is Whorf's demonstration of the way notions from modern physics could anchor a material conception of mind far more subtle and sophisticated than that accommodated by the mechanistic (classical) physics of his contemporaries. His intellectual daring in trying to formulate a conception of language in cognition which might facilitate understanding of the complex subtlety of linguistic thinking in action and at the same time place this phenomenon in the context of patternment at large — the patterned cosmos — deserves respect at least. But his notion of a realm of patterns or a matrix of relations sustained as a cohesive state of interconnection and having the emergent potential to actualize themselves in time and space in forms of gross manifestation accessible to human perceptual processes is particularly interesting, as we will now see in more detail.

2.2 *Points in the pattern*

What I call 'the points in the pattern' model of cognitive organization is possibly the prime demonstration of the capacity Whorf shared with Sapir to conceptualize relations between what we are used to thinking of as 'items', 'units', 'entities', or 'components' within systems in a holistic, dynamic, and essentially relativistic way. Sapir's and Whorf's analytical focus was on patterns of relationship and linkage systems connecting identifiable but abstract 'points' — in the sound system of a language in the paradigmatic case. These relativistic points or abstract loci themselves were conceptualized, at least by Whorf, as indeterminate and effectively nonexistent as entities unless 'actualized' in speech situations.

This relational rather than componential approach to understanding human behavior was identified by Mandelbaum (1949:3) in terms of the importance of the “configurational or field approach to understanding the elements of language” in Sapir’s writing. He emphasized that it underscored “the fallacy of purely mechanistic or atomistic analyses of linguistic phenomena” and quoted Sapir’s belief in the necessity of “getting behind the sense data of any type of expression in order to grasp the intuitively felt and communicated forms which alone give significance to such expression”. Mandelbaum also drew attention to Sapir’s opinion that “no entity in human experience can be defined adequately as the mechanical sum or product of its physical properties”. In referring to Sapir’s conception of phonemic organization as embodying a ‘field approach’, Mandelbaum may have been drawing attention to the relevance of physical field theory to it. As Einstein & Infeld (1938:151) put it: “In the new field language it is the description of the field between the two charges, and not the charges themselves, which is essential for an understanding of their action.” The focus is on *relationships* between apparent entities rather than the entities themselves.

Before the term ‘phoneme’ had come into currency in American linguistics, Sapir (1921:56n) asserted that the phonetic distinctions which a native speaker of a language makes with ease are those which “correspond to ‘points in the pattern of his language’”. He had found that even “subtle, barely audible, phonetic differences, if only they hit the ‘points in the pattern’ were easily and voluntarily expressed in writing” by persons he taught to write their own language. According to Darnell (1995, p.c.) he was using a proto-phonemic theory as early as 1907 and in an early letter to Kroeber chided him for assuming that a native speaker might have misheard when learning to transcribe his own language in symbols reflecting Kroeber’s hearing of the language. Sapir noted in 1921 that in watching his Nootka consultant write, he “often had the curious feeling that he was transcribing an *ideal flow* of phonetic elements which he heard, inadequately from a purely objective standpoint, as the intention of the actual rumble of speech” (my emphasis). What is actually heard, as Hockett (1987:48) points out, may be almost unrecognizable in strictly auditory terms. What hearers think they hear is the ‘norm shape’ of the forms they recognize. The “work the hearer’s internal circuitry must do” is to identify what is heard, not in terms of its actual physical characteristics, but in terms of expected ‘clarity norms’ (p.146n), knowledge of which is registered in the person’s internalized linguistic system.

Sapir (1921) stressed that: “We cannot define [language] as an entity in psycho-physical terms alone, however much the psycho-physical basis is essential to its functioning in the individual” (pp.10-11). His conclusion, based on the fact that it “consists of a peculiar symbolic relation — physiologically an

arbitrary one — between all possible elements of consciousness on the one hand and certain selected elements localized in the auditory, motor, and other cerebral and nervous tracts on the other”, was that “we have no recourse but to accept language as a fully formed functional system within man’s psychic or ‘spiritual’ constitution”. He considered that

the particular points or clusters of points of localization in the several tracts that refer to any element of language are connected in the brain by paths of association, so that the outward, or psycho-physical, aspect of language is of *a vast network of associated localizations* in the brain and lower nervous tracts, the auditory being without doubt the most fundamental of all for speech. (Sapir 1921:10; my emphasis)

Whilst Sapir conceptualized the points in the pattern as ‘ideal’ or abstract entities, his comments indicate that, like Whorf, he was able to imagine their material basis in what would now be described as a connectionist way, one which does not however, imply isomorphism of the linguistic system with the physical matrix which realizes and sustains it. Whorf was able to accommodate this lack of isomorphism through his further adaptation of field theory to mental functioning; he had no need, in other words, for recourse to words like ‘psychic’ or ‘spiritual’ which some have taken to refer to nonphysical existence, whatever that might be. To clarify — using concepts which do not require that what is mental cannot by definition also be physical — a neurolinguistic system can be thought of as essentially electrical, magnetic, or chemical in nature.

In a later description of phonemic organization Sapir explained how he conceptualized relationships between the points in the internalized system. He said that each phoneme, which he still called a ‘speech sound’, in a

[sound] system is not only characterized by a distinctive and slightly variable articulation and corresponding acoustic image, but also — *and this is crucial* — by a psychological aloofness from all the other members of the system. The relational gaps between the sounds of a language are just as necessary to the psychological definition of these sounds as the articulations and acoustic images which are customarily used to define them. A sound that is not unconsciously felt as “placed” with reference to other sounds is no more a true element of speech than a lifting of the foot is a dance step unless it can be “placed” with reference to other movements that help to define the dance. (Sapir 1925[SW]:35; original emphasis)

He pointed out that it is not a matter of “objective relations” between two sets of sounds in the repertoires of different speakers — indeed a sound in one set may be objectively close (e.g. a lisped ‘s’ compared with another person’s ‘th’)

to a sound which in the other set occupies a different point in someone else's internalized system. Such objective differences are "only a first approximation to the psychological relations" which actually constitute the pattern. It is the fact of similar patterns of "psychological 'spacing'" between the sounds within each system which enables a listener to understand what is being said (pp.36-37). Paul Churchland (1990:204) makes the same point when he draws attention to the fact that: "A female child at 2 years and a basso male at 50 will produce quite different sorts of atmospheric excitations in pronouncing [a particular vowel] but each sound will be easily recognized [as that vowel] by other members of the same linguistic culture."

For Sapir, the points in the pattern phonemic model represented the "more restricted 'inner' or 'ideal' system" which lies "back of the purely objective system of sounds that is peculiar to a language" but he also thought that the same "feeling for form" which gives phonemic configuration to phonetic phenomena informs conceptual patterning as well through grammatical organization. He said that: "Both the phonetic and conceptual structures show the instinctive feeling of language for form" (Sapir 1921:57-58). He further emphasized that our ability to act in conformation with any socially established pattern of behavior is a function of "an unconscious control of very complicated configurations or formal sets" which are "individually acquired" and which "lie entirely outside the inherited biological tendencies of the race and can be explained only in strictly social terms" (1927[SW]:555). He considered gestural behavior to be a good nonlinguistic example (p.556). In his 'configurational' point of view "the emphasis is not on the actuality of every bit of behavior, trait, or element, but on its position in relation to other elements". It "emphasizes the placement of a cultural element rather than its content" (Sapir 1994[1930s]:103). In making these remarks Sapir was also reflecting his familiarity with ideas elaborated the previous century by Wilhelm von Humboldt (1767-1835) and developed by German linguists into this century. (See Miller 1968 and Koerner 1977, 1995b for details of this tradition and its relevance to developments in North America).

Whorf (1929b) also explored the points in the pattern model and clarified the relativistic character of phonemic patterning in two sets of rough notes, the first as a set of preparatory discussion notes written seven months after he first met Sapir. In marginal jottings, Whorf isolated the following phrases for attention from Sapir's (1921) discussion: "conception of the ideal phonetic system", "a phonetic pattern", "points in the pattern", "system one might term it of symbolic atoms" and "level of linguistic representation" (pp.54-56). He then went on to interpret Sapir's remarks from a physical science perspective, writing:

The sounds of a language, considered not in a purely external way as phenomena of physics but as units in a system for communicating

meaning, as the raw material of a signalling code should be regarded not as a mere continuum of sound in which every point has an equal value, but as a number of isolated points in a pattern, the pattern of the particular language in question.

The phonetician as a physicist may be compelled to give equal attention to every sound difference his ear hears or his apparatus records, but the linguist, once he has discovered what the points in the pattern of a language are [...] must give his particular attention to the difference between these points and may [...] remain comparatively indifferent to differences between those sounds that tend to vary about such points. (Whorf 1929b:1)

He then asked: “What is, basically, a point?” and: “What is one sound?”. He argued that since the ‘t’ of ‘time’ which is followed by an aspiration and is therefore a sound complex, is one point in the pattern, why shouldn’t “what we are accustomed to call ‘a whole syllable’ be likewise a single significant point in the pattern of a language?” He suggested that “from the standpoint of human behavior” a syllable might be thought of as “a single act, a single ejaculation (explosion) or ‘chunk’ of sound from the speaking apparatus” and that there might “be cases where the specialization of syllables is not always carried to the extent which our alphabet presupposes”. He said that although “the older Semitic and Egyptian systems allocated their signs to sounds in quite a different way, nevertheless they no doubt also covered all their own phonemic points quite adequately”. He did not believe, however, that “they were trying to record the consonants and leave out the vowels, they thought they were recording all the sounds there were” their unit being “a broader thing” than ours. He emphasized that: “Not all the physical sound wave produced is heard. Not all that is heard is appreciated linguistically” and much of what is heard “is not part of the meaningful pattern woven by that sound” (pp.1-2).

Eleven years later after inventing the term ‘allophone’, Whorf elaborated further on the relativity of the phonemic principle saying that “the unit segmentations” of language are “purely relativistic”. Making it quite clear that he was applying constructs from modern physics to language he explained that:

Discovery of the phonemic principle made a revolution in linguistics comparable to relativity in physics [...] Most linguists unfortunately haven’t had a strong physical science education and don’t realize that phonemics is a *relativity principle*. This is the hard idea to get across to our students; at first they can’t comprehend it, think it is just a matter of different levels of analysis, etc. We let them work along until at last it comes to them as it does from working on interlanguage contrast, when they see it is the only fruitful working hypothesis.

The instrumental records, kymograph tracings etc. reveal a continuum whose fluctuations are not relative to linguistic structure. The more accurate the record the more striking this becomes. Until the phonetic structure of a language is already known from “learning the language” from phonemic analytic techniques, it cannot be extracted from a purely instrumental record. After it is known by such means, the instrumental record becomes immediately enlightening as to the physical events involved in each linguistic unit. The various maxima and minima in the instrumental record are in no necessary correspondence with the “speech sounds”. The situation is not that of a melody which may be transposed in pitch and still give a similar instrumental curve. Or, in other words, the linguistic structure and the structure of the acoustic record are non-isomorphic. [...]

There are to be sure, smaller phonetic units than phonemes; that is what fools people. But they are also relativistic and are merely sub-alternates subsumed under the main structural alternants, the phonemes. The older name “positional variant”⁹ gives a good idea of these [...] Objectively, acoustically, and physiologically the allophones of [a] phoneme may be extremely unlike, hence the impossibility of determining purely instrumentally what is what. *You always have to keep “the observer” in the picture.*

What linguistic pattern makes like is like, what it makes unlike is unlike. (Whorf 1940j:1-2; original underlining; my italics)

The notion of keeping the observer in the picture is, of course, fundamental to Einstein’s physical theory of relativity and is a matter we will look at more closely later. The relativity of any psychologically salient “entity” which fits into a socially (and therefore historically) generated and sustained system that makes sense to members of a community was also made explicit by Sapir, who compared phonemic theory with musical theory saying that:

Even the most resplendent and dynamic symphony is built up of tangibly distinct musical entities or notes which, in the physical world, flow into each other in an indefinite continuum but which, in the world of aesthetic composition and appreciation, are definitely bounded off against each other, so that they may enter into an intricate mathematics of significant relationships. (Sapir 1933a:8)

Whorf emphasized that the points in any internalized system are also indeterminate as well as relativistic, saying that:

⁹ Darnell (1995:p.c.) has commented that “Boas had been talking about ‘alternating sounds’ since 1888, but he failed to theorize the positioning of sounds from the native language within the overall language specific pattern”.

The mathematical sciences require exact measurement, but what linguistics require is, rather, exact “patternment” — an exactness of relation irrespective of dimension. [...] linguistics has developed techniques which, like compasses, enable it without any true measurement at all to specify EXACTLY the patterns with which it is concerned. Or I might perhaps liken the case to the state of affairs within the atom, where also entities appear to alternate from configuration to configuration rather than to move in terms of measurable positions. As alternants, quantum phenomena must be treated by a method of analysis *that substitutes a point in a pattern under a set of conditions for a point in a pattern under another set of conditions — a method similar to that used in analysis of linguistic phenomena.* (Whorf 1940d[LTR]:231; my emphasis)

This emphasis on the relativistic and indeterminate character of linguistic entities is also helpful in understanding Hockett’s resonance theory. Remarking that it had taken him “fifty years to understand” what Sapir (1925:33-35) meant in differentiating between the ‘wh’ of a speech sound and what can be a physically identical sound made in the act of blowing out a candle, Hockett explains that the speech sound “retains, even in isolation, its tiny residue of the meaningfulness of all the English speech in which it has been heard” (Hockett 1987:95). In this theory, resonances are connections set off in the internalized linguistic system of a person by features of heard utterances. These resonances are activated for hearers by elements of utterances which are similar to memory traces of what has been heard previously. People’s internalized systems are thus accumulations of their entire linguistic experience, organized into patterns of interrelationship on the basis of similarities and differences between elements of utterances. It is this internalized system which enables them to understand the speech they hear and also to produce utterances which may be understood by others in speech communities they are part of.

Whilst the points in the pattern model and resonance theory are both essentially holistic and relativistic in conception, the focus in Hockett’s theory is the more explicitly dynamic. For instance he stresses that

every heard utterance must to at least some slight extent restructure the balance among the hearer’s points of potential resonance. Such restructuring is not part of the meaning of the utterance, but it does affect how subsequent utterances will be interpreted. (Hockett 1987:91)

This notion of an internalized linguistic system as a relatively steady state rather than a static system is implicit also in what Sapir and Whorf wrote but is not as clearly articulated there as by Hockett. The idea that the system changes

constantly without moving too far out of alignment with the internalized systems of other participants in a speech community is also explicitly developed by Hockett. Both these notions have particular relevance to the question of language acquisition and are implicit in much of the discussion on interlanguage in second language acquisition research literature. Their relevance to first language acquisition also warrants more focused investigation than has been common to date.

Perhaps the most revolutionary difference from his predecessors however, is Hockett's idea that "potentially resonance-triggering features of utterances" (p.89) may be of any size as long as they are recurrent in presented linguistic data. Hockett has abandoned the notion of morphemes as "minimum meaningful pieces" (p.94) of linguistic organization, an idea which has long held unquestioned sway in linguistic science, and in doing so offers linguists an escape from the conceptual constraint of the traditional paradigm. He argues that, as every morpheme can be thought of as an "idiom, we can discard the notion of morpheme and just acknowledge that idioms come in various sizes" some "tiny and compact" and others much larger. Some may be reducible to combinations of smaller meaningful pieces and some may not. He suggests that we "recognize that ALL the effect of a heard utterance is a function of associations between things in it and things the hearer has experienced before" (p.87). Similarly, all the effect of a point in Sapir's model is a function of its relationships to the whole network of associations set up by accumulated experience, as well as being a function the relational proportions between the points in the system themselves.

Hockett has also seriously questioned the legitimacy of "a phraseology of LEVELS" calling it 'the transducer fallacy' and saying that it "has now been molding our discussions of language design for half a century or more" (p.84). He points out that the "focus of the fallacy, is the insistence on processing in SERIES" and proposes "instead, that the listener may operate on the incoming signal in several ways at once, in PARALLEL" (p.85), a comment very much in keeping with recent trends in other cognitive sciences. This is not the place to go into a detailed analysis of Hockett's arguments in support of his claims; they are subtle and require careful study. Nor can all the ramifications of his theory be fully explored here although some will be referred to again as they bear on Whorf's ideas. Lee (1992a) is a brief review which might be of interest although nothing can replace serious study of Hockett's book.

The important thing to notice at this stage is that a resonance theory of linguistic morphology as Hockett has outlined it is systemic in a different way from mechanistic systems thinking. It is holistic rather than componential, characterized by complex connectivity and associational activity rather than notions of

rule following and sequentiality. An internalized system of this kind is genuinely generative of patterned linguistic behavior as a function of its mode of operation, of which more below. It is also the means by which we can understand linguistic events, whether produced by ourselves or others. The construct also provides a theoretical framework, as its Sapirean and Whorfian precursors did, for studying linguistic activity as an open rather than a closed system. Hockett has argued throughout his career, and in his (1968) challenge to Chomsky in particular, that human language does not constitute a 'well-formed' system like the ones we are able to devise through its use, i.e., in mathematics. Rather, our capacity to language is an open, ever changing, dynamic human function, productive of diverse behavior full of apparent anomalies if studied from an algorithm based perspective. An adequate linguistic science must ultimately cater for these features as well as those more amenable to traditional description and explanation.

To summarize, whilst it is well known that Sapir introduced the notion of the phoneme into linguistics, the implications of his insights and Whorf's and Hockett's elaborations of them are more far reaching than is usually acknowledged and suggest starting points for a shift in analytical perspective which constitutes a significant counterbalance to trends which have prevailed in recent decades. In the next section we look more closely at Whorf's ideas about the mode of operation which might be attributed to an internalized system of the points in the pattern/resonance theory kind. Before doing so however, it may be useful to briefly review the nature of holographic and connectionist research which has taken place during the last half century and which, in terms of what I think of as 'conceptual mode', bears such interesting affinities with the earlier work.

Ways of talking about cognitive behavior which use holographic metaphor have been developed on the basis of original work in mathematics in 1946 by Dennis Gabor (1900–1979) and subsequent developments. The three dimensional image production technique (holography and the production of holograms) which became technically possible as a result of the invention of lasers has since caught the popular imagination. In this technology any part of the plate on which an image has been stored can be used to reconstruct the image as a whole. What results is a less well defined, but otherwise complete, image because information about all parts of the image is stored in a distributed fashion in all parts of the plate. The idea that *the part contains the whole* (a commonplace in much traditional Asian philosophy) is also, therefore, a feature of discourse which uses holographic metaphor. According to Patricia S. Churchland (1989: 407–408) the suggestion "that the brain's information storage is holographic" was first made by P. J. Van Heerden in 1963. Although Churchland emphasizes

that “the brain is *like* a hologram inasmuch as information appears to be distributed over collections of neurons” (original emphasis) she considers that “the holographic idea did not really manage to explain storage and retrieval phenomena”. Its value as a “metaphor did, nonetheless, inspire research in parallel modelling of brain function”.

The notion that information from the environment may be cognitively stored either in a distributed fashion across a range of neurological structures or in common vectors constituted by neural operations has been explored via computer modelling. One example, which referred back to a theory of memory developed by David Hartley (1705–1757) “in which the mechanism for associative encoding consisted of the overlapping of the ‘vibrations’ produced by contiguously presented events” explored the possibility that “holographic and neurological models of memory which use the encoding and retrieval operations of convolution and correlation” are involved in human memory processes of associative encoding and retrieval (Metcalf & Murdock (1981:161). The investigators explained that: “Convolution and correlation allow the possibility that memory traces may be both distributed and cumulative, that is, they may share the same neural sub-strate”.

Further work by Janet Metcalfe (Metcalf & Eich 1982:627) was aimed at addressing “the question of how people associate two ideas and store the association in memory in such a way that at some later time, when only one of the ideas is available, they may use that idea to recreate or retrieve the other”. Again operations of convolution and correlation were used to associate sets of features, the associations being “stored by being superimposed in a composite memory trace”. In a theoretical elaboration on this work Murdock (1982) explained as a “wholistic view” that: “Associative memory could occur without any localized storage of individual items at all” (p.609) and that information could be “represented by random vectors [...] of attributes” (p.610). In 1985 Metcalfe & Eich reported additional investigations involving her “composite holographic associative recall model” (CHARM). These addressed the question of changes or transformations which occur interactively in connection with stored information. In this work, retrieval of convolved items of information was interpreted as bringing items forth which were not identical to any particular input item but which, instead, embodied a coalescence of features of many input items — output, in other words, in a sense contained the whole.

In earlier work, Miriam L. Yeavick (1975) had followed up the idea that “neural holograms enter as units in the thought process” (p.197). She was “motivated to search for a language of patterns as a model of associative thought, based on the logic of holographic processes”. In the course of her mathematical investigations she identified “holographic filtering” and “holographic associa-

tion” respectively as examples of “primitive operations and logical primitives (relations, concepts) implicit in the holographic process” (p.198). She concluded that “a language of thought in which holographic operations enter as primitives is essentially different from one in which the same operations are carried out sequentially and hence over a finite time span” and that there may be “a language of patterns based on holographic processes” which “utilizes the associative properties of holograms in ‘one shot’”. She examined “some potentially distinctive aspects of a holographic logic [...] such as holographic identity (directly related to randomness), equality, containment and ‘association’” and speculated “on the potential relation of holographic association to the, as yet unclarified notion of ‘connotation’ in logic” (p.212). Her analysis was particularly interesting because she ventured, like Whorf, to speculate about more complex cognitive operations than the recall and recognition functions which psychologists have tended to concentrate on in work purporting to deal with Whorf’s ideas.

Bohm’s (1980) theories about holographic organization of the universe at large mentioned earlier provide some useful terminology. In an application of holographic thinking to philosophical conjecture he described the manifold of existence as an ‘implicate order’ in which all that is, is ‘enfolded’ or inchoate. He conceptualized this order as having the capacity to precipitate the ‘explicate’ order of manifest existence; the world of objective entities and events that we are able to conceptualize and otherwise experience, into manifestation through processes which involve ‘unfolding’ of what is implicate. Although interest in Bohm’s ideas seems to have waned in recent years, perhaps through oversimplification and popularization in some quarters, the style of thought facilitated by the terminology is worth reconsidering in relation to Whorf’s thinking and I will use it from time to time in this book.

The study of nonlocalized information storage is also a feature of connectionist investigation which involves simulating neurological operations by the use of network models and parallel distributed processing. Discussing recent investigations P. S. Churchland & Terry Sejnowski (1989) claim that the results can “yield clues to how the nervous system can embody models of various domains of the world” (p.245) and in doing so “free us from the bonds of the intuitive conceptions of representations as language-like and computation as logic-like” (p.248). Bechtel (1990:245) explains that: “In connectionist programs, the contributions of the components are minimized and the behavior of the system results more from the interaction of the components than the behavior of the components themselves.” This is the same kind of holism that Mandelbaum identified in Sapir’s writing on human behavior and which is also evident in Whorf’s work.

Paul M. Churchland has argued that since the kind of “knowledge” or “understanding” that computer modelled connectionist systems come to have does not need to be explained in “symbolic” or “sentential” terms:

An individual’s overall theory-of-the-world, we might venture, is not a large collection or a long list of stored symbolic items. Rather, it is a specific point in that individual’s synaptic weight space. It is a configuration of connection weights, a configuration which partitions the system’s activation-vector space(s) into useful divisions and subdivisions relative to the inputs typically fed the system. *Useful* here means ‘tends to minimize the error messages’. (Churchland 1990:217; original emphasis)

Although an immense amount of connectionist research is currently under way and much of it is directly pertinent to questions of interest to linguistic science it will not be explored further here. William Bechtel & Adele Abrahamsen (1991) provide a comprehensive introduction to this burgeoning field of research while William F. Allman (1989) offers a breezy journalistic account of the turmoil in cognitive science brought about by threats to the dominant paradigm during the 1980s. My purpose in the previous few paragraphs has simply been to alert readers unfamiliar with this field to the general nature of the current work and a few of the concepts involved so that affinities with some of Whorf’s ideas can be better appreciated. The field of cognitive science is growing so rapidly that an introduction of the kind offered above cannot hope to do justice to the complexities involved and is not intended to do so.

2.3 *Emergent from a field of causes*

We have seen how in his flowered wall analogy Whorf described language as a complex of interpenetrating systems. Although his conception involves a hierarchy of orders, it differs fundamentally from more conventional explanations which describe language in terms of a range of separate and serially connected levels interlinked by transformational processes of some kind, i.e. from the ‘transducer’ model. When we study Whorf’s discussions of neurolinguistic organization closely it is fascinating to see how unconventional his insights were in the context of the behaviorism of his day. Talking about the linguistic processes which facilitate communication he said, for instance:

Sense or meaning does not result from words or morphemes but from patterned relations between words or morphemes. Isolations of a morpheme, like “John!” or “Come!” are themselves patterns or formulas of a highly specialized type, not bare units. Words or morphemes are motor reactions,

but the factors of linkage BETWEEN words and morphemes, which make up the categories and patterns in which linguistic meaning dwells, are not motor reactions; they correspond to neural processes and linkages of a NON-MOTOR type, silent, invisible, and individually unobservable. It is not words mumbled, but RAPPORT between words, which enables them to work together at all to any semantic result. It is this *rapport* that constitutes the real essence of thought insofar as it is linguistic [...] The non-motor processes that are the essential thing are, of their nature, in a *state of linkage according to the structure of a particular language, and activations of these processes and linkages in any way, with, without, or aside from laryngeal behavior, in the forefront of consciousness, or in what has been called "the deep well of cerebration," are all linguistic patterning operations, and all entitled to be called thinking.* (Whorf 1937c [LTR]:67-68; my italics)

With regard to this neurolinguistic state, and it is important to remember that very little was known about neurolinguistics at the time, Whorf added that:

The pronounced materialist may still be granted leave to regard this matrix of relations as consisting of paths and chains of brain cells or what-not which link and relate themselves by physicochemical processes, but no clue to the nature of the RAPPORT, *the structure of the matrix relations*, can be obtained in this way, any more than the social organization of a tribe could be worked out from the blood groups of the individuals. (Whorf 1937c [LTR]:67n; my italics)

Whorf's linguistic 'state of rapport' does not seem very different in principle from the 'weight space' of connectionist theory. He also said that "the mere bare RELATIONS do not correspond to any verbalized concepts but nevertheless govern absolutely the linkages of morphemes and shape the channels of thinking" (p.67n). These comments were written for private circulation among his colleagues. In his final article for theosophists he gave additional details which clarify how he conceptualized the linguistically engendered "structure of the matrix relations". He drew this time on his readers' familiarity with Hindu and Buddhist notions of the power of Mantric Yoga, a practice which he said involves ordinary mantra (sacred words or syllables repeated for spiritual effects) taking on "a different, a very intellectual meaning" where

the mantram becomes a manifold of conscious patterns, contrived to assist the consciousness into the noumenal pattern world — whereupon it is "in the driver's seat." It can then SET the human organism to transmit,

control, and amplify a thousandfold forces which that organism normally transmits only at unobservably low intensities.

[...] mantric formula-language is specialized [...] to make available a different type of force manifestation, *by repatterning states in the nervous system and glands — or rather in the subtle ‘electronic’ or ‘etheric’ forces in and around those physical bodies.* Those parts of the organism, until such strategic patterning has been effected, are merely “innocent gadgets,” as incapable of dynamic power as loose magnets or loose wires but **IN THE PROPER PATTERN** they are something else again — not to be understood from the properties of the unpatterned parts, and *able to amplify and activate latent forces.*

In this way I would link the subtle Eastern ideas of the mantric and yogic use of language with the configurative or pattern aspect which is so basic to language. (Whorf 1941b [LTR]:249-250; my italics).

Whorf’s final comment in these quotations makes it clear that his esoteric example was intended to illuminate (by extension) the activity of ordinary language in cognition. Thus the relatively steady cognitive state of linkage or rapport of a person who knows a language may be thought of as being something like an electrical or magnetic field established in and around the physical structures of the human body which are involved in speaking and thinking. His inclusion of organs other than the nervous system (e.g. glands) is particularly interesting because it seems to be an attempt to allow for a linguistic patterning of emotion along with that of thinking, something which certainly needs further research in the light of improved knowledge of the endocrinal system today.

Whorf also likens the human mind/brain to a radio station or power plant, again using imagery very different indeed from componential metaphor. He argues that just as a radio station, through the use of a “mathematical formula [...] makes feasible an adjustment of matter to a very strategic configuration, one which makes possible an unusual manifestation of force” allowing it to “project music to a far country”, so modifications which occur in the course of acquiring language modify the human brain to allow augmentation of its power. In the case of a power plant he points out that different formulas

make possible the strategic arrangement of magnets and wires [...] so that, when the magnets (or rather the field of subtle forces, in and around the magnets) are set in motion, force is manifested in the way we call an electric current. (Whorf 1941b [LTR]:249-250)

What we have here is a field theory of neurolinguistic or cognitive organization. In this context we might be curious about the status of the linguistic elements (phonemes, morphemes, words, etc) we have become used to thinking of

as small components stored as items awaiting retrieval and use in strings of such items representing various discrete classes of components which together make up language in the mechanistic model. In dealing with this problem, Whorf combined his physics and knowledge of Eastern philosophy to argue for the indeterminate (or, to use Bohm's terminology, implicate) nature of linguistic elements when not actually manifest in discourse or active thought. He explained that:

Just as language consists of discrete lexation-segmentation (*Nama-Rupa*) and ordered patternment, of which the latter has the more background character, less obvious but more infrangible and universal, so the physical world may be an aggregate of quasi-distinct entities (atoms, crystals, living organisms, planets, stars, etc.) not fully understandable as such, but rather *emergent from a field of causes* that is itself a *manifold of pattern and order*. It is upon the bars of the fence, beyond which it would meet these CHARACTERS OF THE FIELD, that science is now poised. As physics explores into the intra-atomic phenomena, the discrete physical forms are more and more dissolved into *relations of pure patternment*. The PLACE of an apparent entity, an electron for example, becomes indefinite, interrupted; the entity appears and disappears from one structural position to another structural position, like a phoneme *or any other patterned linguistic entity*, and may be said to be NOWHERE in between the positions. Its locus, first thought of and analyzed as a continuous variable, becomes on closer scrutiny a mere alternation; *situations "actualize" it*, structure beyond the probe of the measuring rod governs it; three-dimensional shape there is none, instead — "Arupa". (Whorf 1941b[LTR]:269; my italics)

In this statement, which we will come back to in a later chapter, we may see more subtle and interesting implications than are usually accorded Bloomfield's famous definition of "the *meaning* of a linguistic form as the situation in which the speaker utters it and the response which it calls forth in the hearer" (Bloomfield 1933:139; original emphasis). The focus at the moment, however, is on Whorf's point that any "patterned linguistic entity" is indeterminate, being brought into objective status only when actualized in situations. Otherwise it exists only as a potential function of a set of patterned relationships — something implicit, enfolded within the implicate order of existence and awaiting manifestation or precipitation into the explicate order.

The notion that such 'entities' are "emergent from a field of causes" is similar in some respects to an earlier comment about "the patterned 'potentials of

linkage’¹⁰ which ramify” isolated words “and connect them with complex patterns of linguistic phenomena” (Whorf 1937c[LTR]:67n) but there is a subtle conceptual difference between the two statements. In both the 1941 and 1937 remarks linguistic entities were evidently conceived as functions of extensive internalized linkages but in the 1941 statement the implicit nature of an entity’s existential status when not actually operationalized as an objective occurrent in time and space is clear. In 1937 the matrix of interconnections which gives meaningful identity to a word seems to have been conceived as a network of linkages within which we might be tempted to think of the word as having a particular location. The ‘potentials of linkage’ which Whorf imagined as branching out from each word, are presumably what Hockett has called ‘valences’¹¹ when he said that linguistic forms have “a set of different KINDS of potential ties to accompanying forms” (Hockett 1987:111). For example:

Transitive verbs like *abandon* or *sing* have a valence for an actor, in addition to which the former has a strong (compulsory) valence for a goal, the latter a much weaker (optional one); an intransitive verb like *rejoice* has only a valence for an actor. *Look* and *listen* have no goal valence, but their grammatical fields include the fact that they can be “transitivized,” the former with *at*, the latter with *to*. When the hearer hears a word, its valences are activated, and it is by virtue of them that the hearer is able to supply the structure-in-depth. (Hockett 1987:111; original emphases)

In an earlier terminology which emphasized the dynamism which can be attributed to these connections, Hockett (1958:248) gave the example of the Chinese morpheme *kai*, saying that it “has a ‘positive’ valence of a special directive kind; it seeks something in the context to seize on as its object”. This seeking may be met by grammatical requirements of the linguistic context. Sometimes, however, “the valence of that morpheme reaches into the non-speech environment” (p.249). He continued:

It is as though the whole network of structural relationships between forms, overlapping sometimes into the non-speech context, constituted a complex intertwining of various kinds of valences, only one layer of which is

¹⁰ ‘potentials of linkage’. This phrase, which Whorf put in quotation marks without indicating the source, possibly comes from Sapir but if so, I have not found its location. Note however, the affinity of Hockett’s 1948 use of the term ‘synaptic potentials’ on page 189.

¹¹ Hockett (1987:159n) has explained that when he introduced the term *valence* from chemistry, he thought it was his own idea. He later found it had been used by Lucien Tesnière in 1953 and 1959 in a way which anticipated his own use. A useful introduction to valency grammar is the 1995 review by David J. Allerton.

immediately apparent to the analyst. This most apparent layer constitutes, we shall say, *surface grammar*. Beneath it lie various layers of *deep grammar*, which have much to do with how we speak and understand but which are still largely unexplored, in any systematic way, by grammarians. (Hockett 1958:249; original emphases)

Although the term ‘deep grammar’ came to have a different, more static and architectural rather than organismic set of connotations when Chomsky (1965) began to refer to ‘deep structure’, and although it is somewhat different again from Hockett’s present ‘structure-in-depth’ which replaced it, this early use is interesting since it spreads a word’s ramifications into the speech situation at large, which includes linguistic context but is not limited by it. His interpenetratively layered and intertwining “network of structural relationships” is also reminiscent of Whorf’s patterned wall analogy. In each case the matrix of relations which supports linguistic phenomena is conceived as multidimensional, spreading beyond what has traditionally been regarded as the domain of language into the rest of a person’s environment. The complexity of surface to depth relationships was also acknowledged by Ludwig J. Wittgenstein (1889–1951) as Ranjit Chatterjee (1985:45) points out, arguing that “Whorf and Wittgenstein agree on a usage corresponding to the latter’s ‘depth grammar’”. Wittgenstein’s remarks are as follows:

664. In the use of words one might distinguish ‘surface grammar’ from ‘depth grammar’. What immediately impresses itself upon us about the use of a word is the way it is used in the construction of the sentence, the part of its use — one might say — that can be taken in by the ear. — And now compare the depth grammar, say of the word “to mean”, with what its surface grammar would lead us to suspect. No wonder we find it difficult to know our way about. (Wittgenstein 1958:168e)

Notice that the ramifications in focus in all these formulations are semantic, whether or not they are articulated by what have traditionally been regarded as formal grammatical processes.

The network concept found in Sapir’s, Whorf’s, and Hockett’s descriptions of internalized organization has been elaborated in resonance theory in terms of ‘resonance channels’ (Hockett 1987:111) and in terms of the notion of words lying on a ‘search path’ (p.93) (a term about which Hockett (1990, p.c.) has subsequently expressed doubts). Whorf also wrote of “the channels in which [...] talking and thinking run” (1940d[LTR]:222) and, as we will see below, Sapir wrote of ‘grooves’ in relation to thinking and language. The notion of search paths is also utilized in some network models of cognitive processing.

Hockett (1987:112), however, emphasizes that: “Hearing and speaking involve more than just searching through vocabulary. As hearers we also construe; as speakers [...] we also select and assemble.” He also clarifies that

the linearity of speech itself does not obviously imply comparable linearity either in the processing of heard speech by a receiver [...] or in the internal preparation by a transmitter of what is to be said. [...] Reasoning in words, like anything else in words, has to be linear, but that need imply no linear constraint on reasonable THINKING. (Hockett 1987:135n)

These remarks are clearly harmonious with Whorf’s (1937c[LTR]:67n) insistence that “the structure of the matrix relations” which support linguistic thinking and its expression in communicative activity is a different matter from “the paths and chains of brain cells or what-not which link and relate themselves by physicochemical processes”.

How then may we conceptualize the emergence of perceivable i.e. objective, or manifest, entities from the complex matrix of connections which form their substrate? Whorf’s concept of entities “emergent from a field of causes” is similar to a concept in S matrix theory which, according to Capra (1975:274), was originally proposed by Werner K. Heisenberg (1901–1976) in 1943, although it has been further developed since. In this theory, which brings elements of relativity and quantum theory together and in which the subatomic particles (hadrons) are regarded as “intermediate states in a network of reactions” (p.284) or ‘events’ rather than ‘objects’, the notion of ‘singularities’ (foci of energy) is important. A singularity is an abrupt change in the mathematical structure of the S matrix at values where the ‘resonance energies’ of atomic particles are such that “the creation of a new particle becomes possible” (p.291). This notion of the accumulative causal impetus of resonance activity is rather different from more ordinary ways in which we think about causality, but is by no means new with its focus on the transience and change. Capra argues at some length that the perspective of modern physics which sees “change and transformation as the *priary* aspect of nature, and [...] the structures and symmetries generated by the changes as secondary” (p.299) has much in common with ancient Chinese thought as revealed, for instance, in the *I Ching* or *Book of Changes*.

It seems that in S matrix theory, existential microelements are thought of as being precipitated into existence (or actualized) through intensification of resonances in primary elemental flux — Whorf’s cosmic patternment. The intensification concept in S matrix theory seems similar to the one he outlined above in connection with the emergence of electrons and phonemes. This is not surprising given his understanding of modern physics although he could not have

known of Heisenberg's formulation since he died before it was put forward. For Whorf the notion was applicable to any experiential "quasidistinct" entity — "crystals, living organisms, planets" etc — which might be actualized out of patternment into manifest existence. Concepts too might be regarded (when active) as context appropriate precipitants from a state of potentiality rather than as entities which retain independent integrity and structure even in uncontextualized storage. Or, as Turner (1991:45) argues in the process of stressing that "concepts are not different from thought":

Thought is an activated pattern in the brain, and a concept is an activated pattern inhering in thought. We do not have a given concept except when its pattern is active in thought. What we have instead is a latent capacity for the pattern to be activated. Concepts are active, dynamic devices in the brain that compete with each other to become active in the attempt to make sense of things. Concepts are themselves thoughts. They do not structure thoughts in the way a mold structures clay or wax. They are rather a feature of thought.

An interesting insight, not only into Whorf's understanding of the productive power of patternment but also into distinctions he made between helpful and unhelpful mentalism, is found in a response to Charles C. Hibben who had asked for an evaluation of a paper he had written. Whorf explained that the method his correspondent had been using to try to decipher Maya was inherently flawed although it seemed to be a matter of "common sense". He clarified, saying:

It is "mentalistic", in the sense in which that term is now being somewhat used by linguists, a term which I don't like to see used as a term of abuse, for I think that all language is of mental nature; nevertheless they mean by it something which is definitely wrong or confusing in a great deal of our traditional thinking, which linguists were among the first to observe, and are constantly in a position to observe. It means *not sufficiently configurative, not alive to the significance of formal patterns and automatic phenomena occasioned*, not by the reasons that officially pass current, but *by the large systemic wholes they are part of*. For such insight into linguistic patterning "mentalism" tries to substitute the bogus coin of emphasis upon "ideas". Hence the old method [of deciphering Maya] analyses writings not enough by their linguistic patterns and too much by discussing the "ideas" which they are supposed to "convey". It is largely based on logomachy over such terms and concepts as "ideographic", "phonetic", "pictographic", etc. It talks as if it were able to see what people think when using a system of writing, and to argue from that as to

what they read from the writing. (Whorf 1940h:2; my italics; original underlining)

In the light of further developments in linguistic science since Whorf I think we can take it that the “formal patterns and automatic phenomena” include not only the phonemic, morphological, and syntactic, patterns which might come to mind most easily, but also semantic phenomena, including large scale patterns of imagery of the kind Lakoff & Johnson (1980), Lakoff (1987), Johnson (1987), Sweetser (1990), and others have investigated.

The power to precipitate entities into existence which Whorf attributed to patternment may be clarified further by considering his use of the term ‘manifold’. Whilst a manifold in ordinary use may be anything having varied forms, parts, or features, its mathematical meaning seems to be particularly pertinent to what he said and links the points in the pattern concept with holographic thinking. In the context of the use of tensor calculus in relativity theory a manifold is explained as follows:

The fundamental notion is that of a geometrical point which is defined, as in elementary analytical geometry, by means of its coordinates [...] All the points which together constitute the plane are said to form a *two-dimensional manifold* of points, the number of dimensions of the manifold being equal to the number of independent co-ordinates required to specify a point in it. Ordinary three-dimensional Euclidean space forms a three-dimensional manifold of points, each point requiring three coordinates to specify it completely. Generalizing these ideas, an *n-dimensional manifold* of points is one for which n independent *real* numbers ($x^1, x^2, x^3, \dots, x^n$) are required to specify every point completely. These n numbers are denoted collectively by (x) and are called coordinates of the point. The manifold is, for the moment, assumed to have no structure except that it is continuous in the sense that, in the neighbourhood of every point (x) , there are other points whose coordinates differ infinitesimally from those of (x) . [...]

The coordinates of a point are essentially a means of describing the point that is invented by the investigator. (McVittie 1965:10; original emphases)

Whorf’s “manifold of pattern and order” is also an n -dimensional realm since he contrasts it explicitly with the three dimensional world of “shape and form” and refers to it as a ‘hyperspace’. There are two important points to notice about the concept. The first is the notion that an n -dimensional manifold is continuous in the way Bohm wrote about the enfolded order. The second is the idea that the coordinates of an entity are essentially the outcome of methodological decisions made by an investigator. This notion is also applicable, perhaps metaphorically,

to decisions by linguists to designate certain features of their data as entities which may be described within a reference framework and to leave others unaccounted for.

Perhaps the most important feature of the holistic logic which informs Whorf's theorizing is the genuine generativeness attributed to the socially acquired internalized linguistic system. This contrasts with the use of 'generative' in the transformational generative paradigm to mean 'explicit' (Chomsky 1965:4-9, 1986:3). Points in the pattern and resonance theory provide an alternative basis for attempting to explain the consistent, creative, and socially acceptable production of linguistic behavior, regarding it as a function of the projective capacity of the matrix of physiologically entrenched neurolinguistic patterning acquired in the course of social interaction. Creative linguistic behavior includes the interpretive activity of hearers who are able to make sense of utterances they have never heard before and also our ability to produce unique utterances appropriate to the contingencies of new situations.

While both senses of 'generative' are concerned with the productive or creative potential of a person's foundational knowledge of language, the Chomskyan paradigm has always focused on the production of an infinite number of 'well formed sentences' through the operation of sets of rules or principles which are regarded as both discoverable and definable. The logic involved is formal and mathematical. It is also somewhat circular in that utterances which are both acceptable and understandable but not necessarily definable as 'sentences' or 'well formed' according to the rules may be regarded as irrelevant for purposes of analysis. Points in the pattern/resonance theory attempts to explain (in the way Hockett has always insisted is necessary for a mature linguistic science) how *all* the data of communicative interaction are generated on the basis of accumulated linguistic experience and its impresses in the mind/brain. Different conceptions of language based on different kinds of metaphors are needed in a system of thinking where notions of mental 'mechanisms' and 'operations' upon static 'structures' have little role to play.

To review the nature of the theory outlined in this chapter then, firstly each point in the abstract pattern or matrix of connections which makes up the linguistic system is conceived as operating as a function of, and being characterized by, the totality of connections in which it is embedded and which enables it to exist. This approach is quite different from any componential or feature analysis. Feature analysis in any field of enquiry where it has been used allows researchers to define things by lists of attributes which are thought of as being distinctively characteristic of those things. Individual items or units of experience thus identified are thought of as contributing to the overall functioning of larger entities or events by virtue of their role as specialized components with distinctive

functions. Frequently the overall organization of the larger entity or mechanism is conceptualized as being a function of the application of rules or principles to the various parts, bringing them into operational interrelationship in the process. Such analysis backgrounds or ignores the relational embeddedness of components in the system as a whole and their status as “quasidistinct entities [...] not fully understandable as such”, to recall Whorf’s characterization.

It should perhaps be pointed out that the term ‘matrix’ used in connection with two dimensional arrays of items is quite different from the Sapir-Whorf use of the term which draws on biological and geological notions of a generative organ or substrate which is productive of phenomena unique to itself. Whorf as we saw earlier, wrote of a matrix of relations entrenched neurologically as “the categories and patterns in which linguistic meaning dwells”. That this concept is a generative and holistic one has been demonstrated above. Whorf was a supporter of ‘organismic thinking’ (as a certain kind of holism was called in his day) and hoped that it might reveal “new laws of thought and nature [...] and provide the necessary intellectual tool for future science in its onward march into the unknown” (1941e:12). Sapir also used the term ‘matrix’ in its natural science sense when he explained that in the study of culture it is not always appreciated that

behavior is not a recomposition of abstracted patterns, each of which can be more or less successfully studied as a historically continuous and geographically distributed entity in itself, but the very matrix out of which the abstractions have been made in the first place. (Sapir 1934[SW]:594)

Sapir called the productive or generative capacity of internalized systems of behavior ‘projective’ in line with psychoanalytic theories about the operation of unconscious processes in human behavior. Although his explicit references to projection (whether in connection with the perception of speech sounds or the apprehension of other socially meaningful behavior) were to the ways in which we *interpret* social phenomena by projecting our own patterns of comprehension unconsciously upon them in the process of trying to extrapolate meaning from them, it was also implicit in what he said that we *produce* socially acceptable behavior (e.g. pronunciation of sounds, constellations of gestures, or understanding of events) as functions of the same internalized systems which allow the interpretive activity. Enfolded or implicate knowledge, in other words, has the capacity to unfold into explicate manifestation. In Whorf’s terms, entities which are indeterminate and indeed “NOWHERE” (Whorf 1941b[LTR]:250) may be actualized or brought into existence by situations out of states of linkage or rapport within which they exist in a potential state.

Although Sapir's and Whorf's ideas were developed in the course of trying to come to terms with the nature of complex human behavior of the kind which is socially generated and sustained (and significantly acquired by individuals in the process of acculturation), in Whorf's discussions at least it is also clear that this type of analysis was used as a tool for thinking about the functioning of the human mind/brain. His way of conceptualizing how linguistic patterning may be neurobiologically entrenched in cognition has remained markedly different from that of most modern discourse about cognitive, including linguistic, processes. Most explanatory modeling in psychology and linguistics has been based on a transfer to the micro world of cognition of common sense understandings about sequential interaction patterns which can be observed in gross relations between objects and beings in the macro world. Although cognitive science has reintroduced cognitive or mental processes involving representations of the world of experience and computational or rule following operations upon these intentional objects in the mind (Haugeland 1978), the fundamental mode of operation attributed to cognition has remained largely grounded in conventional notions of cause and effect with their concomitant reliance on what is often called 'linear' thinking.

Whorf's theorizing gives centrality to patternment and the products it generates, including conceptual activity. As Bechtel (1990) points out, given the efficacy with which pattern recognition can be modelled in connectionist systems which actively attempt to simulate neurological structures, it is worth considering the possibility that "pattern recognition might be an important cognitive capacity" and that "rule-based reasoning processes" may be less paramount in cognition than has generally been imagined (p.263). Bechtel draws specific attention to concepts as one of several examples where this could be the case and the matter is also discussed elsewhere in the connectionist literature.

Turner (1991, 1995) goes further in a tenor somewhat reminiscent of Whorf, stating that: "A human person is patterns of activity in a human brain" and that everything that goes to make up a person, including culture and language and the mind itself is a matter of patterns of activity (1991:30). Turner concerns himself in particular with the bulk of unconscious patterning which constitutes reasoning and compared with which he regards conscious thought as simply a "reduced slice" (p.31).

In the next section we move to a consideration of the concept of 'linguistic thinking' which flows naturally from the way Whorf thought about the patterning of language in brain and which, once again, owes much to Sapir's influence.

2.4 *Linguistic thinking*

James H. Stam (b.1937) has pointed out that: “It is crucial to clarify what is and was meant by the terms ‘thought’ and ‘reality’ as they are said to correlate with language” (p.249) and, reminding us that attention has been given to this question since the 18th century, summarized the main point made by Johann G. Hamann (1730–1788) in 1762 as: “The correlation between language and thought is only as good as the clarity of our explanation of the kind of thought and language we are talking about” (Stam 1980:251). In this section I attempt to clarify the claim that Whorf operated from a notion of *language in cognition* rather than the more conventional assumption that language and thought in all important respects are separate human functions. Whilst the fact of patternment in linguistic phenomena of all kinds is overtly thematic in what he wrote, the other element of the hard core of his theory complex — the notion of linguistic thinking — is more elusive. It is also more theoretically crucial and more controversial. The matter is vital in any reevaluation of his ideas because linguistic thinking, by Whorf’s account, is fundamentally characteristic of human conceptual activity and constitutes what is distinctive about human cognition.

The main problem with most discussion of what Whorf said is that it has been based on assumptions about the nature of language, thought, and even human experience which are different from his. The fundamental difference reduces to a difference of opinion about the role of language in cognition. A traditional approach takes conceptual activity to be largely a matter of ideation independent of language (language being merely a vehicle for the expression of pre-formed notions and primarily a communicative function). No distinction is drawn between simple and complex thinking in this regard. According to this line of argument, what is distinctive about human cognition is what we describe as our superior power of mentation compared with that of other species. We think of complex cognitive processes such as reasoning as being particularly human, but we separate them for theoretical purposes from the linguistic processes in which they are embodied when we communicate our ideas to others. When we record our ideas in writing or other media it may seem self evident that the process of thought has been fixed in a separate medium; we do not generally inquire about the degree to which the fact that we are languaging beings may have predetermined our capacity to generate ideas in forms suited to these media.

Those people who think of language and thought as separate activities usually agree that being able to share ideas through language and having the ability to pass on knowledge from generation to generation through language are both activities which have the capacity to enhance human cognitive power immeasurably. What is being acknowledged in these cases is that human communicative abilities significantly augment human cognitive capacity. Accordingly, the

capacity to talk is generally given central place in descriptions of what it is to be human. Nevertheless, linguistic processes *themselves* have not usually been identified as fundamental to the operation of the kind of cognition which is distinctively human. Even when linguistic activity is regarded as a cognitive function, linguistic processes are generally considered to be adjuncts of mentation rather than in any way constituting the activity of mentation itself.

By contrast with this traditional way of understanding relations between language and thought, Whorf argued that it is the species specific capacity to talk which definitively differentiates what Sapir (1921:218) called “the actual process of thought” in humans from that of other animals. Putting it rather bluntly for his *Technology Review* readers Whorf said that:

There is no need to apologize for speech, the most human of all actions. The beasts may think, but they do not talk. ‘Talk’ OUGHT TO BE a more noble and dignified word than ‘think’. (Whorf 1940a[LTR]:220)

When his writings are taken as a whole it is clear that Whorf considered, as we saw above, that socially generated and sustained patterns of meaning making embodied in different languages become physiologically entrenched in some way in the mind/brain when one learns language. He defined advances in thinking in terms of the capacity to recognize and operate with relationships in a mental or intellectual sense and asserted that such relationships are intrinsically bound up with linguistic processes (Whorf 1937c[LTR]:83-84). Linguistic processes, according to Whorf’s way of thinking about language, are thus cognitive operations at the heart of conceptual activity, whether or not they are also deployed in the communication of meanings.

For Whorf therefore, the linguistic augmentation of cognitive power was not only a function of the way language allows us to share knowledge and build new knowledge on the basis of other people’s experience as well as our own. It was also, in a far more fundamental sense, a function of the acquisition of language itself. Although there is no record of Whorf discussing the process of initial language acquisition in detail (and the study of language acquisition did not come into its own as a major subfield of linguistics until after his death) it is clear that he considered that cognitive elaboration brought about by the incorporation of socially generated and sustained patterns of language use into cognition is the primary sense in which linguistic competence constitutes an augmentation of cognitive power. The fact that Sapir was very much interested in the prelinguistic child in the 1930s (Darnell 1995, p.c.) suggests that it is possible that he and Whorf may have discussed these matters.

The assumption that there are two separable phenomena, one cognitive, and the other of dubious status (often the implication is that language is not a

cognitive process, but rather a purely or at least predominantly communicative or social one) is based in experience and is useful in certain kinds of conjecture. Certainly there are mental processes like remembering, attending, concentrating, and even anticipating which do not seem to be related in a primary way to our languaging ability although linguistic processes may seem to interweave with them, support them, or even direct them at times.

There are also language behaviors which seem to have fundamentally social rather than conceptual ramifications. Examples might include sharing our emotional responses verbally, maintaining phatic contact, disagreeing with another person, asking for something, promising, ordering and so on. Austin's (1955) 'performative verbs' fall into this category. The functional aspects of these speech acts are more noticeable usually than their conceptual underpinnings. When it comes to other social functions like communicating attitudes or expressing ideas the conceptual content and motivation of the act, i.e. its cognitive component, is so central that we need to think about how it is integrated into the speech function. Is it entirely a case of ideas, concepts, or thoughts which exist in some sense quite apart from language being encoded, or contained, in a separate medium (i.e. language) for the purpose of their being communicated? In his explication of the 'conduit metaphor' Michael Reddy (1979) demonstrates cogently that this is the model within which most of us work.

For instance, elaborating on the idea introduced briefly in chapter one that: "Language and our thought grooves are inextricably interrelated, are, in a sense, one and the same" Sapir adds:

As there is nothing to show that there are significant racial differences in the fundamental conformation of thought, it follows that the infinite variability of linguistic form, another name for the infinite variability of the actual process of thought, cannot be an index of such significant racial differences. This is only apparently a paradox. The latent content of all languages is the same — the intuitive *science* of experience. It is the manifest form which is never twice the same, for this form, which we call linguistic morphology, is nothing more nor less than a collective *art* of thought, an art denuded of the irrelevancies of individual sentiment. At last analysis, then, language can no more flow from race as such than can the sonnet form. (Sapir 1921:217-218; original emphases)

His reference to racial differences here is an extension of his inquiry into whether what was thought of at the time as racial or national 'temperament' could be said to operate inherently in language, an inquiry which had held the imaginations of some linguists in the previous century, and which continued to do so into this one. Today his remark can be taken as being similar to questions

of whether there may be individual or cultural differences in the “fundamental conformation of thought”, i.e. in its genetically given configuration. He argued that there are no such differences underpinning language, since what is given is the latent or inherent “content of all languages” which is the same for all and therefore universal and which, by implication, is the same thing as “the fundamental conformation of thought”. This he further identified with “the intuitive science of experience”, contrasting it with “the infinite variability of the actual process of thought” which was in turn identified with “linguistic form” or morphology. Manifest linguistic form does vary from culture to culture and in referring to it as “a collective *art* of thought” it is clear that Sapir regarded it as a socially generated and elaborated feature of human behavior.

Sapir did not, in other words, consider linguistic form to be derived from innately given predilections which become manifest in language development and use in the way Chomsky and others have argued. This does not mean, however, that he thought that nothing innate is elaborated linguistically — that language is a purely social phenomenon with no genetically determined component. On the contrary, his remarks above make it clear that he thought that the “intuitive science of experience” is latent in every language and therefore independent of socialization, predating it ontologically as part of the nonlinguistic input into the process of language acquisition.

We need to ask what “the intuitive science of experience” might be. I suggest that any kind of science can be defined as a conceptual systematization of data. In that case Sapir’s intuitive science would have to be a latent or invariantly available systematization of experiential data. What he referred to as “the fundamental conformation of thought” must therefore be an operation on experiential data which is prelinguistic and inevitable. The “latent content of language” must, accordingly, coincide with the primary organization or configuration of experience. What is fundamental to our discussion at this point however is the way he identified “the actual process of thought” with manifest and variable linguistic form. The actual process of thought, in other words, is the actual process of language, its grammatical processes and semantics.

Sapir (1921:22) also said that “language as a structure, is on its inner face the mold of thought” indicating again the impossibility of separating the one from the other and confirming that they might be considered “in a sense, one and the same” (p.218) or at least “inextricably interrelated” (p.217). It is evident that although he did not absolutely identify “the actual process of thought” with that of language in stating that the ‘grooves’ of language and thought cannot be extricated from each other he was saying in effect that what we separate as language and thought are different operationalizations of essentially the same cognitive phenomenon. He conceptualized language and thought as inter-

penetrative at least, if not one and the same function in cognition, dependent on the same physical basis — their ‘grooves’ or ‘channels’. If something is inextricably interrelated with something else it is intimately and inevitably involved with it at numerous points in a complex set of interrelationships. Simple causal statements about influences (which at their most simplistic are usually conceptualized as operating in one direction at a time) become problematic in such contexts.

What Sapir seems to have been saying is that the activities of speaking and thinking are two expressions of our capacity to language. It is probably important to note that he was not equating cognitive activities like remembering and attending and so on with speech or even with language in general; he was writing about conceptual activity. He made it clear that the kind of thinking he was interested in has to do with concepts and reasoning. For instance he said that his discussions assumed “that the material of language reflects [...] the world of concepts, and, on what I have ventured to call the ‘pre-rational’ plane, of images, which are the raw material of concepts”. Although he did not think “that language moves entirely in the ideational or cognitive sphere” because “the volitional aspect of consciousness also is to some extent explicitly provided for in language” and because emotion is catered for as well (Sapir 1921:38), it is evident that in general, when referring to thought, his references were primarily to conceptual activity. It was the relation of language to this kind of thinking which interested him most, as it did Whorf.

Does this mean that within the parameters of conceptual activity talking and thinking can or should be thought of as being at least potentially isomorphic in some sense? Should Sapir’s ‘grooves’ be conceptualized as internal representations of externalized language, having basically the same form? Commenting on the issue of whether “Silent thinking” is basically “suppressed talking or inaudibly mumbled words or silent laryngeal agitations as some have supposed” Whorf (1937c[LTR]:66-67) said that although it was to the early 20th century psychologist, John B. Watson’s (1878–1958) “great credit” that he had identified “the very large and unrecognized linguistic element in silent thinking”, his mistake had been in “going the whole hog” and supposing “thinking to be entirely linguistic”. Watson, he said, had either not realized, or at least not emphasized “that the linguistic aspect of thinking is not a biologically organized process, ‘speech’ or ‘language,’ but a cultural organization, i.e., *a language*” (p.66n; original emphasis).

What then is the most useful way to take Sapir’s comment when he said that “language and our thought grooves [...] are, in a sense, one and the same” (1921:217-218)? An analogy may be useful to clarify what is at stake here. Ice, water and water vapor are not isomorphic. Their fundamental constitutive

elements, however, remain the same regardless of the form H_2O takes in each manifestation. If language and thought are not isomorphic and yet are essentially the same in a constitutional sense we might ask how those grooves should be conceptualized. Part of the problem is simply Sapir's rather limited repertoire of metaphors through which he could grope for the concepts he sought to articulate. Whorf's ideas about linkage and rapport within the internalized linguistic system carry his mentor's insights further in imagery which is easier for us to relate to today. As we saw earlier, Whorf made it quite clear that he conceptualized the "linguistic patterning operations" which are "all entitled to be called thinking" as physico-chemically entrenched processes and states which might be conveniently described in terms of field theory.

Although unequivocally physicalist in nature, the conceptual subtlety of Whorf's formulations and the modern physics on which they were based stand in marked contrast to behaviorist accounts of language current in his time which relied on a simple mechanist stimulus response model for explanatory purposes. Whorf's ideas may to some degree be regarded as an interesting extension of Vygotsky's although it is not known whether Whorf read Vygotsky. As Lucy & Wertsch (1987) point out however, their common intellectual influences included the writings of Sapir, Watson, and the gestalt psychologists. Vygotsky (1934:84-85) referred to Watson's ideas in an explication of the notion of "inner speech" or "verbal thought" which is somewhat similar to Whorf's ideas about linguistic thinking. Like Whorf, he considered that Watson had "hit on the right methodological approach" (p.85) in concluding that "speech is interiorized psychologically" and, again like Whorf, he believed that this interiorization is physical (p.86) and that 'inner speech' is non-isomorphic with spoken language, the point on which they both disagreed with Watson.

Like Sapir and Whorf, Vygotsky imagined the realms of thought and speech as interpenetrating or overlapping without necessarily coinciding. He said that:

Schematically, we may imagine thought and speech as two intersecting circles. In their overlapping parts, thought and speech coincide to produce what is called verbal thought. Verbal thought, however, does not by any means include all of thought or all forms of speech. There is a vast area of thought that has no direct relation to speech. The thinking manifested in the use of tools belongs in this area, as does practical intellect in general. (Vygotsky 1934:88)

It was Vygotsky's opinion that

inner speech develops through a slow accumulation of functional and structural changes, that it branches off from the child's external speech

simultaneously with the differentiation of the social and the egocentric functions of speech, and finally that the speech structures mastered by the child become the basic structures of his thinking. (Vygotsky 1934:94)

This means that: “Thought development is determined by language, i.e., by the linguistic tools of thought and by the sociocultural experience of the child” (p.94). He concluded that: “The problem of thought and language thus extends beyond the limits of natural science and becomes the focal problem of historical human psychology, i.e., of social psychology” (p.95). In bringing history and psychology together Vygotsky was expressing a position similar to the Boasian stance on the matter with which Whorf would have been familiar. As Ruqaiya Hasan (b.1931) points out, Vygotsky’s insights also mean that: “The structure of language and the function of language are two sides of the same coin” (Hasan 1987:120). And, as Michael A. K. Halliday (b.1925) emphasizes, when these are separated for analytical purposes there is always the risk that what will be studied may bear “little relation to what people actually write — and still less to what they actually say” (1985:xxviii). Vygotsky’s focus on the developmental aspects of the “social origins of uniquely human higher mental functioning” and the role of “semiotic mediation” in both interpersonal and intrapersonal communication, reflection, and reasoning is emphasized by Lucy & Wertsch (1987: 69) who, in their thoughtfully argued comparison of Whorf and Vygotsky, make the important point that the complementarity of their ideas “is most suggestive for future research” on “the significance of language for thought” (p.84).

David McNeill (b.1933) offers a theory of “linguistic actions” (1987:2) based on a blend of ideas derived from those of Saussure and Vygotsky (p.ix), and which incorporates the term “linguistic thinking” (p.132) although his analysis is not derived from Whorf’s work. His opinion is that:

Thinking is an integral part of speaking; language is also an integral part of thinking [...] Thinking and speaking lie on a continuum. It makes no sense to ask where one ends and the other begins. Rather, there is a transformation of thinking from one type into another type. The transformation takes place in both directions: outward to speech and inward to speech understanding. At one end of the continuum thinking is more global and imagistic, and at the other end more segmented and syntactic. But a continuous process of transformation connects the two ends. (McNeill 1987:1)

Although some of McNeill’s comments are in harmony with Whorf’s ideas, his theorizing is heavily dependent on analysis of the way gestures seem to

anticipate and present in imagistic form ideas which are about to be expressed verbally. It is almost certainly the case that linguistic thinking incorporates nonverbal behavioral patterns as well as verbal ones in the state of linkage which sustains it but it is not clear how widely applicable McNeill's theory is to languaging across different cultural groups. Whorf (1939c[LTR]:155) for instance, considered that: "The Hopi gesture very little, perhaps not at all in the sense we understand as gesture" and that, by contrast, English speakers gesture a great deal. If this were indeed the case in the 1930s, or if it is still, this fact would somehow have to be incorporated into McNeill's account of linguistic activity. Without much more crosscultural data than we have his theory must be considered somewhat speculative.

Alex Kozulin (1986), in his introduction to the new translation of Vygotsky's *Thought and Language*, summarizes Vygotsky's central point as follows:

Vygotsky believed that the outward, interpsychological relations become the inner, intrapsychological mental functions. In the context of this idea, the transition from egocentric to inner speech manifests the internalization of an originally communicative function, which becomes individualized inner mental function. (Kozulin 1984:xxxvi)

In these comments we have the same awareness of the role of social processes in the development of linguistic thinking as appears in Whorf's and Sapir's writing. In the remainder of the chapter will explore some theoretical implications of the dynamic, process oriented way in which Whorf talked about language in cognition.

2.5. Form and substance, process and content — cutting through the dichotomies to linguistic thinking

Much of the problem in understanding Whorf has its origin in the way 'content' and 'process' (or 'substance' and 'form') are dichotomized in European thinking about language and thought. Lucy (1985:106) for instance, makes the point that "the very separation of form and substance, of language and thought" needs to be questioned, since it may well be an outcome of language patterns, and therefore patterns of meaning, specific to ways of talking characteristic of European languages.

In arguing this way he develops points made by Whorf in a comparison of the Hopi language with what he called "Standard Average European" (SAE) languages. Anticipating Lakoff & Johnson (1980) by four decades, Whorf had drawn attention to the distinction between "container" and "contents" which he

said is “somewhat forced upon our description of events by an unavoidable pattern in language” (Whorf 1939c[LTR]:141) and which encourages us to describe and think about intangibles in terms of a substance/form dichotomy. Existence, for speakers of languages like English, Whorf claimed, tends to be built up in terms of “a duality of formless item plus form” (p.142).

For instance, he argued that “an unavoidable pattern” in English encourages us to individualize mass nouns like “cloth” or “water” by naming a body type or a container as part of a descriptive formula for the substance referred to. Examples he gave include “piece of cloth”, “glass of water” etc. (p.141). This binomial formula becomes more problematic when extended in such phrases as “a moment of time” which, as he said, tends to “objectify” an intangible on the analogy of physical substances (p.142). He considered this pattern of meaning making to be one example of a pervasive tendency, facilitated by SAE grammatical processes, for experience to be “objectified” conceptually in SAE cultures. The topic of objectification is important with respect to Whorf’s broader analysis of the world view of English-speaking people — for instance with respect to the concept of time promoted in English — but as the literature on it has been adequately handled in Lucy’s (1992a) study, I will concentrate here on the implications of this linguistic pattern for the way language and thought have been conceptualized in discussions of Whorf’s ideas.

Referring to the usual definition of linguistic relativity as the notion that language influences thought, Lucy (1985:106) argues convincingly that “the form or the force of the linguistic relativity hypothesis” may itself be “historically relative, that is, a product of our own social institutions and forms of thought” and that the concept of “a linguistic form shaping a cognitive substance” may itself be a culture specific one. Lucy’s point is correct in my opinion in that it indicates the origin of the difficulty most commentators have had in interpreting what Whorf said. It is problematic, however, in that Lucy has attributed the same dichotomizing of language and thought in terms of form and substance to Whorf himself.

Whorf’s descriptions of the way linguistic patterning becomes entrenched in cognition were process descriptions, as we have seen, and not descriptions of the way a formless substance is contained or given form by a static structure. His statement (quoted above) that any “*activation*” of any “*linguistic processes* or linkages” or “*linguistic patterning operations*” whatsoever can be called “*thinking*” (my emphases) is unequivocally a statement about the dynamic nature of the kind of thinking which is linguistic. Only one kind of behavior — linguistic thinking — is under consideration in these remarks and it is cognitive. There is no evidence that Whorf conceptualized this behavior in terms of a substance or entity. Indeed the tendency to refer to the process, ‘thinking’,

rather than the entity, 'thought', found throughout his writing underscores the dynamism of his conceptualization.

Although he wrote about *relations* between language, thought, and reality, a relationship can be one of interpenetration, or at least partial fusion, or a matter of alternative manifestations of the same function in cognition as discussed earlier. In each of these cases the notion of *influence* from one entity to another is either doubtful or irrelevant. Even if we move out from the narrower parameters of conceptual activity to language at large (including its noncognitive aspects) and thinking at large (including its nonlinguistic aspects like remembering, attending, and functioning with practical intelligence) the notion of an influence from one to the other remains problematical. What links the two realms of activity is the domain they share, as Vygotsky explained, or the degree to which they are "inextricably interrelated", as Sapir put it.

Focus on process was a signature of Sapir's work and Whorf seems to have been strongly influenced by him in this regard. However, as Hymes & Fought (1975:984-999) pointed out, by the 1950s Sapir's influence on linguists who followed him had become obscured in published commentary on the preceding era for a variety of reasons (which they outline) and this largely remained the case in the decades immediately following. They argue that in the Spier (1941) memorial volume to Sapir and the Hoijer (1946) collection of grammatical sketches there is ample evidence of "a Sapirean variant of structuralism" characterized by a "consistent concern for semantic function and the interdependence of features within a configuration of language as a whole" (Hymes & Fought 1975:996). They comment that Whorf's work within that tradition stands out in respect of this concern (p.1002). If we take 'structuralism' in this context to refer to a mode of analysis which emphasizes system and pattern, the features we should consider are the holism of Sapir's and Whorf's conceptions of language in general and the dynamism which is attributed to grammar when descriptions are worded in terms of process rather than a more static conception of structure.

Introducing Whorf's collected writings Carroll (1956:26) argued that "Whorf was more concerned with substance than process [...] in what was being thought about than with the mental processes by which one might think", that he "appeared to believe, indeed, that the content of thought influences the process of thought" and that further, "comparison of different language structures" had the potential to reveal "differences in thought content and their corresponding effects on thought processes and behavior in general". These comments make language and even language structure matters of content rather than process and thought a matter of nonlinguistic mental activity. As such, Carroll apparently attempted to place what Whorf had said within the psychological tradition he himself worked in at the time and in doing so perhaps failed to appreciate the

significance of the dynamism of Whorf's notion of linguistic thinking and the relevance of Sapir's earlier formulations to that concept.

If Sapir's remarks quoted earlier in the chapter are used as a reference, the "comparison of different language structures" referred to by Carroll would have the potential to reveal differences in "the actual process of thought", i.e., differences in the way people articulate or connect meanings in relation to each other when they make sense of their worlds. The content metaphor is not applicable here. Only secondarily does such a comparison have the capacity to reveal the (latent) content (the conformation of experience by nonlinguistic processes) which underlies language, but this is not presumably what Carroll had in mind.

Carroll was aware that "the relation between language and thought" is a "very difficult area, clouded with numerous semantic difficulties arising from the diverse usages of the term *thought* in popular parlance and even in psychological writings". He described thought as "essentially a matter of how the individual handles information in central mediation processes, whether it comes to him perceptually and nonlinguistically, or already coded linguistically". He added that: "The role of language in thought [...] reduces to the problem of whether or not the 'information' (environmental as well as internal stimuli) becomes linguistically coded, and, if so, what it is that influences the selection of linguistic units and the translation or recoding of these units into other units" (Carroll 1953:103; original emphasis). Carroll conceded that language plays "an enormously important role in thought" and that "the automaticity and multifariousness of linguistic responses, once these responses have been learned, make it impossible to conceive that language does not constantly intrude on what we have described as thought", but he explicitly rejected Révész's (1950) notion that they "form an inseparable, multirelational duality" (Carroll 1953:104) of the kind we have explored in the ideas of Sapir and Whorf. Like Lucy more recently, Carroll seems to have had a strong intuitive understanding of the implications of what Whorf said while perhaps finding it difficult to articulate the concepts involved in standard psychological terminology, the medium of his professional socialization.

For instance when Lucy (1992a:3) differentiates at the outset of his major study between with "the *contents* of thought, that is, a speaker's conceptualizations of the world as part of a cultural system studied, for example, by cultural anthropologists and historians" and the other with "the *processes* of thinking, that is, the activities of attending, remembering, reasoning, etc. as studied, for example, by cognitive psychologists" (original emphases), he dichotomizes in a way which may reflect interdisciplinary boundaries but which is difficult, as he admits, to apply to Whorf's ideas. It all comes down to the way the internalized linguistic system is conceptualized. If it is imagined as a highly dynamic, massively interconnected network of associations with deeply entrenched patterns of

activation which we might (or might not) like to think of as ‘rules’ of operation, then its activation in any way (either centrally or peripherally) during cogitation is surely a matter of process as well as content although it is essentially linguistic. If it is imagined as a collection of intricately catalogued stored items which are brought into relationship with each other on the basis of the activity of another agent (thought?) which applies rules to their manipulation, then the content metaphor is more applicable. Another serious problem for this way of thinking, however, is that this metaphor leaves the rules somewhat in limbo, not quite a part of content (language) and not quite process (thought).

As we might anticipate from earlier discussions therefore, the evidence from Whorf’s writing suggests that it is incorrect to argue as Lucy does that “Whorf’s theory was about the content of thought (hence ‘concepts’), rather than process” although it was certainly about conceptual processing. It is further confusing to add: “although certainly content guides processing and in that case is indistinguishable from it in most cases”. To state that Whorf’s “entire enterprise can, in one sense, be thought of as an attempt to show that much of what we think of as process (and, hence, intrinsic and universal) is better regarded as content (that is, extrinsic and variable)” (Lucy 1992a:43) is unnecessarily limiting. “Latent content” — “the intuitive *science* of experience” (a “pre-rational” systematizing activity of some kind) was, after all, defined as universal by Sapir. Content in his terms can therefore can be intrinsic, universal, and also dynamic. Linguistic processes, according to both Whorf and Sapir, are cognitive processes of a variable kind; processes are not necessarily universal therefore. Moreover, the possibility that there may be universal linguistic/cognitive processes is not precluded by their remarks; Sapir’s (1921:94) discussion of the universal operationalization of the presumably “intuitive” traditional notion of the doer of an action in languages suggests as much. To argue as Lucy does (1992a:43) that Whorf “meant” or “really meant” something other than what he said is to impose an alien set of metaphors on the ideas he was struggling to articulate in his own terms and to miss the revolutionary nature of his insights. And to say that “the focus of Whorf’s research [...] is on the connection between [...] two pattern schemes, that of language and that of thought” (p.45) is to compound the error in my opinion.

In the terminology I have been using, languaging is simply the process of making meaning in a communicable way using speech and its derivatives and associated systems. It is something people do, generating conceptual activity and refining communicative expertise as they go. Or as Maturana (1987:324), working from a biological-conceptual orientation puts it, it is “our condition of existing in language”. He says: “We find ourselves as human beings here and now in the praxis of living, in the happening of being human, in language languaging”

(p.326). This is not to say that we may not have concepts which have never been linguistically operationalized and brought into the “actual process of thought” (in Sapir’s terms) which constitutes linguistic thinking, only that many concepts are so embedded in the language system that it is difficult to think of them having a life separate from that network of linguistically articulated understandings. How for instance should we imagine the independent nonlinguistic existence of the concept expressed in the word ‘however’ or that in the term ‘metaphor’? By contrast, it is easier to imagine the independent existence of the concepts communicated in the words ‘larger’, ‘tree’, and even ‘sudden’.

Lucy (1992a:67) has argued, mainly on the basis of his analysis of Whorf’s Sapir memorial paper, that there is a “model” implicit in what he said which explains “the unwitting appropriation of linguistic analogies — both lexical and grammatical — in habitual everyday thought”. He considers this implicit model to be the theoretical core of Whorf’s postulation of a linguistic relativity principle and claims that it

reveals the mechanism by which language and thought interact. Linguistic analogies associated with the linguistic classification of experience both embody conventional compromises necessary for speech and provide a locus for diverse meanings to interpenetrate and influence each other. *These analogies are appropriated as guides in habitual cognitive activity* such as the interpretation of external reality and result in the speaker having a linguistically conditioned habitual thought world. (Lucy 1992:62-63; my emphasis)

The use of the verb ‘appropriates’ throughout Lucy’s study emphasizes again that at the heart of his explication is the notion that one entity or function, thought, actively takes over aspects of a different entity or function, speech, in the process of guiding the interpretation of reality. Indeed it is specified that the “hypothesis” attributed to Whorf “involves two key notions — *language* and *thought* — and therefore cannot be adequately defended without data and theory pertinent to both” (p.263-264; original emphases).

Again it is the language of explanation which subverts the effectiveness of the argument for while the general idea is useful, a closer look reveals conceptual problems inherent in the terminology chosen. For instance, it is hard to imagine how “the linguistic classification of experience” could not at the same time be a cognitive operation; what is a classification if not a conceptual organization of data? It cannot happen separately from the business of humans thinking and therefore it is not at all clear how such classifications could be for the purposes of speech alone and not primarily a function of thinking. The

“compromises” involved are compromises of meaning; they are, in other words, a cognitive matter unless one takes a Platonic view of concepts. As Reddy (1979:291) argues, it is the habitual patterning entrenched in certain English idioms which encourages us to talk and think as if “thoughts and feelings [...] exist independently of any need for living human beings to think or feel them”. The fact that concepts manifest in speech as well as occurring in thought is just a feature of our apparently species specific capacity to share ideas in a precise kind of way.

Secondly, although “the interpretation of external [and internal] reality” may be at least in part a nonlinguistic cognitive activity — and Whorf allowed for this in his references to “experience interpreted nonlinguistically” (Whorf & Trager 1938:6 typescript) — a matter we will turn to very soon in chapter three — it does not therefore follow that making meaning of what happens is always and only a matter of nonlinguistic thought. After all, Whorf (1940a [LTR]:213) also said that the organization of experiential data “by our minds” is largely a function of “the linguistic systems in our minds”. That Lucy is aware of some of the problems involved in the separation of language from thought but is trapped within them by the nature of his theory is evident in the following comments:

After a certain point in development, of course, categories of language may not be readily distinguished from categories of thought in ordinary behavior. Nonetheless, it is important that there be a clear analytic distinction between linguistic categories and cognitive categories so that the influence of the former on the latter can be detected and identified. If language and thought are conflated, then the research findings will be ambiguous; if they are equated, then what is to be proven will have, in effect, been presupposed. (Lucy 1992a:264)

One would have to agree. Nevertheless, the notion that analogic transfer is fundamental and ubiquitous in language behavior was a widely accepted insight in Whorf’s time. That it was oversimplified by Chomsky as part of his mission to ridicule previous paradigms does not mean that it should not be studied seriously today, particularly in relation to language acquisition, the key area in which Chomsky and his followers argued that it could not be relevant. In particular, Lucy’s idea that analogic activity “provide[s] a locus for diverse meanings to interpenetrate and influence each other” is valuable and compatible with Whorf’s general treatment of meaning. It is only the deliberate operational separation of language and thought in order to accommodate theoretical pre-conditions for empirical investigation which is incongruent with the way Whorf wrote about language in cognition, and unnecessary.

Lucy does seriously examine the possibility that language and thought might be identified with each other in the course of his discussion of influences from Boas and Sapir on Whorf. He points out that while “Boas emphasized that every language represents a classification of experience” which is “automatic” and “outside the sphere of conscious awareness” he only late in life tentatively accorded even “a shaping role for language” with respect to thought (Lucy 1992a: 16-17). It is worth noting that Boas quite clearly differentiated between language and thought as separate functions when he said that “it will be recognized that in each language only a part of *the complete concept that we have in mind is expressed*, and that each language has a peculiar tendency to select this or that aspect of the mental image which is *conveyed by the expression of the thought*” (Boas 1911:43; my emphases).

Here Reddy’s (1979) “container” or “conduit” metaphor for language and thought is at work again and it is evident that Boas was unaware that “the image” which he experienced when translating the words of one of his informants need not necessarily be the same as his consultant’s in its finer detail even though both people in their own way refer to the same objective situation in their respective languages. His conclusion that each person leaves something out when they speak which is there in “the complete concept we have in mind”, is a reference to the fact that the specific range of features of a situation picked out for linguistic operationalization by speakers differs from language to language. It is not necessarily the case, however, that because features are objectively perceptible they will also be included in a conceptual sizing up of the situation. This matter is discussed in detail in the next chapter on linguistic relativity.

Sapir (1921:13) considered the question of whether “thought is possible without speech further, if speech and thought be not but two facets of the same psychic process.” He thought this question difficult “because it has been hedged about by misunderstandings” (p.14). These misunderstandings bear directly on the place of conceptual activity in language. He emphasized that “whether or not thought necessitates symbolism, that is speech, the flow of language itself is not always indicative of thought”. He then gave an example of a speech event, the remark “I had a good breakfast this morning”, which he described as hardly involving “laborious thought” and being instead more concerned with the transmission of “a pleasurable memory symbolically rendered in the grooves of habitual expression”, the “sentence as a whole having no conceptual significance whatever” even though each element in it “defines a separate concept or conceptual relation or both combined” (p.14).

Pointing out that: “Language may be looked upon as an instrument capable of running a gamut of psychic uses”, Sapir compared the event described in the last paragraph with a situation where, in spite of a dynamo having enough

power to run an elevator, it is used to operate an electric door bell. In other words he can be understood as saying that in the basically phatic communication the full power of thought inherent in the language used was hardly activated. The “flow of language”, he explained, parallels “the inner content of consciousness” but does so “on different levels, ranging from the state of mind that is dominated by particular images” (in this case images presumably related to the pleasurable breakfast) “to that in which abstract concepts and their relations are alone at the focus of attention and which is outwardly called reasoning”. Thus while “the outward form” of language remains constant, “its inner meaning, its psychic value or intensity, varies freely with attention or the selective interest of the mind, also, needless to say with the mind’s general development” (p.14). Notice that in these comments reasoning, a cognitive operation *par excellence*, is characterized as being at one extreme end of a linguistic cline with phatic communication at the other end. What varies along the cline is the degree of conceptual activity involved in languaging.

Sapir continued with comments which provide the focus an exploration by Lucy of the question of whether he actually identified thought with language:

From the point of view of language, thought may be defined as the highest latent or potential content of speech, the content that is obtained by interpreting each of the elements in the flow of language as possessed of its very fullest conceptual value. *From this it follows at once that language and thought are not strictly coterminous* [...] It is, indeed, in the highest degree likely that language is an instrument originally put to uses lower than the conceptual plane and that thought arises as a refined interpretation of its content (Sapir 1921:14-15). (Sentence within *-* not included by Lucy in his use of this passage in 1992).

Sapir’s preceding discussion about the different ‘psychic uses’ to which language could be put and the possibility that some *speech* is relatively devoid of thought content (note that what is in question here is not whether *thought* occurs without language) provided the background for his conclusion that language and thought could not be considered ‘strictly coterminous’, a point avoided by Lucy. Something which is not strictly coterminous nevertheless (presumably) involves some degree of overlap so it is important to determine what kind of overlap Sapir had in mind before coming to the conclusion that “Sapir did not thereby equate language and thought, in fact he explicitly claimed the opposite” Lucy (1992a:20).

The omitted section (not the starred section) in the quotation above (and in Lucy’s use of it also) states that when people claim that they can think without speech, i.e., that “language is but a garment” (Sapir 1921:15), they may be

mistaken, language being “not so much a garment as a prepared road or groove”. As we know that Sapir considered language and thought grooves to be “in a sense, one and the same” (p.218), we can conclude that he considered language and thought coterminous insofar as thought is linguistic (to paraphrase Whorf); to be coterminous, in other words, with respect to conceptual activity — “the highest latent or potential content of speech”. Sapir’s point is that when it comes to phatic activity, language and thought are not very coterminous at all since ‘grooves’ with the capacity to carry refined cognitive content are deployed for other purposes.

Notice that in Sapir’s writing we have been now been alerted to “latent content” in terms of primary processing of both experiential data and reasoning, the one nonlinguistic in character but the foundation of linguistic thinking, and the other epitomising the cognitive potential of linguistic processes which may or may not activate that potential in a given situation. Clarifying what he thought about the process of reasoning (which is usually taken to be a nonlinguistic cognitive operation) Sapir wrote that he,

for one, [was] strongly of the opinion that the feeling entertained by so many that they can think, or even reason, without language is an illusion. The illusion seems to be due to a number of factors. The simplest of these is the failure to distinguish between imagery and thought. As a matter of fact, no sooner do we try to put an image into conscious relation with another than we find ourselves slipping into a silent flow of words. Thought may be a natural domain apart from the artificial one of speech, but speech would seem to be the only road we know that leads to it. (Sapir 1921:15-16)

That Whorf agreed in principle with these remarks is suggested by several comments he made. He said that “linguistics is fundamental to the theory of thinking” (1937c[LTR]:78) and that “the very essence of linguistics is the quest for meaning” (p.79). He also said that: “Thinking may be said to be language’s own ground” (p.66), that “we think in our own language” (1939c[LTR]:138) and that “the HOW or logic of understanding — its background of laws or regularities [...] is the grammatical background of our mother tongue” (1941a[LTR]:239). Thus, although he considered that “thinking is most mysterious” he also thought that “by far the greatest light upon it that we have is thrown by the study of language” (1941b[LTR]:252). In comparison with Sapir’s (1921) remarks, which were more general, Whorf’s comments are additionally interesting for their emphasis on the central role of linguistic science in the study of cognition.

Whorf clarified the difference between linguistic and nonlinguistic thinking when he said that Jung's definition of thinking "contains a large linguistic element of a strictly patterned nature, while feeling is mainly nonlinguistic, though it may use the vehicle of language, albeit in a way quite different from thinking". Although "sensation and intuition" are "involved in the processes of talking, hearing, and understanding" he said that they "may fairly be termed nonlinguistic" (Whorf 1937c[LTR]:66).

Within the category of linguistic thinking, Whorf differentiated between "lexations" and linguistic meanings that are not "lexated". He defined a lexation as "having the status of a meaning or idea when it is connected with a lexeme (i.e. as a word or stem in the lexicon; not a word as element in a sentence)" and gave "feminine" as an example. He said that grammatical categories, e.g. gender, are meanings which are "linguistic" although they are not "lexated". He pointed out that "the idea lexated as 'noun' is not the idea of the Eng. noun category itself, but rather a surrogate for it" and that: "Many ideas which are akin to lexations are never lexated independently". He also noted, by comparison, that "the meaning of a blueprint is neither a lexation nor linguistic" (Whorf & Trager 1938:15; original abbreviation).

In this chapter I have tried to show that the central operational construct in Whorf's theory complex is that of linguistic thinking and that it emerges naturally from his conceptualization of the internalized linguistic system as essentially a matter of patternment, rapport, and linkage. Whorf regarded linguistic thinking as a distinctively human set of operations involved in making meaning of experience, whether covertly in cogitation or overtly in communication. Broadly speaking we may characterize linguistic thinking as conceptual activity, differentiating it from other cognitive processes such as attention and memory which have traditionally been given most attention in attempts to test his ideas. At the same time, we need to acknowledge the intricate meshing of linguistic thinking with many other kinds of cognitive activity.

As we have seen, Whorf described the product of linguistic enculturation as physically entrenched in the human mind/brain and emphasized that it is not a "biologically organized process [...] but a cultural organization", not "language" but "*a language*" (Whorf 1937c:66; original emphasis). As such, he could regard it as an augmentational function imposed on cognition in general and having the capacity to enhance mental activity in a specifically human way. In this respect his ideas have much in common with Vygotsky's. The fact that humans have an innate predilection to develop language if raised in interaction with other people does not undermine the logic of Whorf's claims. Nor does the likelihood that the "cultural organization" which characterizes a specific language is an elaboration

of irreducible biological givens which leave their marks in specific languages and idiolects.

In chapter three we move away from the what in Lakatosian terms might be regarded as the “hard core” of the theory complex and begin to consider elements of the ‘protective belt’ (Lakatos 1970) of theories which make up the rest of the Whorfian research program. The most important of these, Whorf’s appropriation of certain principles and findings of gestalt theory to linguistics, provide the basis for another pivotal theoretical construct, that of ‘isolates of experience’. Without this concept, I argue, the subtleties of his formulation of the linguistic relativity principle cannot be fully appreciated.

CHAPTER THREE

THE LOGIC AND DEVELOPMENT OF THE LINGUISTIC RELATIVITY PRINCIPLE

3.1 *The linguistic relativity principle*

The idea that different languages foster different Weltanschauungen or ‘world views’ in their speakers is part of a tradition popularized by Wilhelm von Humboldt in the 18th century long before it became associated with Whorf. Preoccupation with the question goes back to the 17th century at least. Roger L. Brown (1967) and Robert L. Miller (1968) provide historical surveys and Harold H. Basilius (1952), Julia M. Penn (1972[1966]), E. F. Konrad Koerner (1977, 1992, 1995b), James H. Stam (1980), Emanuel J. Drechsel (1988), and John A. Lucy (1992a) offer analyses which contextualize 20th century American developments associated with Boas, Sapir, and Whorf in the European tradition. John E. Joseph (1996) presents convincing evidence of alternative twentieth century influences on Whorf and on what is most frequently referred to nowadays as ‘the linguistic relativity hypothesis’ or ‘the Sapir-Whorf hypothesis’. In this chapter, however, I will argue that Whorf’s own term — ‘linguistic relativity principle’ — is, the most appropriate for use in relation to his thinking on the matter. Jane H. Hill (1988) and also, with Bruce Mannheim, (1992) has produced two interesting reviews of literature about relations between language, culture and world view which bring fresh perspectives to a debate which over the years has tended to become somewhat repetitive and nonproductive in its preoccupations. Finally, Lee (1994) is a review and refutation of Lucy’s theoretical arguments in relation to Whorf’s ideas about linguistic relativity. Literature on relationships between language, experience, and world view is considerably more extensive than this list can indicate, however.

Various attempts to systematize the notion of linguistic relativity have been made over the years. Joshua A. Fishman (b.1926) for instance proposed “a double dichotomy which gives rise to a discussion of the hypothesis at four levels” (Fishman 1960:323). In some of his concluding remarks he referred to a

difference between “language *determinism*” and “language *relativity*” (p.336; original emphases), a distinction which has been sustained in much of the literature since. Hymes (1966) suggested that there are two kinds of linguistic relativity, the first to do with linguistic structure and the second to do with the use of language. Penn (1972[1966]:1), opening her influential argument that there are two “Whorf hypotheses” — one that “‘language determines thought’, an extreme hypothesis indeed”, and the other that “‘language influences thought’, a much milder assertion” — remarked that “the first difficulty in deciding just what ‘the’ Whorf hypothesis is” is “lack of precision in wording”. She added that: “No statement can be found in Whorf’s writing which clears up the ambiguity as to which assertion he intended to be making”.

Alford (1980) considers that the narrowing of attention in relation to the range of Whorf’s ideas which was brought about by these attempts to identify and formalize a ‘hypothesis’ began with the psychologist Roger W. Brown (b.1925) who attributed it to his associate, Eric Lenneberg (1924–1975) in 1953. Certainly it is found in Carroll’s (1956) introduction to Whorf’s selected writings. The notion that there is a strong or deterministic version of linguistic relativity extractable from Whorf’s remarks and another weaker version which merely posits an influence is now widely taken for granted and the point has been made by several people, including Lucy (1992a), that the weakest interpretations are uninteresting theoretically. On the other hand, the general consensus that a strongly deterministic interpretation is untenable has occasioned much heated debate in disciplines as varied as philosophy, education, anthropology, psychology, and the new cognitive science, as well as linguistics.

The fact of the matter is that there is no evidence that Whorf intended to make either of the assertions Penn claimed can be made in relation to his work. One of the deep problems about this kind of discussion is, once again, the dichotomized conception of language and thought which generates it and which, as we saw in the previous chapter, is not at all characteristic of the way Whorf seems to have understood the phenomenon of language in cognition. Not only did he provide clear definitions of the linguistic relativity principle but he does not seem to have regarded it as a hypothesis. In his own terms the principle, as we will see in more detail below, is a statement summarizing a certain kind of observable regularity in linguistic data — a law which has to do with relationships between language and the way we understand experience. Indeed Hill & Mannheim (1992) make the point that linguistic relativity for Boas, Sapir, and Whorf is “an axiom, a part of the initial epistemology and methodology of the linguistic anthropologist” (p.283). They argue that although Whorf would have been familiar with hypothetico-deductive language and the notion of variables as

a result of his scientific training, it is significant that he did not use this kind of terminology. An axiom is judged “not by canons of falsifiability” but (in this context) “on the basis of the extent to which it leads to productive questions about talk and social action” (p.389).

Grace (1987:5) argues that the “common position” that Whorf was proposing “some kind of *hypothesis* [...] but that he had given no clear formulation” of it is a natural concomitant of “the mapping view of language” that is, the idea that “there is a common world out there and that our languages are analogous to maps of this world” (original emphasis). It is also a natural concomitant of the use of metaphors which make language and thought seem like entirely separate entities with power to act on other entities in the way concrete objects or beings act. Whorf’s own terminology, it will be recalled, conjures up images of massively connected networks of highly dynamic interactions within which it is not always possible to say just what is language and what is thought, and not always easy therefore, to talk about influences, whether determining or otherwise.

Grace argues for a “*reality-construction* view” (p.6; original emphasis) which stresses differences in understanding which may be generated by our perceptual interface with the environment. He is correct in pointing out that Whorf’s assumptions in formulating the principle “were not assumptions of the problematic kind — that is, hypotheses to be tested; they were of the incorrigible kind”. He was incorrect however, in my opinion, to add that this means that “they are not supposed to be acknowledged and [...] by the nature of their function necessarily elude exact formulation” (p.118). As we will see below, Whorf did explain the means by which the linguistic relativity principle operates in the nexus of human understanding and our interaction with the rest of the world and in doing so explained the principle more precisely than any of the formulations we have just surveyed.

It was in the context of discussions about relationships between experience and the meanings we make in relation to that experience that Whorf first mentioned linguistic relativity. Writing for the scientific and technically trained readers of M.I.T.’s *Technology Review* who could be expected to understand his comments in the light of their awareness of Einstein’s principle of relativity he said:

We are thus introduced to a new principle of relativity, which holds that all observers are not led by the same physical evidence to the same picture of the universe, unless their linguistic backgrounds are similar, or can in some way be calibrated. (Whorf 1940a[LTR]:214)

In what he regarded as more “informal terms” in the follow up article later that year he said that this means that

users of markedly different grammars are pointed by their grammars toward different types of observations and different evaluations of externally similar acts of observation, and hence are not equivalent as observers but must arrive at somewhat different views of the world. (Whorf 1940d[LTR]: 221)

The first thing to notice about these definitions is that they are indeed more precise than the claim that linguistic relativity has to do with the question of whether language in general influences thought in general, or even the broad claim that different languages shape thought differently. Although often quoted, they have not usually been analyzed in sufficient detail to reveal the subtlety of the concept Whorf actually deployed nor its similarity to the relativity principle of physics. What we are presented with in these statements is the notion that although all observers may be confronted by the same physical evidence in the form of experiential data and although they may be capable of “externally similar acts of observation” (i.e., although perceptual processes may be basically invariant from person to person apart from pathology) a person’s ‘picture of the universe’ or ‘view of the world’ differs as a function of the particular language or languages that person knows. In physics that view is a function of differing positions in space with respect to the object observed. These are statements about experiential invariants and their relation to conceptual activity.

A picture of the world is surely a conceptual framework or overview of the way things are, a basis from which persons operate to make meaning of what happens in their lives. According to Whorf, what varies as a function of particular languages known to a person is not thought in general (or, for that matter, cognitive processes such as attention and memory) but conceptual processing. If conceptual operations upon perceptual (experiential) data vary, it follows that from a subjective orientation, experience — the only reality we can say we *know* — also varies, perhaps in very subtle ways. The linguistic relativity principle is concerned therefore with the conceptual and experiential ramifications of one’s linguistic resources. As such it is concerned with the role of language in cognition. In particular it is concerned with the way language mediates between the invariances of the environing world in which humans have their existence on the one hand, and invariances of cognitive processing of a perceptual kind on the other.

Like other strands of the theory complex, the foundation for the linguistic relativity principle may be found in Sapir’s work, as Hymes (1983[1970]:153-154) points out. In a discussion about the “differences of analysis” involved in

making sense of events, Sapir (1924[SW]:158) refers to “the relativity of concepts, or as it might be called, the relativity of the form of thought”, a relativity brought about by “incommensurable analyses of experience in different languages”. He argues that this “kind of relativity [...] is generally hidden from us by our naive acceptance of fixed habits of speech as guides to objective understanding of the nature of experience” and while “not so difficult to grasp as the physical relativity of Einstein” nor “as disturbing to our sense of security as the psychological relativity of Jung [...] it is perhaps more readily evaded than these” (p.159). Given that both Sapir and Whorf were explicit about the fact that they had drawn their linguistic analogy from physics, it is a real puzzle that so few commentators, including Lucy (1992a) have adequately taken this into account. Alford (1981) and Heynick (1983) are notable exceptions.

Whorf did not restrict the notion of linguistic relativity entirely to its conceptual dimension. In the context of a discussion on phonemics, which seems to be part of an earlier draft for his second *Technology Review* article, he asserted that: “The unit-segmentation of a language is purely relativistic, as can be deduced from my ‘linguistic relativity principle’” (Whorf 1940f:1). He argued that: “The discovery of the phonemic principle made a revolution in linguistics comparable to relativity in physics” and pointed out that “phonemics is a relativity principle” and that allophones (a coinage he himself had introduced a few years earlier)

are also relativistic [...]. Objectively, acoustically, and physiologically the allophones of [a] phoneme may be extremely unlike, hence the impossibility of determining what is what. You always have to keep the observer in the picture. What linguistic pattern makes like is like, and what it makes unlike is unlike. (Whorf 1940f:1-2)

In the case of conceptual relativity the “unit-segmentation” involved is semantic; experience is understood (or analyzed, to use Sapir’s term) in accordance with a particular way of making meanings, i.e., in accordance with one’s particular selection of linguistic resources, which may be drawn from one or more languages. In the case of the sounds of a language the stream of sound is broken up by the hearer in accordance with a particular way of attending to sound patterns, that pattern of attention being a function of an internalized phonemic system or perhaps systems in the case of the multilingual person.

In both conceptual and phonological relativity, experiential data available in a physically invariant way in the environment is processed through a cognitive frame of reference which has developed over time as an automatic function of a person’s linguistic competence. In physics a frame of reference is regarded not so much an *influence* on observation as the very *medium* through which it

occurs. The experience of one observer of an object in space is different from that of another on the basis of the difference between their physical positions and the frames of reference associated with these. According to Sapir and Whorf, concepts and auditory percepts also vary relative to variations in people's internalized frames of reference and despite sameness in presented data. Discounting physiological differences (e.g., in hearing acuity) subjective experience of the same speech sounds differs from person to person insofar as their internalized phonemic systems differ. This is a commonplace in linguistic science and a matter of practical concern in language teaching. With respect to concepts, understanding of the range of experiential data impinging on one's senses is relative to another person's understanding insofar as conceptual resources for processing raw information are different from person to person. According to Whorf and Sapir, conceptual resources are significantly dependent on ways of talking which have been acquired in the course of socialization. To understand this reasoning in detail we turn first to Whorf's opinions about the nature of experiential data and our processing of it.

3.2 *Raw experience*

When Whorf (1937b[LTR]:102) wrote Carroll that he expected (in lectures he was to give at Yale the following year) "to give a good deal of attention to the subject of the organization of raw experience into a consistent and readily communicable universe of ideas through the medium of linguistic patterns", he unwittingly set the scene for a crucial misreading of his work in subsequent decades. Lucy is only a recent representative of a number of scholars who have decided on the basis of this comment and phrases such as: "stream of sensory experience," "kaleidoscopic flux of impressions," "flux of experience," "flowing face of nature," "continuous spread and flow of existence" and "mass of presentation" (LTR:55, 213, 239, 241, 253); Whorf & Trager (1938:8; typescript) that "Whorf regarded the external world as essentially unstructured from the point of view of a speaker" (Lucy 1992a:42). Lucy followed Lewis S. Feuer (1953), Franklin Fearing (1954), and Max Black (1959) in coming to this conclusion.

The term 'store house of impressions' was used by William Dwight Whitney (1827–1894) who, in the words of Koerner (b.1939) was "the most influential American linguist of the second half of the 19th century" and a clear inheritor of the Humboldtian tradition (Koerner 1995b:205). It would, therefore, have been familiar to Whorf and his peers. Indeed, key ideas about the 'inner form' of language and the articulating or structuring function of language with respect to experience were in some respects merely being restated

by Sapir and Whorf in the first half of the 20th century, as the full statement by Whitney suggests:

Every single language has [...] its own peculiar framework of established distinctions, its shapes and forms of thought, into which, for the human being who learns that language as his “mother-tongue”, is cast the content and product of the mind, his store house of impressions, however acquired, his experience and knowledge of the world. This is what is sometimes called the “inner form” of language, the shape and cast of thought, as fitted to a certain body of expression. (Whitney 1987:21-22)

The debate about whether “the world of ‘things’ is constructed and acquires meaning only through language” or is already “constructed without the aid of language”, conceptual ‘content’ being “ORIGINALLY the same for the speakers of all languages” (Miller 1968:36; original capitalization) was also well established before this century, as Miller and Koerner discuss in some detail.

At least after 1938 (or 1937 perhaps) when, by his own account (Whorf 1941c:7-8), a distinctive conceptual shift began to emerge in his work, Whorf argued on the basis of his interest in the findings of the then new discipline of gestalt psychology that the world which a human being experiences is essentially structured, both perceptually and culturally. It is fundamental to understanding what he said about linguistic relativity to appreciate that although he thought that each language embodies a distinctive world view, this overall conceptual orientation towards experience is generated at least in part by the way speakers of a language habitually and unconsciously “segregate different *essentials* out of *the same situation*” (1939d[LTR]:162; my emphasis). These ‘essentials’ are available to everyone, regardless of language or other aspects of culture, but different habits of selection, at least partly mediated by linguistic patterns acquired in the course of enculturation within particular language communities, mean that what one person conceptualizes in relation to a situation may not be congruent in all respects with someone else’s conception.

When Whorf’s arguments in both published and unpublished papers are taken together it becomes evident that these essentials or ‘isolates from experience’ (1940a[LTR]:208), are critical to his conceptualization of the way linguistic relativity operates. Although it might be argued that he thought (at least sometimes) of the ‘flux of impressions’ in terms of physical atomism as it impacts upon our sense organs, it is also important to take into account that he said of these ‘impressions’ that they have “to be organized by our minds — and this means *largely* by the linguistic systems in our minds” (p.213; my emphasis). ‘Largely’ means significantly but not exclusively. The world is not presented to

our understanding in a state of unstructured elemental flux, but is perceptually structured, using ‘perception’ in its broadest possible sense.

Whorf did not claim therefore, as so many have assumed, that linguistic processes operate in an entirely arbitrary fashion on undifferentiated experiential data. Comments by the philosopher, Max Black (b.1909) seem to have been particularly influential in fostering this opinion. Black (1959:247) considered that Whorf’s argument that a “distinctive ‘conceptual system’ for ‘organizing experience’” is embodied in a language necessarily implied that he thought “[t]he underlying picture is of an undivided continuum arbitrarily dissected by language”. It is not at all clear why Black should have come to this conclusion. It is just as logical to argue that languaging operations are secondary elaborations upon data which are already structured perceptually. It is clear from what Whorf said that he thought that linguistic processes are constrained by contingencies of human perceptual processing and that they operate irrevocably within universal experiential parameters which can be investigated independently of the linguistic organization of experience. At one level, the level of *nonlinguistic* organization of experience, all humans share the same experiential world. It is upon these foundations that different conceptual worlds are elaborated according to different constellations of cognitive processing which are the concomitants of different ways of talking.

The question of linguistic (and therefore, conceptual, cultural, and experiential) relativity in a universe where the human interface with the environment is anchored in biological invariances is then a question of investigating two levels of human experience — the one (variable) being an elaboration upon the other, which does not vary. It was Whorf’s opinion that an investigation of the latter has the potential to provide linguists with “a reference frame in which to describe strictly linguistic phenomena” without recourse to categorizations of reality which are themselves functions of a particular linguistically mediated conceptual frame (Whorf 1938d:3). This is a crucial point about which much of the discussion below will turn. It seems that he thought this neutral, nonlinguistic frame could be developed on the basis of findings in gestalt psychology. Although others (e.g., Lucy & Wertsch 1987, Lucy 1992a) have noted Whorf’s interest in gestalt theory, I believe I am the first to have identified the pivotal significance of his discussion of the linguistic and nonlinguistic ‘segmentation of experience’ introduced in detail in the hitherto unpublished report to the Yale Department of Anthropology (Whorf & Trager 1938) which is included as an appendix to this book and is also examined in some detail in the final sections of this chapter. The associated notions of ‘isolates from experience’ and ‘isolates of meaning’ (Whorf 1940a[LTR]:208) are concomitants of this strand of the theory complex and are also dealt with in the report, although only explicitly named

in this way in the later papers. These late appearing constructs are not incidental elements of Whorf's theorizing but the very basis on which he constructs a principle of linguistic relativity with implications for conceptual activity.

It is something of an historical enigma that Whorf's references to gestaltism have been so seriously undervalued because Whorf clearly thought he had made a major advance in incorporating this material into his explanations of the way language, thought, and experience interpenetrate. This much is picked up by Lucy & Wertsch (1987:72) who draw attention to the fact that Whorf "referred to the Gestalt school extensively, emphasizing both the importance of configurative pattern in language as its central operating principle and the significance of perceptual gestalt phenomena as constituting a level of sublinguistic psychological regularity". In their conclusion that "Whorf did not develop an explicit theory about how languages influence thought" (p.73), however, I believe they missed the logical relevance of that nonlinguistic regularity in the nexus of experience and understanding, and its role in meaning making.

Certainly the fact that access to Whorf's unpublished papers has been limited until relatively recently is significant, but it is worth pointing out that all the essential elements of his thinking about isolates can be found in the published writings, as will become evident as we trace out their development. Before doing so, however, it may be helpful to take a closer look at the kinds of phrases which have mistakenly led people to believe that Whorf thought raw experience to be essentially unstructured.

There are two problems with the idea that "Whorf regarded the external world as essentially unstructured from the point of view of a speaker" (Lucy 1992a:42). The first is logical. It is the whole thrust of Whorf's argument about linguistic relativity that for a *speaker*, i.e. someone who knows a language, the presented world is already unconsciously organized to a remarkable degree by virtue of linguistic processes entrenched in cognition during language acquisition. The external world for a speaker is essentially structured, by language at least (according to this way of thinking) because, as Bloomfield (1939a:30) pointed out: "We cannot return to the animal's or the infant's state of speechless response" to the world. The difficulty Whorf confronted was whether we, as mature speakers of a particular language or languages, can ever find a way of talking and thinking about what experience is like prior to language acquisition. If we cannot, we are trapped within the languages we speak to such a degree that, as scientific investigation of the world around us can only take place through languages known to us, we can never feel confident that we have knowledge of the world which is not at least partly a function of our cultural construction of reality.

Lucy (1992a) has shown in interesting detail that Boas, Sapir, and Whorf all subscribed to the opinion that a language is a particular ‘classification of experience’. It is worth noting in this context however that although we may sometimes say that a *language* classifies experience this is only a manner of speaking which is liable to deceive us into thinking that we can separate ourselves experientially from the operation of linguistic classification and thus confront a reality where language has no influence. *People* classify because people think and talk. And classifying is a conceptual and not a purely verbal activity, as I pointed out earlier. The shared complexes of related behaviors which we refer to as ‘languages’ are just the communally manifested and perpetuated embodiments of conceptual behavior in a shareable form, one which also provides the medium for acquisition of the same concepts in the course of language acquisition. Language itself does not classify experience as though it were in some sense an intentional being capable of experiencing; we do. To the degree that the way we think is linguistically articulated, we classify experience similarly to others who talk the way we do. The world of a speaker cannot therefore be “essentially unstructured”.

The second problem then is whether a person’s world can be regarded as unstructured prior to speech acquisition or even with respect to those domains of conceptual activity which are not linguistically organized in later life. Today Johnson (1987:xix) argues rather convincingly that it cannot be. He points out that “human bodily movement, manipulation of objects, and perceptual interactions involve recurring patterns without which our experience would be chaotic and incomprehensible” and that ‘image schemata’ in cognition derived from these experiences “are gestalt structures, consisting of parts standing in relations and organized into unified wholes, by which our experience manifests discernible order”. Half a century earlier Whorf advanced an essentially similar argument with respect to ‘essentials’ or ‘isolates’ of experience although he did not conjecture about the form they take in cognition or their combinatory potential other than as it may be revealed through language structure.

It is true that some of Whorf’s phrasings may seem to encourage the idea that he believed that humans confront an essentially unstructured world. It is important to notice however that in 1941a he also wrote of “the spread and flow of *events*” (LTR:240; my emphasis) as well as the “kaleidoscopic flux of impressions” (1940a[LTR]:213). What we call “events” are configurations of experience which stand out from the rest of what happens. We would not normally describe an event as essentially unstructured. It is only on the basis of initial perceptual differentiation and organization that what we would be prepared to call an event may be extrapolated as a unit of experience from the ongoing flow of experiential data.

Thus, by extension, it can be argued that phrases like the “manifold of experience” or “the continuous spread and flow of existence” (1941b[LTR]:253), and even “the flux of experience” (1941a[LTR]:239) are as likely to be references to a structured matrix of existence as to undifferentiated flux. Indeed Lucy himself in an earlier paper emphasized that:

What Whorf says in these remarks is that the world *presents* itself in a “kaleidoscopic flux of impressions.” Nowhere does he suggest that the world is actually *perceived* as a continuum; he acknowledges that the world is perceived categorically and by reference to types. (Lucy & Shweder 1979:602; original emphases)

In this article, the importance Whorf gave “biological universals” in the context of apparently universal responses to certain sounds which he regarded as “lower-psyche facts” (Whorf 1941b[LTR]:267) is noted. Lucy & Shweder (1979:601) observe that Whorf had indicated that the “relationship between biological universals [...] and language and culture was not one of contrast, but rather one of ‘appropriation’”, an observation which fits in well with the argument which will be advanced here that Whorf considered isolates of meaning to be extrapolations from the range of isolates from experience available to a person.

Grounds for misinterpreting this crucial element of Whorf’s ideas about the nature of experience are thus to be found in his own comments. It seems that he may sometimes have been thinking of atomistic flux as it impinges on our sensory being and sometimes referring to sense data as they are experienced perceptually. He might, in other words, have interchanged physical with perceptual levels of description at times, leaving his readers unsure as to whether ‘raw experience’ referred to stimuli which are as yet undifferentiated in sensory terms or to configurations of sense data which make up the level of experience we describe as perceptual. Even an impression, after all, is not usually conceptualized as being without structure or distinctive character. The ‘flux of impressions’ may, accordingly, be regarded as the flow of events which are organized in perceptual terms but upon which further organization may be imposed according to cultural forces which operate in a person’s life.

If Whorf had not begun to read gestalt psychology in 1937 when he referred to raw experience’ or “the stream of sensory experience” (1936f?[LTR]:55) it is quite possible that he imagined at that time that linguistic processes operate directly on unstructured or undivided continua of experiential data. This was certainly the psychologist Fearing’s conclusion in 1953, in one of the earliest comments on the problem. He took Whorf’s use of ‘impressions’ to mean that he had thought that “primordially the experience of the individual is blooming

confusion" (a reference to a well known statement of Watson) and emphasized that such an opinion "is unsound and untrue", that "there is always figure-ground differentiation", and that: "Perception in primitive types occurs preceding the development and utilization of linguistic patterns" (Fearing 1954:180). This is exactly Whorf's point. Although Fearing had access to articles which make it clear that from 1938 on at least Whorf had accepted the implications of gestalt findings and actively tried to incorporate them into his theoretical formulations, Fearing asserted incorrectly that: "Whorf's discussion is wholly on the assumption that, apparently, there is no such prelinguistic stage" (p.181).

To clarify what is involved in this controversy, it may be worth considering what it would mean if languages, or more correctly their speakers, "arbitrarily dissected" a reality which was "an undivided continuum" as Black (1959:247) claimed Whorf thought. If this were the case translation would be a very chance affair and shared reference, even within a language, a much more uncertain matter than it already is. Speakers of different languages need to be referring to the same thing for their utterances to be comparable and for a translation attempt to be of any significance. If each human being really did operate in an *experiential* reality which consisted of undifferentiated flux there would be no common basis for reference. Each person would extrapolate idiosyncratically from that flux for the purposes of making meaning of experiential data. Individual realities would intersect only by chance and language, a social phenomenon based on shared patterns of reference, would be a tenuous business, if developed at all.

Whorf's point, at least at the stage when his theory complex was beginning to develop the range of elements necessary for it hold together as a coherent explanation of how language and the rest of experience interpenetrate, was that the business of making meaning of experience, while it may be culturally selective in the way it works, is not arbitrary. His central assumption about linguistic relativity seems to have been that what is "linguagable" (Whorf 1940i:2) is a structured reality which is patterned according to the same psychophysical principles for everyone. Whilst speakers from different speech groups may articulate that common reality differently ('articulate' is used here in its structural as well as its speech sense) the crucial fact that it is a shared foundation for reference means that different ways of talking can be compared with each other in relation to it.

The linguistic relativity principle, therefore, operates by virtue of the way languages differentially elaborate facets of experience which are universally available to all human beings. According to this way of thinking it is only because people are able to scan those parts of their experience that they do not habitually attend to for clues that they are able to make sense of other ways of

talking and thinking which give salience to aspects of experience which are non-salient in their own speech community. Linguistic relativity, in other words, is predicated on the hypothesis that there are universal configurations of experience upon which different linguistic schemes of classification operate in a variable way. In the next section we trace the development of Whorf's ideas about universally available isolates of experience and their relationship to language as his thinking developed during the period 1937 to 1941.

3.3 *Isolates of experience — the nonlinguistic configuration of experience*

Whorf's first enthusiastic discussion of the possibilities inherent in a gestaltic approach to linguistic analysis was expressed in a letter he wrote in April 1938 to Trager who was in Europe on a traveling fellowship at the time, having taught the previous semester at Yale. Trager and Whorf had been engaged to teach the graduate linguistic course during Sapir's absence on sabbatical leave and Whorf was completing the course Trager had started. Whorf told Trager that he was enjoying the teaching and that he had recently "projected some ideas new to linguistics" at one of the monthly meetings of linguists in New York. He said he had been "met by that baffled look — I trust you know what I mean". The topic had been "Noun and Verb". I shall quote a lengthy extract from this hitherto unpublished letter because of its importance as a contextualizing statement in relation to the period 1937–1941:

I have been very much interested in the question of noun and verb recently or rather of whether there are *any general psychological forms or mental forms corresponding to these grammatical terms*. I think there are, but it's too long and complicated a subject for a letter. What I maintain is that we have to have *new concepts to characterize the typical referents* of nouns and verbs. Grammatical form won't do it, it can only tell you that there are two grammatical categories, distinguished by certain linguistic tests, but it can't tell you the sphere of subject-matter that each is most appropriate to. And yet this is important, and is one of the things that most subtly and unerringly characterizes a language. Boas tried to prove which is which by dividing the sentences into a subject and predicate — but his own examples showed there was no way of telling which thing predicated and which thing subjectified. *I am all for launching some new and quite unlinguistic and psychological concepts to act as a reference frame in which to describe the strictly linguistic phenomena, in place of such terms as "action", "thing", etc.* My pet ideas right now are "Time and Space Segmentation" and "Figure versus Ground". (This is a concept of Gestalt psychology, as maybe you know, and I have been studying it recently with much profit).

The figure-ground concept can be used to analyze ideas, meanings, semantics, patterns, phonemes, stresses, rhythms, tones — anything in short that's psychological — whether or not linguistic, but all linguistics is included because of its psychological side. Thus, in English a noun meaning can be almost anything¹ “a table” = figural, with figural stability,² “a wave” = figural, no figural stability,³ “a temperature” ground, no figural implication⁴ “a sky” ground, figural implication,⁵ “a cloud” figure, relative stability only — etc. Now in Hopi, the type 2 can't be a noun, has to be a verb — you can't even say “a shooting star” in Hopi — type 1 is usually a noun but it can be a verb, whereas in English it is practically always a noun. *Or in phonemes, speech is a stream in which the phonemes are the “figure” and all the rest of the noise is “ground” — background.* Hence it is easy to see that phonemes are what they are because of the combinations they make in meaningful patterns, or that different sounds, physically, may be the same phoneme because of the pattern they are in, just as S is one kind of design — call it a “chevron” by itself, but in the combination SEA it is the letter S. (Whorf 1938d:1-3; original punctuation, my emphases) Figure 1 on page 98 is a reproduction of this section of Whorf's letter.

Trager replied to Whorf's letter, agreeing that the “matter of noun and verb is decidedly important”, but saying that he had “never given it much thought” and that he knew “nothing of modern psychological thinking”. He agreed, however, that:

It would be very convenient to have a non-linguistic reference frame, so as to avoid the constant confusion that now results between linguistic form and the various kinds of meaning categories. One feels, for instance, that there is a difference of some basic kind between the English use of a verb to say “Post no bills”, and the French use of a noun in the corresponding “Defense d'afficher”. But describing the difference in terms of the differing linguistic categories does not tell the whole story. (Trager 1938:1-2)

In spite of this initial responsiveness to Whorf's explorations, it seems that Trager never understood the way his colleague had applied gestaltic principles to linguistic analysis. Oddly enough he also seems not to have become aware (or at least not to have realized the significance of) the report his colleague was about to write under both their names. Here Whorf developed his application of gestalt psychology to linguistics in considerable detail under the general rubric of ‘configurative linguistics’, a term he evidently used with Trager who himself referred to “the realm of configurational linguistics” in later years e.g., in 1958: 143). Trager's lack of familiarity with Whorf's gestalt theory based reasoning



Or in phonemes, speech is a stream in which the phonemes are the "figure" and all the rest of the noise is "ground" - background. Hence it is easy to see that phonemes are what they are because of the combinations they make in meaningful patterns, or that different sounds, physically, may be the same phoneme because of the pattern they are in, just as  is one kind of a design - call it a "chevron" by itself, but in the combination  it is the letter S.

Figure 1. Sample of Whorf's handwriting from a letter to George Trager written 6 April 1938. Reproduced with permission from *The George L. Trager Papers*, Department of Special Collections, University of California Irvine Library.

was suggested when, commenting on the paper which Voegelin, Yegerlehner & Robinet 1954 had presented at the 1953 Conference on language in culture at Chicago, he said:

The reviewer must confess that he does not understand how one arrives at classifications like externally perceived and internally perceived, how this leads to discrimination between contemplative and eventful, or what *Gestalt* means as used here. (Trager 1955:228)

Even if he had understood it would not have helped much. Voegelin and his colleagues had attempted to apply Whorf's notions of the 'external and 'egoic' fields of primary experience (to be discussed in more detail below) to an analysis of Shawnee law. Their methodology, discussion, and conclusions, however, showed only the haziest comprehension of the reasoning in Whorf's (1939d) paper "Gestalt technique of stem composition in Shawnee" which they said they had used as their investigative stimulus. In particular, their criteria for defining what they referred to as "externally" and "internally perceived events", though derived in a general way from Whorf's discussion, was then modified according to a logic which is difficult to relate to the points he had made. They did not emphasize the crucial importance of basing their analysis on a nonlinguistic reference frame, nor did they use the figure/ground concepts which Whorf had regarded as centrally important to the application of gestalt theory to linguistics. Indeed their very use of the word *Gestalt* suggests a lack of familiarity with the psychological literature relating to it.

Voegelin's failure to identify precisely what Whorf had found useful in gestalt psychology is surprising because he had shown what he described as "that long letter which you sent round robin in the summer of 1938" (Voegelin 1939b) to Bloomfield, arguing (Voegelin 1939a:2) "that it was essentially a translation into Gestalt concepts". He reported that "Bloomfield thought that the thing could be done to advantage". (The letter itself has not been definitively located in the course of my research but may have been similar in content to the Yale report written about the same time).

So what were the insights which created such a ferment in Whorf's mind and which he had such difficulty trying to get Trager and Voegelin to understand? Whorf left some notes which clarify how he had been thinking when he wrote to Trager and which give us another starting point for looking at the way he incorporated gestaltic concepts into his work. These jottings, entitled "The Ideas of Verb and Noun from a Semantic Standpoint", were attached to preparatory lecture notes written in January 1938 some months before the letter to Trager. Whorf observed that typical verbs and nouns could in general be distinguished "by properties of meaning and reference" which he had found

“useful to describe and consider from two general semantic standpoints — The aspectual standpoint or space–time standpoint” (the “Time and Space Segmentation” mentioned in the letter to Trager) and “The figure and ground standpoint”. (Whorf 1938f; original underlining)

Referring to the “aspectual standpoint”, which seems to be a distillation of an important part of his analysis of Hopi, he differentiated between “thing vs. action” which he apparently understood in terms of the “space–time of physics” and “point–events” (Whorf 1938f). Several examples which he evidently planned to use in his lecture were noted. A more fully developed discussion of the same kinds of examples occurs in the paper “Science and linguistics” where, pointing out that “nature herself is not thus polarized” according to the pattern by which English nouns and verbs differentiate grammatically between different experiences, he drew attention to the following anomalies:

If it can be said that ‘strike, turn, run,’ are verbs because they denote temporary or short-lasting events, i.e., actions, why then is ‘fist’ a noun? It also is a temporary event. Why are ‘lightning, spark, wave, eddy, pulsation, flame, storm, phase, cycle, spasm, noise, emotion’ nouns? They are temporary events. If ‘man’ and ‘house’ are nouns because they are long lasting and stable events, i.e., things, what then are ‘keep, adhere, extend, project, continue, persist, grow, dwell,’ and so on doing among the verbs? If it be objected that ‘possess, adhere’ are verbs because they are stable relationships rather than stable percepts, why then should ‘equilibrium, pressure, current, peace, group, nation, society, tribe, sister,’ or any kinship term be among the nouns? It will be found that an “event” to US means “what our language classes as a verb” or something analogized therefrom. And it will be found that it is not possible to define ‘event, thing, object, relationship,’ and so on, from nature, but that to define them always involves a circuitous return to the grammatical categories of the definer’s language. (Whorf 1940a[LTR]:215)

He continued with contrastive examples from Hopi and Nootka, pointing out for instance, that: “Hopi [...] has a classification of events (*or linguistic isolates*) by duration type” and that in Nootka, “all words seem to us to be verbs, but really there are no classes 1 and 2 [nouns and verbs in the English pattern] we have, as it were, a monistic view of nature that gives us only one class of words for all kinds of events”. Terms equivalent to our ‘house’ or ‘flame’ “are inflected for durational and temporal nuances” in a way which would seem quite strange to someone familiar only with English (pp.215-216; my emphasis).

The key point in relation to our present discussion is that whilst experience itself, in a primary, existential, and nonlinguistic sense may be patterned on

what we can describe as a thing–action or thing–event aspectual continuum, grammatical categories in any particular language are not necessarily reliable or objective guides to the place of different types of experiences in that continuum. When Whorf said, therefore, that “the world is presented as a kaleidoscopic flux of impressions which has to be organized by our minds” he evidently considered one of the nonlinguistic, or primary experiential parameters of the organizational process to be aspectual in the sense he explored.

He said, for instance, that “psychological time, which is much like Bergson’s ‘duration,’ but [...] quite unlike the mathematical time, *T*, used by our physicists” is a one of the “psychic experiences” which underly any elaboration of the kinds of cosmic concepts used in “the construction of a consistent picture of the universe” (p.216). This experience, which underlies “Our awareness of time and cyclicity”, he said, is “the basic sense of ‘becoming later and later’” (Whorf 1939c[LTR]:139). He was inclined to think that this “subjective experience” (an “ever-later-becoming duration”) is the experience of “real time” (p.142) available to any person and that different languages elaborate this primary existential datum in different ways. Similarly he thought that “probably the apprehension of space is given in substantially the same form by experience irrespective of language” and argued that: “The experiments of the Gestalt psychologists with visual perception appear to establish this as a fact.” Nevertheless, he said, “the CONCEPT OF SPACE will vary somewhat with language, because, as an intellectual tool” (he noted: “Here belong ‘Newtonian’ and ‘Euclidean’ space, etc.) “it is so closely linked with the concomitant employment of other intellectual tools, of the order of ‘time’ and ‘matter,’ which are linguistically conditioned” (pp.158-159).

It is not clear whether, when Whorf called this broad ‘aspectual’ parameter of experiential organization a general *semantic* standpoint he was calling attention to its function as a process implicated in making meaning of experiential data at the personal level. By definition such meaning would have to be nonlinguistic, although it might be paralleled by linguistic meanings having various degrees of correlation with the physical space–time continuum according to the semantic resources of different languages. In the context of other comments in his lecture notes it seems more likely that on this occasion at least he meant that it was a broadly semantic criterion that *linguists* might use to tackle language data so that they might be unblinkered by assumptions implicit in grammatical categories of their own languages.

Nevertheless, if there are primary apprehensions of time and space of the kind he described, and if these are universally available before a person becomes linguistically enculturated, and if they continue to operate in conjunction with more variable influences on conceptual structure, then these

apprehensions must be part of the nonlinguistic organization of data accomplished by our minds, whether or not we consider this activity to be one of making meaning of what happens. As such Whorf's aspectual parameter of experience is part of 'the latent content of language', an operation of innate processes involved in 'the intuitive *science* of experience', to use Sapir's terms. In chapter two we considered Sapir's opinions about a 'pre-rational', and presumably prelinguistic plane where "images" provide an experiential base for the development of concepts. I suggested there that if a science is a systematization of data, then Sapir's "*science* of experience" must be an inherently available organization of experiential data uninfluenced by linguistic patterning. In gestalt theory Whorf found further clues to the nature of this organization.

The notion that certain processes universally available to human beings *organize* the data of primary experience is the central feature of gestalt theory. Whorf's early 1938 jottings on the matter suggest the kind of emphases he was extrapolating from his reading of the 1935 publication: *Principles of Gestalt Psychology* by Kurt Koffka (1886–1941). He notes:

our visual experience has 'picture-quality'
 no picture on photograph, simply array of tiny points of varying concentration of pigment, which would be completely described by a tabulation like a timetable. Picture is in eye of beholder, but eye not retina — no picture on retina but only mosaic of stimulation; picture is created by *organization of field of consciousness*. This works as a *field of force*, building and maintaining forms. The forms built on principle of figure vs. ground — more highly organized forms having ch[aracter of?] figure, less organized, ground.

At this point two drawings are included as illustrated in Figure 2 on page 103. A cube with its highly organized form is contrasted with a less symmetrically organized figure which, Whorf argues, is more likely to be interpreted as ground. As figure, the cube shape can also be given various interpretations: a set of three diamond shapes or a hexagon, for instance, as well as being seen as a cube. Whorf then remarks that "The ground also is full of configurations or gestalts but less organized — *the play of forming forces*" which "may be glimpsed" for instance in the activity of some neon signs. The moon provides another example. He continues:

Lgs by and large have classes of words some of which are strong in the figure-quality of their reference, others less so or more ground quality. On the whole, former what we call nouns. Combining the gestalt and the aspect meanings all lgs have references strong in fig. quality = long duration

(typ[ical] nouns) & weaker and more fluctuating fig. & var[iable] or short dur[ation]. (typ vbs.) Typ. adjs. weak figure long duration aspect.

While this the av. or norm. diff. lgs. sort differently. (Whorf 1938f; original punctuation & abbreviations, my italics).

His comments here about “the field of consciousness” and “a field of force, building and maintaining forms” are particularly interesting with respect to some of the ideas we examined in the previous chapter. There we saw that Whorf was able to conceptualize linguistic patterning operations as creating cognitive fields or states of linkage or rapport in the nervous system and associated glands. Whilst those ideas (apparently developed around 1937) may have been partly generated by his background in the physical sciences they are also reminiscent of the gestaltic version of a trace theory of memory. Indeed there is a ubiquitous emphasis on fields of force at all levels of experience in the gestalt psychology literature and if this influenced his thinking about how linguistic processes might be physically entrenched in cognition, it suggests that he was already aware of this research by 1937. This would not be surprising, given that Sapir was familiar with the this literature, referring to the Gestaltpsychologie school of thought as early as 1925 (Malkiel 1989:93).

Whorf remained actively interested in investigating gestaltic phenomena to the end of his life. This is attested by a set of notes and drawings he made on an apparently sporadic basis in late 1940. As well as noting examples of phenomena reported by Wolfgang Köhler (1887–1967) in 1929, it seems that he was also in the habit of noticing and recording his own experiences of perceptual illusions — the apparent motion in a neon display for instance. He noted that it is the “gestalt which determines motion” (Whorf 1940m: frame 841). He also sketched several situations where the viewer mentally completes a figure even where part of what is seen is obscured, e.g., the silhouette of a woman behind a venetian blind or a sign partially observable behind a tree trunk. He commented too on a drawing he had made which can be interpreted as a woman sitting on a stool with her back either away from, or toward the viewer, noting that it was an instance of the “effect of will on gestalt” (frame 843). He also noted that Köhler had pointed out that gestalt quality is lost when a figure is viewed without its field, for instance from very close up or through a restrictive viewing apparatus. As Koffka (1935:319) said: “one will never discover that such things as faces exist if one looks through a microscope”.

Referring to a photographic reproduction, Koffka argued that what is “on the developed plate” is only a picture “if the person who looks at the plate in the situation” is taken into account (p.74). This is the ‘molar’ rather than ‘molecular’ approach to the study of behavior (25ff.) but of course it is also the principle established in relativity physics and fundamental to the notion of

linguistic relativity. The molar approach was advocated by the gestaltists as a means of analyzing any kind of animal behavior holistically, in terms of the organism's "behavioral environment" which was understood to be imbued with tensions and "endowed with forces" (p.43) on the model of "electrical and magnetic fields as the carriers of forces" (p.42). A molecular approach in terms of the "geographical environment" (physical reality) would yield a different result, because it would operate within a different universe of discourse. Koffka pointed out that the

[photographic] plate can be adequately described if you divide it up into small areas and measure the thickness of the layer [of exposed particles] in each of these areas. A complete table of these thicknesses would be a complete description of the developed plate. There is *no* picture on it, if we mean by picture more than this complete table. Break off a corner of your plate, rub off a part of the photographic layer, the rest will remain as it was before, each point having its characteristics independently of all the others. (Koffka 1935:75; original emphasis)

He argued that the "immediate cause of our vision of any object is just such a mosaic of stimulation as that of the photographic plate" and asked "how the enormous richness and variety of our visual environment can be aroused by such a mere mosaic of light and shade and color [...] the 'dimensions' of our environmental field [being] far more numerous than those of the mosaic of the stimulation?" (p.75). His answer was that "the psychophysical field is organized". To "study the organization of the environmental field" he said that it is necessary (a) to

find out the forces which organize it into separate objects and events, (b) the forces which exist between these different objects and events; and (c) how these forces produce the environmental field as we know it in our behavioral environment. (Koffka 1935:67)

In further discussion about the "forces of organization" involved in patterning experiential data, he argued that "there is a connection between things and figures on the one hand, and ground and framework on the other." [...] "The ground serves as a *framework* in which the figure is suspended and thereby determines the figure" (p.184; original emphasis). In visual experience, he said, orientation in a horizontal or vertical direction, relative size of different parts of what is seen, and what he described as the "relative energy density" of parts of what is seen, all seemed to be shown experimentally to be factors involved in determining what would appear as figure and what as ground in a particular

visual array (pp.190-193). He said that areas of greater “internal articulation” are also likely to be seen as figure whilst “good continuation and good shape” are additional factors involved in the “spontaneous organization aroused by the stimulus mosaic” (pp.208-209). These ideas were subsequently experimented with by Whorf in an analysis of Hopi verbs, as we will see towards the end of this chapter. With reference to the perception of motion, Koffka said that:

Our perceptual field [...] is never entirely homogeneous. Even in complete darkness it has an above and below, right and left, near and far [...] Inhomogeneity of the total field and a displacement of a point within such an inhomogeneous field are therefore two necessary conditions for the arousal of the psychophysical process of motion. (Koffka 1935:281)

Each of these examples of perceptual salience, or of ‘figure’ in a broad sense, against the more homogeneous or less sharply differentiated ground of the perceptual environment may be thought of as an isolate of experience in Whorf’s terms. That he used the term ‘isolate’ as equivalent to ‘figure’ is evident in a letter to Frederick G. Fassett Jr. (1901–1991), editor of *The Technology Review*, where he referred to “the gestalt relations of isolate and background” (Whorf 1940n:1). He was elaborating here on the point he wanted to make in the first *Review* article where he remarked that

if a rule has absolutely no exceptions, it is not recognized as rule or as anything else; it is then part of the background of experience of which we tend to remain unconscious. Never having experienced anything in contrast to it, we cannot *isolate it* and formulate it as a rule until we so enlarge our experience and expand our base of reference that we encounter an interruption of its regularity. The situation is somewhat analogous to that of not missing the water till the well runs dry, or not realizing that we need air till we are choking. (Whorf 1940a[LTR]:209; my emphasis)

He gave additional examples, e.g., a race of people only able to see blue would not be able to talk about blue or indeed about color in general. He also noted that “the law of gravitation is a part of the untutored individual’s background, *not something he isolates from that background*” (my emphasis).

Like the gestalt psychologists therefore, Whorf worked from the knowledge of invariant principles which organize visually processed sensory data to the assumption that all sensory information in what they called the ‘psychophysical field’ is similarly subject to configurative forces inherent in human physiology. When he stressed that “we must have a way of describing phenomena by non-linguistic standards, and by terms that refer to experience as it must be to all

human beings, irrespective of their languages or philosophies” he was referring to all the phenomena which might be referred to in language. He continued:

This is possible, the way having been shown by Gestalt psychology. Visual perception is the standard, norm, and framework of all experience. The forms and laws of visual perceptions are the same for all individuals — even the most glaring abnormalities, like color-blindness, are relatively minor, and do not disturb the universal configurative principles of visual perception. We need not cite these laws here — see, e.g. Kurt Koffka, “Gestalt Psychology”. The basic principle is the contrast of figure and ground, involving the differing degrees of organization, stability, and fixity in figures or outlines of all sorts. (Whorf & Trager 1938:7; typescript)

In his Shawnee article he asked: “how do these laws of vision give any canon of reference for non-visual experience?” and answered, identifying two fields of experience:

By process of elimination. Everything that “takes up space” can be shown to be known directly or indirectly through vision. Everything unvisual is unspatial in character (and vice versa) and is felt as immediate to the experiencer. Touch alone is somewhat fused with visual material, and, when it tells us form, contour, and texture, it is indirectly visual. Visual experience is projected and constitutes space, or what we shall call the *external field of the observer*; unvisual experience is introjected and makes up what we shall call, following some Gestalt psychologists, the *ego field*, or *egoic field*, because the observer or ego feels himself, as it were, alone with these sensations and awarenesses. [...]

This principle of classifying referents is nonlinguistic and *nonsemantic in the ordinary sense of semantic*. An isolate of experience in either the external or the egoic field, e.g., a shape or a noise, is not a meaning. Nevertheless a language may sometimes have a principle of classifying groups of morphemes and their semantic effects which is coordinated with this universal principle. (Whorf 1939d[LTR]:164-165; my emphases)

He explained that like the visual field, “the egoic field has its own Gestalt laws, of sense quality, rhythm, etc., which are universal”. He also clarified the nature and range of phenomena in the egoic field, saying that “the referent of a lexeme of hearing, tasting, or smelling” as well as “those of thinking, emotions, etc” are egoic. Experiences such as “the difference between light and darkness, and the referent of seeing, not of what is seen”, he suggested, are

either borderland or of the egoic field, because the sensation quality is introjected though the figure-ground quality is projected; the referent of saying something is also egoic, because the observer introjects both his own and other people's speech, equating an essential from it to his egoic field of hearing or sound; and the referent of possessing or having is also egoic. (Whorf 1939d[LTR]:164)

In the Sapir memorial article, he discussed the external/egoic field dichotomy without mentioning its derivation from gestalt theory. Here, equating the notion of "field" with that of "consciousness", he pointed out that:

Nonspatial experience has one well-organized sense, HEARING — for smell and taste are but little organized. Nonspatial consciousness is a realm chiefly of thought, feeling, and SOUND. Spatial conscious is a realm of light, color, sight, and touch, and presents shapes and dimensions. (Whorf 1939c[LTR]:155)

These are rather subtle explorations which possibly accounts both for the difficulty Voegelin et al. (1954) had in working from them and for the fact that they are not often referred to in the literature. It is significant that although participants at the influential Language in Culture conference of 1953 discussed issues directly related to the points Whorf had made in the Shawnee paper, no one there appears to have fully appreciated their significance in relation to the question of linguistic relativity, which was the topic of the conference. Of course lack of access to the range of materials referred to in this chapter, especially Whorf's (1938) letter to Trager and the Yale report, must be taken into account. These papers and other notes now available to scholars illuminate remarks in the published materials in such a way that the influence of Whorf's interest in gestalt psychology in his post 1938 papers becomes much more salient for the reader than it might be otherwise. We could perhaps say, bearing the arguments in chapter two in mind, that the resonative weight of accumulated references in Whorf's work taken as a whole precipitates the points in the pattern of his gestaltic analysis into greater focus for us as readers. However it remains the case that all the essential elements of the theory about isolates from experience are to be found in material which was available to conference participants in 1953, although their significance for a proper understanding of what Whorf had wanted to say was not appreciated at the time.

Although Voegelin (Hoijer 1954:170-171) recognized that Whorf had been attempting to discover 'absolutes' or 'universals' which existed "by virtue of some equipment in the organism — because something is built in", he was not able to explain to his skeptical colleagues at the conference how Whorf had

structured his argument. He was crucially hampered in this, in my opinion, by his failure to appreciate the theoretical significance of Whorf's terminology — including 'isolates', 'segregation' (or 'segmentation') 'of experience', and the 'external' and 'egoic' fields. Most importantly, he seems to have failed to understand the operational relationship Whorf postulated between invariant and universally available isolates of experience and the activity of making meaning — in particular the significance of the fact that all isolates of experience are available to speakers of all languages although they may be variously emphasized or backgrounded according to semantic processes in each language. A further problem, as the record of the discussion after his paper makes clear (pp.167-169), was that Voegelin's use of 'extrovert' and 'introvert' in relation to his own data definitely confused participants. In spite of his personal contact with Whorf the evidence suggests that he simply had not understood the latter's empiricist approach to the question of how experiential data may be analyzed in a neutral way.

Fearing responded to Voegelin in the course of the debate by insisting, as he did throughout the conference, that Whorf had not "in general" argued "for absolutes" and that he had found little "evidence for the existence of absolutes and universals" (Hoijer 1954:171). Voegelin's rather vague reference to his "feeling that there are absolutes" which he said was derived from Whorf's examples and his "own reading of Gestalt" (p.171) did nothing to convince his critic and yet in the discussion session after his own paper Fearing pointed out correctly that "Whorf was really presenting a theory of cognition" and that he had been "talking about the way the human animal sees the real world" (p.175). He then presented a range of points developed on the basis of his own knowledge of gestalt psychology (pp.175-182), making it clear at the same time, however, that he was either not familiar with Whorf's Shawnee paper or had not understood the significance of key statements made there. This makes Voegelin's failure to enlighten him all the more surprising since he certainly knew the paper, which had been published as an appendix to his own book on Shawnee.

3.4 *A canon of reference, the same for all observers*

It was left to Hockett, as the philosopher, Abraham Kaplan (b.1918) later pointed out (Hoijer 1954:218) in the course of discussion, to draw participants' attention to the importance of the fact that Whorf had been seeking "a cross culturally valid frame of reference" and that what "he thought he had found in figure and ground, was not a human universal, but a sort of co-ordinate, which would be valid in measuring differences from one language to another and one culture to another" (Hoijer 1954:171). It is not clear why Hockett should have

thought that the figure/ground principle could not also be regarded as a human universal (if that is what he meant, and if what he said was correctly recorded) but he was correct in the other respect. Whorf specifically referred to “this universal principle”, as we saw above. His statement about the need for “a canon of reference for all observers, irrespective of their languages or scientific jargons” by which “all visually observable situations, and many other situations, also” can be broken down and described came from the Shawnee paper (Whorf 1939d[LTR]:163) to which participants had access and is a paraphrase of what he had previously argued in the Yale report.

The grounds for Hockett’s conclusions as well as Fearing’s (who as we have seen was aware that Whorf was interested in “the way the human animal sees the real world”) may be suggested by Hockett’s statement that he thought that “it is important to distinguish between universals, *culturally speaking or linguistically speaking*, and a cross-culturally valid frame of reference” (Hojjer 1954:171; my emphasis). The essential point about isolates from experience is that they are *experiential universals*. It may be the case that we deploy certain experiential universals invariably in linguistic elaboration of fundamental conceptions; in such cases these isolates may be understood as providing the foundation for linguistic, and therefore cultural, universals. This question is taken up again in chapter five. Linguistic relativity would not be an issue, however, if all possible abstractions (isolations) from experiential data were taken up for linguistic/conceptual utilization in every language.

Hockett went on to argue at the conference that although people like Whorf “have found themselves impelled to search for an absolute that they could use in their wanderings — an anchor to windward [...] no such point of reference is necessary”. He said that: “It is not necessary to have a co-ordinate system in order to have a perfectly valid geometry” and suggested that perhaps “we can dispense with any cross-culturally valid co-ordinate system in making these measures of linguistic and cultural differences” (Hojjer 1954:171). Black (1959:256) made a similar point when he said that Whorf would have done better “to abstain from metaphysics altogether” in his search for a “supposed ‘canon of reference for all observers’”. He said that the relativity of different languages “might still be argued on the basis of intralinguistic comparisons, just as we establish the relativity of geometries without reference to a supposed absolute and nongeometrical knowledge of space”.

To comment on these remarks, firstly it is not necessary to Whorf’s claims about the relationships of different languages to experience for the empirically derived ‘canon of reference’ to be absolute; it is sufficient that it be workable. An investigative methodology developed on the basis of his claims could be considered workable to the degree that it encouraged linguistic researchers to

become aware of the way they might otherwise tend, when analyzing patterns of reference in another language, to rely unconsciously on categories of reference which are linguistically entrenched in their own conceptual repertoire. It might be considered *successful* to the degree that such researchers became able, through application of the method, to conceptualize a more complex reality than their own linguistic habits foster, i.e. to the degree that they are able to abstract and conceptually amalgamate sets of isolates from utterances which refer differently (in different languages) to the same broad situation. Examples Whorf used to demonstrate what he meant are examined later in this chapter.

Secondly, and more importantly, it is not clear how languages might be relative to each other except insofar as they relate differently to a common reality. Black's (1959:256) remark that "the detour into dubious ontology cannot excuse the theorist from the detailed demonstration of variation in grammatical structure" seriously misrepresented Whorf's research program by implication, something he did more than once as Ellis shows in some detail commenting: "Black's analysis of Whorf [...], where careless formulations of Whorf's views introduce seemingly tiny changes of wording that fundamentally change his views and show the careful observer that Black completely misunderstood what Whorf was saying" (Ellis 1993:125n). A significant proportion of Whorf's contrastive semantics, as we have seen, involved grammatical analysis. Indeed Ellis argues that

the nature of [Whorf's] original contribution does not really lie in what is commonly attacked in his work. Whorf shares with many thinkers, before and since, the idea that the concepts of a particular language are unique constructs of that language and thus part of its structure of thought. To attack him uniquely on these grounds, therefore, is both to misconceive what his original contribution was and to shut one's eyes to the much wider currency of those ideas. Whorf's individual contribution lies in something far more specific than this. It has two major aspects: First, his is a unique attempt to take these theoretical ideas and make a detailed empirical study of their application to the study of particular languages, especially languages remote from the Indo-European realm. Second, he shifted the emphasis of the argument from concepts in the lexicon of a language to the broader realm of grammatical structures. The basic ideas involved were not new, but Whorf's use of them in a careful and detailed empirical study that focused above all on grammar definitely was. (Ellis 1993:63)

Whorf emphasized, as Sapir had done, that those elements of utterances which are obligatory in the grammatical sense are also those which operate most automatically in structuring what we say. They are the most subtly influential

processes in linguistic thinking because they are the most difficult to monitor consciously. Whorf was interested in comparing grammars because he wanted to know more about the range of conceptual possibilities available to human beings in relation to the same experiential data. He wanted to know, in other words, how different languages relate to *experience* (the only reality we can truly say that we know). The relativity in question is the relativity of different kinds of linguistic thinking to each other with respect to human reality as it is 'for all observers'.

The matter of the relativity of geometries or languages to each other can be clarified further by referring to comments Sapir and Whorf themselves made on the topic. When Sapir (1924:153) said that: "The outstanding fact about any language is its formal completeness", by which he said he meant that not only has each language "a well defined and exclusive phonetic system with which it carries on its work" but also that "all of its expressions, from the most habitual to the merely potential are fitted into a deft tracery of prepared forms from which there is no escape", he added that: "These forms establish a definite relational feeling or attitude towards all possible contents of experience, in so far, of course, as experience is capable of expression in linguistic terms". It is implicit in this statement that not only are 'the contents of experience' available to speakers of all kinds of languages, but also that some experience is not operationalized linguistically as Whorf (1937c[LTR]:67-68) was to imply some years later in his reference to "thought *insofar as it is* linguistic" (my emphasis).

Sapir continued in a series of comments which precede his explicit reference to relativity quoted earlier in this chapter by several pages and which again reveal his understanding of physical relativity theory:

The world of linguistic forms, held within the framework of a given language, is a complete system of reference, very much as a number system is a complete system of quantitative reference or as a set of geometrical axes of coordinates is a complete system of reference to all points of a given space. The mathematical analogy is by no means as fanciful as it appears to be. To pass from one language to another is *psychologically parallel* to passing from one geometrical system of reference to another. *The enviroing world which is referred to is the same for either language*; the world of points is the same in either frame of reference. But the formal method of approach to the expressed item of experience, as to the given point of space, is so different that the resulting feeling of orientation can be the same neither in the two languages nor in the two frames of reference. Entirely distinct, or at least measurably distinct, formal adjustments have to be made and these differences have their psychological correlates. (Sapir 1924[SW]:153; my emphases)

It is evident here that Sapir wanted to emphasize that the formal (or systemic) and psychological relativity of languages or geometries to each other is a function of the fact that they refer to the same 'enviroming world' or 'world of points' respectively. His reference to an 'item of experience' is additionally interesting, anticipating as it does Whorf's 'isolate of experience'.

Whorf also made it clear that the relativity of different geometries is a function of the fact that ultimately they deal with the same subject matter or extensions from it, just as the relativity of various cosmologies to each other is a function of the fact that they are all attempts to describe the same universe insofar as it can be comprehended by humans. He said that:

Just as it is possible to have any number of geometries other than the Euclidean which give an equally perfect account of space configurations, so it is possible to have descriptions of the universe, all equally valid, that do not contain our familiar contrasts of time and space. The relativity view-point of modern physics is one such view, conceived in mathematical terms, and the Hopi Weltanschauung is another and quite different one, nonmathematical and linguistic. (Whorf 1936f?[LTR]:58)

Thus both Sapir and Whorf made it clear that the possibility of comparing geometries is based on an implicit assumption that what they systematize in the first instance is a common reality — space as it may be experienced by human beings — and that this is differently described and mentally organized according to the principles embodied in each geometrical method. Whorf (1941b[LTR]: 248) it may be recalled thought that mathematics and music "are ultimately of the same kindred as language", presumably because each elaborates experience according to systematic principles which are socially generated and sustained and which allow concepts in the first case and emotions in the second to be communicated in a culturally configured way. It may be useful to give a little more attention to the way different geometries (which are effectively different mathematical perspectives brought about by different ways of talking) articulate different conceptions of space.

Until non-Euclidean geometries were invented it was taken for granted that what Euclid had done was to devise an internally coherent and self contained way of talking about what is involved when measurements are made in the world we understand as being that with which we have immediate physical contact¹². The term 'space' was itself an intellectual abstraction from that

¹² I wish to thank John Callow for helping me clarify these concepts although I must stress that any errors in my reasoning are the result of my own elaborations upon his explanations, for which he cannot be held responsible.

dimension of daily reality, i.e. an extrapolation from experiential realities which are functions of the interface of our physiology with the rest of the world. Euclidean geometry can be understood, therefore, as both the linguistic manifestation of a way of sharing more abstract understandings of some of the things humans do and at the same time, through its system of axioms and methods of calculation, the very means whereby those concepts are articulated and may be further developed conceptually. Again, the term 'articulate' does double work because not only does the language of geometry provide a way of expressing certain concepts but it is the very means by which those concepts can be systematically related to each other in a structural sense.

When non-Euclidean geometries were developed, a crucial axiom of the Euclidean system — that only one line parallel to a given line can be drawn through a given point — was dropped. The mathematics of these geometries, while still anchored in experiential reality (being derived from the earlier system) could then be used to expand that reality conceptually in different ways according to the different principles of articulation available in their specialist terminology. Although it may be the case that mathematicians are able to nonlinguistically conceptualize what is involved in these kinds of extensions (perhaps through specially developed kinds of imagery which can be shared like that embodied in the Möbius strip — a one sided continuous surface made by twisting a long narrow rectangular strip of material through 180° and joining the ends) the fact remains that the concepts are largely developed to more refined stages through the kind of linguistic thinking which is described as mathematical and which is manifested in various calculational and other representational techniques shared by groups of people who know this sort of language.

That this kind of thinking is quite different from our ordinary way of talking is indicated by the fact that people who do non-Euclidean geometry can only describe certain mathematical concepts as dealing with "curved space" when they use ordinary language. Relative to the new geometries Euclidean geometry has to be described as relating to "flat space" even though no such concept was required when there was only one system of geometrical calculation and, indeed, in biological terms might seem counter intuitive. It might seem to someone untutored in geometrical ways of thinking that two entirely different realities are involved, the one experiential in an ordinary sense and the other more remote. The fact remains however, that geometries of all kinds are all conceptual elaborations derived ultimately from the same nonlinguistic experiential reality — apperception of space as a function of all the sensory modes through which we understand ourselves in relation to the environment at large. Both the commensurability and relativity of different geometries to each other are functions of

their status as conceptual systems which relate ultimately to the same subject matter.

Perhaps when Black said that linguistic relativity “might still be argued on the basis of intralinguistic comparisons” he took it for granted that different languages refer to the same human reality and that people can assume they know what this reality is like. But the crux of Whorf’s argument is that we cannot assume that we do know this in the experiential or subjective sense, not because we *cannot* know the full range of aspects of our interface with the rest of the environment but because, by reason of enculturation and in particular its linguistic mediation, we do not *notice* them all and, most importantly, are not aware of the unconscious selective processes involved.

Whorf’s ‘canon of reference’ may be thought of as a meta experiential analytical frame which is empirically based. Of course it too has of necessity to be linguistically articulated to be communicable. As such it becomes part of a scientific jargon and, as we will see in more detail in chapter six, Whorf was certainly aware that for such jargons to be maximally effective scientists need to be aware of their relativity to other ways of talking and alert to ways in which implicit assumptions embodied in them might have the capacity to subvert the consistency of inquiry processes. Whether or not he was entirely justified in doing so, he considered the findings of gestalt psychology to be empirical in the required sense. In developing his notion of an ‘aspectual’ parameter of experience based on our experience of duration he also assumed that our own internal processes and responses to events may be empirically observed, through introspection, in the ‘egoic field’ of experience.

Lenneberg (1953) came to similar conclusions about the need for an appropriate metalanguage for use in psycholinguistic research without appreciating that this had also been Whorf’s aim. He commented on the fact that “a language always selects for codification highly specific aspects from the physical and social environment”. Conjecturing about why there should be such selectivity and how it might be described objectively he admitted that “these considerations, though clearly of a semantic character, have a bearing on the problem of codification” (p.468). He even used the term ‘language of experience’ which he defined as “the words and morphemes that refer to the most elementary forms of experience such as the sensation of temperature, of humidity, or of light” (Lenneberg & Roberts 1956:7). It was for this reason that he proposed color perception and naming as a suitable area for empirical research. He thought that “under laboratory conditions, the power of color discrimination is probably the same for all human beings, irrespective of their language background” (pp.468-469). This statement is almost a paraphrase of some of Whorf’s more general remarks about perception and language.

Lenneberg argued that “speech events (color terms)” and “behavioral events” (recognition of color stimuli) could be correlated through: “The specifications of the physical properties of the stimuli”. This he said “served as a metalanguage, so to speak, for the description of both types of events” (p.471). It is interesting to notice that Whorf did not claim that he had provided a way of describing the “physical properties of the *stimuli*” independent of any screen of observation but merely the invariant characteristics of our *experience* of these phenomena insofar as a satisfactory language might be suggested by gestalt theory. (Readers interested in the color research tradition will find that it is well covered by Lucy (1992a) who provides a detailed evaluation of Lenneberg’s work and reasoning in the context of a thorough study of the empirical research program to which he was an important early contributor. Keith Allen’s (1994) review of Lucy focuses specifically on Lucy’s (and by implication) Lenneberg’s use of the term ‘metalanguage’, questioning the reasoning involved).

In retrospect, considering the high level of interest in Whorf’s work in the early 1950’s and the persistence of at least some of this interest into later decades, it is unfortunate that two commentators as influential as Lenneberg and Black proved to be should have failed to penetrate the logic of the linguistic relativity principle as Whorf had actually described it and not as they imagined he had. Both in their own way appreciated the significance of his work for psychology and philosophy respectively. Certainly both were handicapped by lack of access to his unpublished notes and letters and in Lenneberg’s case in 1953 to the full range of articles to be published in LTR. They also typify Whorf commentators in general in that neither appears to have given serious attention to his explication of gestalt theory in the Shawnee article. This is not surprising in Lenneberg’s case because he was not primarily a linguist and the paper was available only in a technical publication at the time. Black however, based his comments about Whorf’s ‘canon of reference’ on a paragraph from that paper where Whorf’s empiricist approach to the problem of finding an objective reference frame against which to compare utterances made in different languages is unequivocally clear. His full statement is as follows:

A discovery made by modern configurative or Gestalt psychology gives us a canon of reference for all observers, irrespective of their languages or scientific jargons, by which to break down and describe all visually observable situations, and many other situations, also. This is the discovery that visual perception is basically the same for all normal persons past infancy and conforms to definite laws, a large number of which are fairly well known. It is impossible here to do more than touch on these laws, but they bring out clearly that the basal fact of visual perception is the relation of figure and ground, that perceptions are largely in the nature of outlines,

contrasted more or less with the grounds, fields, and fillings of outlines, and that perception of motion or action is figural in type, or connected with the perception of at least a vague outline quality. (Whorf 1939d:163)

In this context, Black's (1959:256) statement that: "Whorf's own metaphysics", which he described as "a Bergsonism", "supplies him with a supposed 'canon of reference'" is remarkable and completely misleading.

Lucy (1992a) is one of very few since Hockett in 1953 who has commented on Whorf's interest in frames of reference saying that: "Whorf occasionally raised the possibility that frames of comparison based on nonlinguistic grounds could be found" for comparing the way speakers of different languages deal with experience (p.32). Although he quoted some of Whorf's references to gestalt psychology his discussion was hampered by the fact that he had not apparently seen any of the unpublished material other than the nine typed pages of the Yale report (held at Chicago University as well as Yale) when he wrote. He was correct, nevertheless, in identifying "a concern on Whorf's part to give language comparison an unbiased foundation" (p.33).

He also drew attention to the fact that: "Whorf's notion of 'concept' needs to be distinguished from more direct, lower level processes of perception" which he identified in references to "sensations, impressions or apprehensions". As he pointed out, Whorf's contrasts (1939c) between the "subjective" experiences which underly concepts of space and time and linguistic patterns associated with those experiences imply that "there is a lower level of psychic experience to which we can, on occasion, have access" (Lucy 1992a:41). He noted that Whorf had argued that the "psychic experiences" classed under the headings of "time, velocity, and matter" are indestructible, even where "categories derived from other kinds of experience" (1940a[LTR]:216) have greater significance in a particular world view.

Like others however, Lucy failed to notice the significance of Whorf's isolate terminology which is the key, not only to his reasoning about the way languages foster a selective segregation of elements from experience, but also to the logic of the linguistic relativity principle itself, as I have attempted to show here. And yet the notion that: "Cognition is dependent, firstly, on the psychophysical organization of man", and that this organization itself is selective by comparison with other species and might be made more so for humans by cultural factors, was emphasized as early as 1955 by the biologist and originator of general systems theory Ludwig von Bertalanffy (1901–1972) in his paper "An essay on the relativity of categories".

3.5 *The biological segmentation of reality*

Bertalanffy (1955) explained that “from the great cake of reality, every living organism cuts a slice, which it can perceive and to which it can react owing to its psycho-physical organization, that is, the structure of its receptor and effector organs” (p.247). Reality, in other words, has different configurations in experiential terms for every species. He said that:

According to von Uexküll’s expression, any organism, so to speak, cuts out from the multiplicity of surrounding objects a small number of characteristics to which it reacts and whose ensemble forms its “ambient” (*Umwelt*). All the rest is non-existent for that particular organism. Every animal is surrounded, as by a soap-bubble, by its specific ambient, replenished by those characteristics which are amenable to it. If, reconstructing an animal’s ambient, we enter this soap-bubble, the world is profoundly changed: Many characteristics disappear, others arise, and a completely new world is found. (Bertalanffy 1955:248; original punctuation)

For instance “the rich environment of the tick” which waits in the bushes until it senses that a warm blooded animal is near “shrinks to metamorphize into a scanty configuration out of which only three signals” are isolated, these being the odor of butyric acid, heat, and a hair-free space on the skin of the victim. Bertalanffy’s opinion was that: “This organizational constraint of the ambient” within which every animal exists goes further to include

the forms of intuition considered by Kant as apriori and immutable. The biologist finds that there is no absolute space or time but that they depend on the organization of the perceiving organism [...] the space of visual and tactile perception is in no way Euclidean [...] the co-ordinates are in no way equivalent, but there is a fundamental difference between top and bottom, right and left, and fore and aft. Already the organization of our body and, in the last resort, the fact that the organism is subjected to gravity, makes for an inequality of the horizontal and vertical dimensions. (Bertalanffy 1955:248)

He said that: “A similar relativity is found in experienced time” which “is not Newtonian” but depends on physiological conditions”. In old age, for instance, “time appears to run faster, i.e. a smaller number of instants is experienced per astronomical unit of time” because of the “slowing down of metabolic processes in senescence”. An ‘instant’ in Uexküll’s terms is a function of a particular nervous system. For instance, while humans require movie frames to be presented faster than 18 per second for the illusion of movement to occur, an

image has “to be presented at least 30 times a second” for “the fighting fish (*Betta*)” to perceive an “imaginary opponent” and “a stick vibrating four times per second appears at rest to the snail” (p.249).

Bertalanffy also discussed “the dependence of categories on cultural factors” (p.252) beginning with cultural conventions about art, then going on to the cultural relativism of Oswald Spengler (1880–1936) which he was careful, however, not to accept without question. Although concluding that “the Whorfian thesis is essentially identical with the Spenglerian” he stressed that:

Linguistic, and cultural categories in general, will not change the potentialities of sensory experience. They will, however, *change apperception*, that is, which features of experienced reality are *focused and emphasized*, and which are under-played. There is nothing mysterious or particularly paradoxical in this statement which, in the contrary, is rather trivial; nothing which would justify the heat and passion which has often characterized the dispute [...]. (Bertalanffy 1955:253; my emphases)

Bertalanffy gave as an example the fact that although any observer sees the same picture when looking at a slide under a microscope, what a person “actually sees, that is, what is his apperception (and what he is able to communicate), depends widely on whether he is a untrained or a trained observer. [...] And even this depends on his line of interest and training” (p.253). He concluded that: “Perception is universally human” but “Conceptualization is culture-bound because it depends on the symbolic systems we apply” which “are largely determined by linguistic factors” even “[t]echnical language, including the symbolism of mathematics” being ultimately “an efflorescence of every-day language” and therefore not independent of it (p.254).

Can human beings know reality as it is outside or beyond the biological and cultural processes which create the *Umwelt* in which we live? Bertalanffy considered that we can. He said that although “the categories of experience and cognition” may be subject to “biological and cultural relativity” (p.255) and although such a state of affairs “touches on the question of the foundations of human knowledge” (p.246), there are also “limits of this relativity” (p.255) and “absolute knowledge, emancipated from human limitations, is possible in a certain sense” (p.247). He rejected Uexküll’s conclusion that “the world of human experience and knowledge is [...] in no way singular as compared to that of the sea urchin, the fly or the dog” (p.255) and, following Lorenz (1943) argued that:

The “apriori” forms of intuition and categories are organic functions, based upon corporeal and even machine-like structures of the sense organs

and the nervous system, which have evolved as adaptations in the millions of years of evolution. Hence they are fitted to the “real” world in exactly the same way and for the same reason, as the equine hoof is fitted to the steppe terrain, the fin of the fish to the water. It is a preposterous anthropomorphism to assume that the human forms of experience are the only possible ones, valid for any rational being. [...]

It is not required that the categories of experience fully correspond to the real universe, and even less that they represent it completely. It suffices — and this is Uexküll’s thesis — that a rather small selection of stimuli is used as guiding signals. (Bertalanffy 1955:256-257)

These selections are, of course, Whorf’s isolates of experience, the where-withal from which meanings are extrapolated according to cultural contingencies and the accumulation of experience. They are the critical factors in the experiential interface of language, thought, and reality and ultimately, the foundation on which human knowledge is constructed, as John Locke (1632–1704) argued.

Locke’s opinion was that “all the materials of reason and knowledge” (Locke 1690:II,i,2,42) are derived from experience either through sensation or reflection. He said that: “*External objects* furnish the mind with the ideas of sensible qualities, which are all those different perceptions they produce in us; and *the mind* furnishes the understanding with ideas of its own operations” (5,44; original emphasis). He considered the reception of ‘simple ideas’ through sensation (insofar as this is “bare, naked perception”) to be “for the most part, only passive” (II,ix,1,73) but he allowed that “actual perception” does require that “impressions [...] made on the outward parts” be “taken notice of within” (2, 73). He considered reflection (the monitoring of internal activity) to be a more active process, involving “some degree of voluntary attention” (1,73).

These ideas seem to equivalent in some respects to Whorf’s external and egoic fields of experience except that Whorf has isolates, the equivalent of simple ideas, being generated in both fields. Internal isolates, while they may include processes of thinking which can be monitored reflectively as Locke observed, also include other stimuli, e.g., physiologically generated internal changes of the kind which are culturally identified as feelings, emotions, or even sensations. These require only the same amount of ‘notice’ as data impinging on the external senses in order to be experienced as perceptions. There is a qualitative difference between this sort of attention and the kind of active reflection upon mental processing which Locke argued develops only at a certain stage in a child’s life, after the capacity for perceptual processing has matured.

To return to Bertalanffy’s discussion about “the rather small selection of stimuli [...] used as guiding signals”, he continued (p.257):

As for the connections of these stimuli, i.e. the categories of experience, they need not mirror the nexus of real events but must, with a certain tolerance allowed, be isomorphic to it. For the biological reasons mentioned above, experience cannot be completely “wrong” and arbitrary; but, on the other hand, it is sufficient that a certain degree of isomorphism exists between the experienced world and the “real” world, so that experience can guide the organism in such a way as to preserve its existence”.

Ultimately, he concluded, “knowledge only mirrors certain aspects or facets of reality” even in the most abstracted and “de-anthropomorphized science”, but: “Each such aspect has, though only relative, truth. This, it seems, indicates the limitation as well as the dignity of human knowledge” (p.262).

These points may not have been appreciated by Grace (1987) who, in comparing ‘the mapping view’ of language and ‘the reality construction view’ has contrasted the mapping notion that “there is a common world out there and our languages are analogous to maps of this world” with the other perspective where he says:

Emphasis is placed upon the fact that we do not have direct access to the real world itself, but only to the data about it provided by our senses. And these senses provide very incomplete information. Our eyes, for example, respond only to a very narrow band of wavelengths within the electromagnetic spectrum [...] etc.

Thus, in the reality construction view, our sensory data are regarded as falling seriously short of constituting an adequate picture of the real world. They are considered to be very incomplete and unsystematic, are seen as not adding up to anything like a representative sample of what is out there [...] all we can do is theorize about reality [...] to construct models of it. These models are our constructed realities, and they are reflected in the languages we speak. (Grace 1987:6)

On the contrary, as Bertalanffy argued and I think Whorf would have agreed, our pictures of the world *are* adequate, albeit constrained by species specific perceptual limitations and modified by culturally generated emphases. Whilst it may be true that we construct the social realities in which we live out our experiential (but not our existential) lives, these constructions are all elaborations on the same basic foundation of perceptual data which licenses as much as it constrains knowledge of the world beyond the senses.

Black (1962b:15) argued that “rules for transformation of co-ordinates yield no information about space; and translation rules for sets of languages tell us nothing about the ultimate nature of reality”. This remark suggests that we could learn nothing new about reality by being able to translate across languages.

However Whorf's observation that we selectively extrapolate different facets of experience from the whole complex of presented perceptual data when we make meanings implies that we do have the potential to learn something new when we learn how other people say things. What we learn may not be about the ultimate nature of reality (something which is difficult to conceptualize if indeed it is a useful concept) but may be an augmentation of our awareness of those dimensions of experience available to us as a species but generally lacking in salience for us because our established habits of attention render them invisible or out of focus.

3.6 *Different essentials from the same situation*

Whorf clearly differentiated between nonlinguistic isolates of experience and the isolates of meaning which differentially operationalize them in culturally specific ways to create the meaning making resources of particular languages. This contrast is the core of the linguistic relativity concept as he articulated it. He evidently believed that it is an empirical matter that speakers of different languages draw "different essentials out of the same situation" (Whorf 1939d[LTR]:162) and make linguistically communicable meaning out of their specific selection.

The most accessible example of Whorf's application of gestalt theory to semantics is probably in the M.I.T. article of April 1940. This paper, the first of the series directed at readers outside the fields of linguistics and anthropology, follows the famous memorial to Sapir written in 1939 (although not published until 1941). That paper, contrary to popular opinion, is not as explicit an exploration of the linguistic relativity principle as such, as are the three *Technology Review* articles, "Science and linguistics" (1940a), "Linguistics as an exact science" (1940d), "Languages and logic" (1941a) and the theosophical paper "Language, mind, and reality" completed in early 1941 and published posthumously the following year, nor is the principle mentioned by name in it. Figure 3 opposite from Whorf (1940a[LTR]:208) provides us with perhaps the most concrete example of what Whorf meant when he talked about the way we draw 'different essentials' from a situation. In these drawings, which Whorf himself drafted in almost the form they subsequently appeared, readers are alerted to differences between "the three isolates from experience" used by an English and a Shawnee speaker respectively to say "I clean it (gun) with the ramrod". The diagrams and comments make it clear that Whorf considered that different mental abstractions from the total situation are operationalized conceptually as "isolates of meaning (thoughts)" and used by the two speakers in "reporting the same experience". When each set of isolates is drawn together in the process of making a statement the references are quite unequivocally to the

same situation in macro terms, that is to the task of cleaning a gun. Different configurations of salience in the two observations, however, suggest subtle conceptual differences in the way the situation as a whole is understood and experienced subjectively.

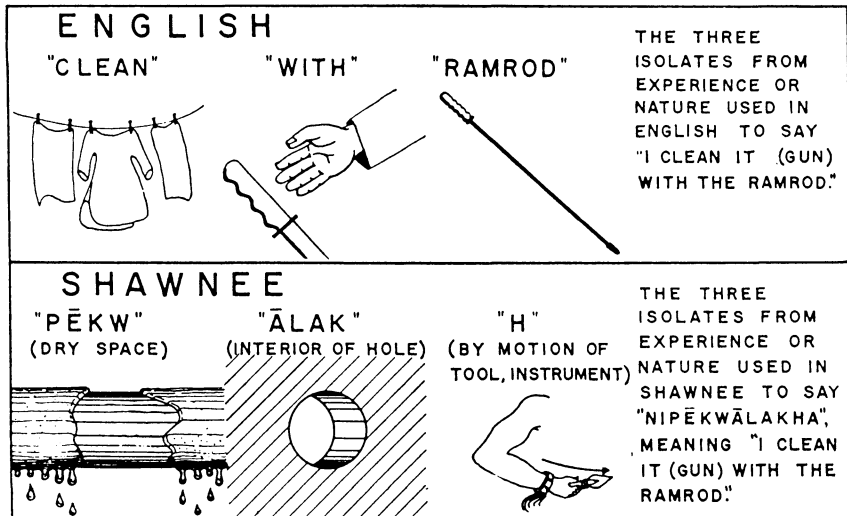


Figure 3. Drawings and comments prepared by Whorf for inclusion in *The Technology Review* (1940) and subsequently reprinted in *Language, Thought, and Reality: Selected writings of Benjamin Lee Whorf* edited by John B. Carroll. Reproduced with permission from MIT Press.

In a microexperiential sense each speaker unconsciously selects a different subset of all the possible perceivable features of the situation, this selection being a function of automatic linguistic processes which have become cognitively entrenched in the process of acquiring language. In Shawnee, according to Whorf, the morphemes which make up the statement refer to the experiential isolates: 'dry space', 'interior of hole', and 'by motion of tool, instrument' while in English quite different isolates are operationalized as concepts and incorporated into the utterance, i.e. 'clean', 'with', and 'ramrod'. Ego and the gun are pivotal in both statements however, which suggests that the referential framework for each speaker has the same basic state parameters or major situational foci.

The "different languages segregate different essentials out of the same situation" (Whorf 1939d[LTR]:162) while at the same time selecting certain significant macrofeatures in common. A "pragmatic translation" where "the emphasis

is on the content of the message” with respect to “the practical matter-of-fact goal” (Casagrande 1954:335) is therefore not difficult to achieve; it would focus on those isolates from the whole experience which occur in both statements. A certain amount of information would be lost in such a translation however, either for cultural reasons — the more subtle features of each observation perhaps seeming irrelevant in the context of the other culture — or because clumsy circumlocutions would be required.

Notice that neither speaker needs to *choose* to report the situation in a particularly idiosyncratic way although this is not to deny of course that each could have used a range of different locutions to report it if they had wanted to and that in doing so they would have been able to manipulate what they wanted to say to produce utterances with various communicative effects or emphases. Whorf’s point was simply that in a straightforward report of what is happening speakers quite unthinkingly operationalize particular experiential isolates rather than others just because that is the way the linguistic processes they have at their disposal work automatically.

All the isolates involved in both statements are physiologically available to both speakers, as indeed are many others not utilized in either utterance, for instance the rigidity or shapes of the gun barrel and rod, the complementary character of these shapes in relation to each other, the concentrated attention of the actor on the job, residue removed by the operation of cleaning, or characteristics of motions involved in the operation. Neither the ramrod itself nor the focus on the fact that the action involved is one of cleaning, is essential to the Shawnee, while the “direction of a hollow moving dry spot by movement of tool” (Whorf 1939d[LTR]:162) is not brought into focus by the English sentence. Nevertheless in each case all these aspects of the situation (and more) are available as functions of the human perceptual interface with the environment. As Hockett (e.g., 1954:116) points out, the differences between languages are not so much with respect “to what it is possible to specify” but “what is relatively easy or hard to specify”.

Whorf (1939d) emphasized, as we saw earlier, that: “An isolate of experience in either the external or the egoic field, e.g., a shape or a noise, *is not a meaning*” (LTR:164; my emphasis) and in the same passage he contrasted these perceptually generated isolates with isolates of meaning which a year later, as indicated in the example above, he specified as being ‘thoughts’, thereby implying that isolates of *experience* are neither thoughts nor meanings. Earlier, however, he had regarded his ‘aspectual’ and figure/ground frames of reference as ‘broad semantic standpoints’, at least from the vantage point of the language analyst.

It is essential to Whorf's case for linguistic relativity that the mental organization of experiential data is not in the normal course of things a conscious matter. In relation to this question we can clarify one aspect of the differences between isolates of experience and isolates of meaning. For instance, when Koffka explained that the 'psychophysical field' is organized he was referring to the patterning of stimuli into contrastive configurations by automatic processes which generally operate out of awareness. Although organization is imposed on experiential flux in the course of this processing, and although the activity may be regarded as cognitive in the modern sense because it is perceptual in broad terms, the 'images' which are precipitated in the process (being 'pre-rational' to use Sapir's term) are not in themselves meaningful without further processing. They are the 'latent content of thought' as we saw in chapter two, the where-withal from which meanings might be generated.

Koffka's (1935) example of the photograph which impacts on us in a primary experiential sense in terms of an arrangement of patterns which are not in themselves meaningful is pertinent here. The patterns which are seen are only *experienced* as meaningful if the person in whom they occur recognizes them as representing something; two different kinds of cognitive activity are involved. We might think of these as being roughly sequential and operating at different 'levels' of cognition but such notions can be counterproductive if taken too literally. In the day to day functioning of the human organism perceptual and interpretive processes interweave and are difficult to separate even though the latter are of course dependent on data produced by the former.

The issue may be clarified further by considering it in terms of Bohm's (1980) terminology introduced in chapter two. According to Bohm, the data of experience are constantly being taken in by the organism and 'enfolded' in cognition. A great deal of this activity occurs without our consciously monitoring it but, having been absorbed, the products are nevertheless implicitly present in cognition as part of the 'implicate order' which subsumes and generates such 'manifest' activity as conscious thinking which we can regard as part of the 'explicate order' of existence in spite of the fact that it happens internally. All that 'explicate' means in this context is that it can be apprehended consciously.

The point, in this way of talking about cognitive behavior, is that to recognize, or to think anything at all, is a function not only of relevant immediate perceptual or intellectual input but, more importantly, of all previous (enfolded) pertinent experience. "Everything is in there" as Hockett (1990, p.c.) has remarked. When linguistic processes become entrenched in cognition they too, being indeterminate or "NOWHERE", as Whorf put it (1941b:269), when not manifest in actual operations of speaking or thinking, are just part of the

implicate order which underpins the possibility of conscious activity or, for that matter, the kind of cognitive processing which takes place out of awareness or during sleep. We might perhaps think of these largely unattended to activities as occurring with different degrees of implicitness. As we saw in relation to the similarity of some of Whorf's ideas to Vygotsky's (and as will be discussed in more detail in the next chapter on covert categories and cryptotypes) Whorf's ideas about what Sapir had called the "actual process of thought" allowed for linguistic thinking which is not strictly isomorphic with the linguistic forms which manifest in speech as well as the kind of linguistic thinking which we can identify as internally occurring speech or self talk.

To summarize, Whorf seems to have differentiated between isolates of experience and isolates of meaning as follows. Isolates of experience include all the perceptual data generated in the interface of the organism with the rest of the environment, and isolates of meaning are those features of experience which are operationalized in making meaning of what happens. Some isolates of meaning are socially acquired or communally generated; others may have purely idiosyncratic or personal value. I think it is fair to assume that isolates of meaning may be either linguistic or nonlinguistic; a symbol deployed in pictorial work might be an example of the latter which has communicative value. A person may also habitually use a great range of images in thinking without necessarily having developed ways of communicating them or even having had the need to do so. Our systematic extrapolations of experiential isolates from presented data are, however, largely unconscious processes, unattended to in the normal course of the meaning making activity we are constantly engaged in.

The linguist using empirical data from perceptual experiments or from introspection can utilize a nonlinguistic frame of reference to analyze how linguistic processes relate to experiential invariances. Because the language analyst in such situations is investigating how people make meanings out of experiential data, the reference frame can be considered broadly semantic. As that part of this structuring (or articulating) activity in linguistic thinking is out of awareness most of the time, Whorf was able to argue a case for the presence of a linguistic relativity principle at work in the interface of human understanding and the world. The principle operates to the degree that there are differences between speakers of different languages with respect to the configurations of salience they extrapolate from the same experiential data and, more importantly, to the degree that they remain unaware of the selectivity of the processes involved and allow isolates of experience taken up by speakers of other languages to remain out of focus in their own discourse and thinking. The language analyst or any metalinguistically aware individual has the possibility of experiencing relative

freedom from the operations of linguistic relativity but can never be totally free of it, something we will consider further in chapter six.

Whorf's point about the unmonitored character of the linguistic, i.e. semantic configuration of experience was missed by Black. Justifiably confused perhaps by Whorf's frequent use of the term 'analyze' and its derivatives, and also the word 'classification', both of which are normally used to suggest conscious behavior, Black assumed throughout his paper that the points Whorf had made about the "background linguistic system (in other words, the grammar)" which "is itself the shaper of ideas, the program and guide for the individual's mental activity, for his analysis of impressions, for his synthesis of his mental stock in trade" (Whorf 1940a[LTR]:212) were references to conscious behavior on the part of speakers. For instance, he said that:

it is hard to believe that the ordinary speaker is aware of a grammatical classification that takes all the virtuosity of a Whorf to discover. I doubt that the average English speaker realizes that the particle "*un*" can be prefixed only to transitive verbs of a "covering, enclosing, and surface attaching meaning" (p.71) that constitute a prototype. [...] Here I think Whorf commits the *linguist's fallacy* of imputing his own sophisticated attitudes to the speakers he is studying. (Black 1959:247; original emphases)

Whorf's discussions of cryptotypes like the one which operates in Black's example were always technical discussions devised to show just how complex and subtle the range of processes which operate in linguistic thinking are and, in particular, their automatic or unconscious nature. There is nothing in his writing to support Black's assumption that he believed that speakers are conscious of such processes without special training. Black also asked of Whorf's analysis of the Hopi "picture of the universe": "How much of all this would the average Hopi recognize? Perhaps it might leave him as dumbfounded as a Greek peasant reading Aristotle" (p.251).

The analogy is apt for Whorf (1936f?[LTR]:58-59) made it clear that although the 'abstractions' he described in this case are "definitely given either explicitly in words — psychological or metaphysical terms — in the Hopi language" they are "even more [...] implicit in the very structure and grammar of that language, as well as being observable in Hopi culture and behavior". In other words, although (as in the Greek case or, for that matter, English) abstruse metaphysics can be discussed by persons familiar with the appropriate terminology, most members of any community remain largely or completely oblivious of the concepts involved in spite of the fact that their presence may be revealed by implication in what they say or do and be apparent to an observer. To the degree that such concepts are functions of linguistic processes in

cognition and operate out of awareness in the normal course of events, a linguistic relativity principle may be said to operate in the interface of experience and understanding, manifesting among speakers of a particular language as a distinctive ‘picture of the universe’ or ‘view of the world’, a characteristic way of interpreting events so that they make sense in the context of previous experience, including previous understandings.

The linguistic relativity principle is integral to the comprehensive investigative methodology Whorf called ‘configurative linguistics’ which is the focus of the report he wrote for the Yale Department of Anthropology in 1938 and to which we will now turn.

3.7 *The Yale report and configurative linguistics*

In spite of Whorf’s undoubted originality and conceptual daring he was very significantly a person of his time as Darnell (1974, 1990), Hymes & Fought (1975), and Lucy (1992a) have also shown. But there is no doubt that he also had a strong sense of the special significance of his own work within the tradition to which he gave allegiance. In rough notes written only a few months before his death for one Robert A. Leshner, a general engineering graduate of M.I.T. in the class of 1913, fan of the *Technology Review* articles, and a person evidently consumed by a desire to make a “history of the sciences in graphic form” (Leshner 1940:1), a task involving “examination of the whole history of not only the Western Culture but all cultures” (p.3) — to which end he said he had left his employment to live on his savings — Whorf sketched the history of linguistics as he saw it. Whorf’s use of the adjectives ‘configurative’ and ‘planetary’ is as interesting as the confidence displayed about his own place in history, a confidence he seemed to sustain at the best of times although its perhaps somewhat manic expression in these notes (as to some degree in the final paper) may suggest something of a level of despair occasioned by impending death. He began by noting:

Conscious beginning of *modern configurative linguistics* with Sapir circa 1910–1915. Sapir unites rigorous comparative linguistics, phonetic law, phonemics [...] interest in accurate descriptive grammar, American and other exotic languages, anthropology, psychological and social relevance, under the concept of ‘significant pattern’. His untimely death in 1939 prevented his making *the direct and overwhelming integrated statement that would have eventually come [...]* Above all, Sapir attempted to put meaning and thought back into linguistics, or to see them as linguistic problems. (Whorf 1941c:5-6; my emphases)

He then remarked (p.5) that “(t)he new planetary approach to language”, with its “(a)tttempts to describe American Indian languages in objective scientific terms”, had its roots in work undertaken by Boas in the 1890’s, this more recent work renewing “attempts at a world-wide linguistic taxonomy initiated by the R. C. Church missionary centers” in the 16th century (p.3), initiatives which had been largely disregarded in the interim.

Rollins (1980:59), who saw these notes when they were still in the hands of the Whorf family, was mistaken when he said in relation to Whorf’s remark about Sapir quoted above that: “It is probably superfluous to add that Benjamin Whorf believed this [his?] hypothesis of linguistic relativity to be a close approximation of what Sapir’s ‘overwhelming integrated statement’ would have been”. It is certainly possible that Whorf hoped in 1938 that his formalization of configurative linguistics in the Yale report might fill something of the vacuum increasingly being felt as a result of Sapir’s illness and impending death but it was not the linguistic relativity principle as such that he was thinking about here, as his next few notes make clear. Writing in effect the epitaph he might have wanted for himself, he roughed out his own place in the history of linguistics in the following terms:

From about 1937 on begins to be articulate the viewpoint expressed in “Science and Linguistics” & “Linguistics as an Exact Science”. This seeks for a *comprehensive objective description of all linguistic phenomena*, world-wide, on both the formal and meaningful sides, and to make the background nature of all these complex phenomena available to the other sciences which they may concern. Also to provide the eventual basis for a planetary logic. (Whorf 1941c:7-8; my emphasis)

It is evident in this remarkable statement that Whorf imagined that “a comprehensive objective description” with an important role to play in the progress of science and in bringing about improvements in “future developments in thinking” (Whorf 1937c[LTR]:83) or in the development of “a new technology of language and thought” (1941a[LTR]:240) would result from applying configurative linguistic methodology to the study of language on a broad scale. Notice that the possibility of discovering ‘a planetary logic’ is firmly anchored in the practice of exhaustive linguistic description. His primary objective seems to have been to develop and refine a methodology powerful enough to achieve these visionary objectives.

What is not generally appreciated is that Whorf made significant progress towards a) developing an overview of the methodology he envisaged and b) demonstrating its application in the Yale report (see appendix for full text). Entitled “Report on Linguistic Research in the Department of Anthropology of Yale

University for the Term Sept. 1937 – June 1938, this document is, in its original form, a closely handwritten paper of 17 foolscap pages on the general topic of configurative linguistics. Whorf also typed up the first seven or so pages (as nine typed pages) and a copy of this part of the report was deposited by Carroll in the University of Chicago Library in the 1950s. The full original manuscript, including the typed pages, is in *Benjamin Lee Whorf Papers*, deposited in the Yale University archives in 1979 and now also available on microfilm. What appears to be a preliminary outline is in the Trager collection at University of California, Irvine.

Although the authors are given as “B. L. Whorf and G. L. Trager” the document was written entirely by Whorf who was working on it at the end of second semester before setting out for his first field trip to the Hopi in Arizona in the summer of 1938. It was written for professional colleagues, including primarily, those members of his department, including George P. Murdock (1897–1985), who persistently failed to see the full value of linguistics to the larger study of human culture and organization (see Darnell 1990, chapters 18–20 for a description of the climate in which linguistics was undertaken at Yale during the period of Sapir’s tenure). The report does not seem ever to have been completed or presented. As important in theoretical terms as the various papers published in LTR¹³, its comprehensiveness at the beginning of an era during which linguists would increasingly lose sight of the big picture with regard to languages and linguistic analysis is most interesting. And although the term ‘linguistic relativity principle’ is not used in it, I would argue that the report is usefully regarded as the foundational document on the topic. It certainly seems to have provided the groundwork for the more entertainingly written memorial paper (which takes on new depth when reread in its light) and for the various articles for nonlinguists written during Whorf’s last months.

The Yale report is something of an historical enigma therefore, particularly because, if it had been known in the decades following Whorf’s death, there might have been a fuller appreciation not only of the theory behind the linguistic relativity principle but also the overall conceptual frame into which it fitted. Whorf may have intended to finish it after his field work but early in the fall, following his return to Connecticut, he underwent his major operation, and later that year the debilitating radiation treatment which followed (Whorf 1938e). It is possible that Whorf began to be unwell earlier in the year and that this interfered with his writing. The fact that Sapir remained seriously ill throughout 1938 (dying in February 1939) and that others in the Anthropology Department were less receptive to his ideas than Sapir would also have discouraged Whorf from

¹³ Neither Carroll or Trager could remember in 1990 whether the report had been considered for inclusion in *Language, Thought, and Reality*.

completing the document, particularly if one of the objectives in preparing it had been to impress his mentor. Whilst the details of his personal relationship with Sapir are difficult to determine from sources currently available, it does seem that Whorf might have felt at times that he needed to work hard to win Sapir's approval. Although Sapir evidently liked and respected Whorf, expressing caution occasionally, however, about his more extreme ideas, there is no evidence of the deep affinity he seems to have felt for Newman (see Darnell 1989 for details of that relationship).

Certainly the fact that another document entitled "Language: Plan and conception of arrangement" (1938c[LTR]:125-133) had been rejected earlier that year for inclusion in "the extensive ethnographic outline prepared and published by the Dept. of Anthropology (G. P. Murdock et al. 1938)" must have constituted a serious discouragement. Instead, only "a very condensed synopsis" had been included although five or six carbon copies were also circulated (including the one Norman A. McQuown (b.1914) kept and Carroll used in 1956 for the LTR collection). Whorf described the plan as an "exploratory" or "tentative outline of the field of configurative linguistics as applied to any one language", saying that it provided the basis for the report (Whorf & Trager 1938:3, typescript) and emphasizing that:

The idea of such an outline is an important one for linguistic taxonomy, or the systematic view and classification of all known "linguistic species", i.e. individual lgs, in order that science may obtain a comprehensive view of the human linguistic faculty as one large whole, much as zoology classifies and studies all animal species, not merely a few preferred ones. Long in advance of the ultimate possibility of such a linguistic world-picture it is desirable to compare many adequately comprehensive outlines and "trait-lists" of individual lgs to "see what we have got" world-wide and so make valid generalizations about the totality Language. (Whorf & Trager 1938: 3; original abbreviations).

Although the term 'configurative' was thematic in anthropology and linguistics at the time, as we saw in chapter two, it is possible that the term 'configurative linguistics' may have become more significant for Whorf as his interest in gestaltism grew. The German word 'Gestalt' is frequently translated 'configuration', and 'configurationism' is an alternative name for gestalt theory. Nevertheless, it should be emphasized, as we shall see in more detail below, that specific reliance on gestalt theory is only a part of the configurative or pattern seeking approach to linguistic investigation as a whole which Whorf wanted to demonstrate in the report and which Sapir actively encouraged in his students, Newman in particular showing the kind of flair he admired.

The Yale report is important because it is a unique attempt to systematize all dimensions of linguistic analysis, from the identification of phonemic patterns to the analysis of meaning in several different social domains, within an overall methodological framework. No other linguist had attempted to develop such a methodology in explicit terms although the principles involved are implicit in Sapir's writing, as Whorf recognized. Trager's (1949) schematization of linguistics (to be looked at in chapter six) was another attempt which may well have its origins in discussions held in 1937/38. Whorf included Trager as co-author in the report because, he said, the parts on phonemics and morphophonemics in Section A were chiefly due to him. The following section dealing with: "Configurations of grammar including grammatical classes" Whorf regarded as a joint effort but he took full responsibility for the rest of the document dealing with "Configurative Linguistics and Cultural World-Outlook — 'Ethnolinguistics'" (Section B) while acknowledging the contribution of discussions with Trager, Hockett, McQuown, Swadesh, Haas, and Voegelin to the development of his own ideas. There is no mistaking the sense of loss experienced by this group as it comes through in Whorf's expression of his "great indebtedness to Prof. Sapir, especially for encouragement and for the stimulation given by his broad and penetrative outlook, at once scientific and sensitive, all of which he has given freely to us even while weighed down by illness" (Whorf & Trager 1938:2).

Concerned about the serious disjunction in scientific terms between descriptive linguistics as he knew it and the ability of linguists to describe how language relates to experience, Whorf argued in the report that:

The task of formal grammar ends when the analysis of all linguistic configurations is completed, but the characteristics of a language are by no means fully accounted for then. It still remains to indicate the *types of experience* and the *kinds of referents referred to* by different grammatical classes, for l[an]g[uage]s may here differ widely. Our ordinary ways of classifying referents, as being "things", "objects", "action", "states", etc. are quite unsuitable for this work, as they are themselves names for *partitionings of experience* resulting after it has been grammatically classed, and circular definitions or mere confusion will result from applying them as if they referred to *the conformation of reality itself*. Terms like "subject", "predicate", "actor", "agent", "function", "cause", "result", are equally misleading or useless in any other than a strictly grammatical sense, defined for and by each particular lge and referring only to the patterns therein and not to *external reality*. It is, e.g. quite legitimate to talk about "the agent" in a given lge where the term has been defined or illustrated, but it is not to say that two different lgs of widely different type are alike in their treatment of "the agent". In such a use it is

not clear what “agent” means. It is impossible to break up the flow of events in a non-arbitrary manner into “subject”, “actor”, “predicate”, etc. as if there existed external realities of this sort. We, to be sure, may analyze a phenomenon as ‘boy runs’, but another lge is capable of analyzing it ‘run manifests as boy’. (Whorf & Trager 1938:6, typescript; my italics, original abbreviations and underlining)

The paper “Grammatical categories” (LTR:87-101) written at Boas’ request in late 1937, but not published until 1945 when it was found among his papers, expresses a similar concern. Well accepted in its manuscript form by Whorf’s colleagues it begins with the article of faith of the Sapir school that “terms derived from traditional grammar, like verb, adjective, passive voice” can and should be avoided in the initial stages of investigating patterns observable in linguistic data because their use is “fraught with grave possibilities of misunderstanding” (Whorf 1937d[LTR]:87) resulting from culturally entrenched assumptions about the general function of each category in its relationship to the world. Whilst Whorf evidently did “not share the complete distrust of all functional definitions” felt by some, he emphasized that “operational descriptions become valid as possible ways of stating the MEANING of the forms, ‘meaning’ in such cases being a characterization which succinctly accounts for all the semantic and configurational facts, known or predictable” (p.88) only after exhaustive study of grammatical patterning.

The question of where meaning does or should enter into linguistic analysis was debated in a lively way in the 1930s and 40s. Trager, for instance, spoke on this question at the March 1939 linguistic meeting at Columbia, subsequently writing a paper on the topic the following year (Trager 1940) and corresponding with George Herzog (1901–1983) in relation to it. Bloomfield’s (1933) discussions of the nature of meaning and its place in linguistic science were undoubtedly well known and his additional treatments of the topic (1939, 1943) were soon to become available, the latter, according to Robert A. Hall Jr. (b.1911), as “an outgrowth, at least in part, of his discussion with colleagues and students at New Haven, especially in the meetings of the Yale Linguistic Club” (Hall 1987:156).

Whorf also attended these meetings when he could. Not only did he regard his efforts to develop a comprehensive configurative methodology as a significant contribution to the debate on the place of meaning in linguistics but, running very much against the contemporary tide, he believed that: “The very essence of linguistics is the quest for meaning” and that “as the science refines its procedure, it inevitably becomes, as a matter of this quest, more psychological and cultural, while retaining that almost mathematical precision of statement which it gets from the highly systematic nature of the linguistic realm of fact”

(Whorf 1937c[LTR]:79). What he wanted to show was that the description of relationships between elements of language and elements of experience could be as objective and scientifically based as descriptions of linguistic items and their arrangements were thought to be.

It seems that Whorf kept up the struggle to convince his colleagues of the viability of these ideas even while engaged in writing his final papers for non-linguists and in a state of severe ill health. Work on Hopi stems (discussed in the next section below) may have been a response to challenges raised by Bloomfield in lectures Whorf was able to attend at that time. As Hall points out (1987:156), Bloomfield emphasized the importance of using “formal, rather than semantic, features as the STARTING POINT for linguistic analysis”. Hall adds that some of those who followed Bloomfield, including Trager, had as their “theoretical aim the description of linguistic structure exclusively in terms of distribution” and, by implication, the patterns observable in that distribution. As far as possible, they tried to exclude the analysis of meaning from their kind of linguistics to such a degree, that a decade or so later at the 1952 Conference of Anthropologists and Linguists at Indiana University, Roman O. Jakobson (1896–1982), never a Bloomfieldian, was moved to say that meaning had “become a No Man’s land” and that just as “we have fought for the annexation of speech-sounds to linguistics, and thereby established phonemics [...] we now face a second front — the task of incorporating linguistic meaning into the science of language” (Jakobson 1953; 21).

What was still at stake in the early 1950s was the degree to which semantics could be actively investigated in a science of language; the use of differences of meaning to establish the separate identity of phonemes or morphemes from each other was taken for granted because it was unavoidable, although even this occasioned discomfort for some hard liners. Jakobson’s appeal was lost in the obfuscation of the Chomsky era which, with respect to this controversy at least, was to a very considerable degree unthinkingly heir to the belief that a scientific linguistics must eschew semantics. As Ellis (1993:12-13) remarks: “The generative tradition in linguistics began with Chomsky’s setting out to systematize linguistic form and claiming that it could be done without regard to meaning: meaning seemed to be source of untidiness that would ruin any attempt at a relatively clean systematization”.

By contrast, as we saw earlier in this chapter, Whorf was convinced at the end of his life that experiential phenomena isolated for linguistic operationalization could be described using gestaltic terminology, i.e., with respect to their figure-ground qualities which might also include “differing degrees of organization, stability, and fixity in figures or outlines of all sorts” (Whorf & Trager 1938:7, typescript). He noted that many of the referents we would call

“things” for example, have “marked outlines, or outlines of primary importance”, while those referents that we tend to categorize as “actions or states” have “outline-quality subordinate or lacking”. Then, he said, if this latter group of words is further subdivided into two groups: “stand, sit, lie, fall” and “white, smooth, large, useful”, the first group will be seen to “refer to experiences with a degree of outline, though a very low degree” while in the second, “the quality of outline is lacking”. He pointed out that:

In Eng[lish] an experience of “liquid H_2O ” must have a certain minimum of outline-quality before it is in common parlance referred to by the noun ‘water’ — lacking this it is treated as ground or field, and referred to by adjectives — ‘wet’, ‘damp’, ‘moist’. Hopi treats “liquid H_2O ” rather differently.[...]

Some lgs [...] have highly figural (i.e. “outlinish”) verbs, e.g. ‘to be a hole in the ice’ (Potawatami), ‘to manifest as a fascicled bunch’ (an outline like a bouquet of flowers) (Hopi). Hopi is indeed rich in highly figural verbs with no counterpart in Eng. If the experience is also momentary or fluctuating it must be a verb reference, no matter how outlinish, unlike Eng; hence our nouns ‘wave’, ‘flash’, ‘blow’ (striking), ‘splash’, ‘lightning’, ‘meteor’ cannot be translated by nouns in Hopi, but the same experiences are there denoted by verbs. This pattern even prohibits the reifying or “nounizing” of such momentarily outlined experiences by roundabout linguistic devices such as participles: ‘shooting star’ is ruled out in favor of ‘star moves’, ‘sunset’ in favor of ‘sun sets’ (literally ‘sun interiorizes’), ‘running dog’ is permissible only when used like a dependent clause, and ‘it is a running dog’ is ruled out in favor of ‘a dog runs’. (Whorf & Trager 1938:7, typescript; original abbreviations)

The most consistently clear example of what Whorf was attempting in terms of gestalt analysis is found in the Hopi parts of speech work considered in more detail below. The report itself is a more comprehensive demonstration of the configurative approach in general, showing the range and subtlety of perspectives which can be brought to bear on linguistic data. There are also hints about the way he might have developed what he had to say for a more general audience. In notes left for a book planned with “possibilities of use as textbook (college) for orientation and coordination course in science and technology, thinking and use of language ” (Whorf 1940i:1) there are indications that the introductory section would have presented the problem facing readers as relating to the “mutual unintelligibility” and lack of co-operation emanating from “the great alibi” — each naive person’s “picture of the universe” which provides “all the answers” but which, the book would reveal, is based on a selectively

elaborated extrapolation of elements of experience from what is available for utilization by the species. Chapter one would have dealt with

the world as perceived — Gestalt — the field of perception — difference from world of physics. Organization there — not the organization of physics — org. of pattern — $\text{diff} < \text{math.}$ — phenom. of rhythm melody etc — & lge. (Whorf 1940i:1; original abbreviations and underlining)

It is clear that perceptual patternment would have been clearly differentiated from elemental patternment (the world of microphysics) and also from cultural patternment (the world of mathematics, music and language) in this text. As I argued above, to reason in this way is to regard *experiential* reality as beginning with perceptual processing and not with elemental flux. Experience at this primary and basically invariant phase of organization is then conceptually elaborated (significantly through linguistically mediated cognitive processing) to produce those dimensions of experience which are personally and culturally modulated.

Although Whorf's effort to schematize reference in gestaltic terms was bound to reveal its limitations if explored exhaustively — given that the notion of semantic primitives with corresponding referential counterparts in the world beyond the speaker will always be inadequate in itself to support a comprehensive theory of meaning (Ellis 1993) — his attempts in this regard are fascinating, unique, and deserving of much closer attention than they have received in the past or can be given here. An overview of the gestaltic treatment of Hopi stems from the unfinished document entitled "The Parts of Speech in Hopi" is offered below and a survey of the key features of the Yale report in section nine. For more comprehensive insights into Whorf's thinking the reader is referred to the full text of the report in the appendix, to the Hopi materials in the Yale archives, and to the secondary literature on these. No attempt is made in this book to evaluate the effectiveness or validity of Whorf's analysis with respect to Hopi; I leave that to others more directly involved with the language.

3.8 *An analysis of Hopi stems — gestalt theory in the service of linguistics*

In addition to his grammar of Hopi published in Hoijer (1946) (Whorf 1939a) Whorf was evidently working on a fuller analysis into the last months of his life. Colleagues knew of the project, Dennis for instance writing to Celia P. Whorf in November of the year her husband died (1941) to inquire about the possibility of arranging for its publication. There was renewed interest in the 1950s. This time it was Eggan (1953) who contacted Mrs. Whorf to ask about the Hopi materials while Voegelin followed up in 1954 with another request for

access with a view to publishing them in the *International Journal of American Linguistics* which he edited at the time. The incomplete handwritten 40 page draft (Whorf 1940k) includes 17 separate pages entitled “The Hopi Parts of Speech Strictly Determined by Non-semantic Formal Analysis”. Here material relating to Hopi stems and previously written up in more conventional terminology is reworked in a manner appropriate for presentation to colleagues interested in developing nonsemantic descriptive techniques. It is this part of the document, begun September 17 1940 and finished October 12 of the same year, which is reviewed here. Although Whorf was listed to speak at meetings over the 1940/41 winter, and although it seems very likely that he wanted to present this paper at that time, correspondence in both the Yale and the Trager archival collections indicates that he was too ill to attend.

In his paper Whorf first sorts Hopi stems into seven classes or paradigms with subclasses, emphasizing that thus far only “an isosemantic criterion”, which he distinguishes from “what is ordinarily understood by semantic, ‘para-semantic’, distinctions of meaning”, have been used. He realistically admits that: “In a way, meaning has played a part in the work, but only in the aspects of inescapable likeness of meaning, enough to keep the informant, or the examiner of texts, sticking to the paradigm of the same stem and extending it for us” (Whorf 1940k(2):4). Several pages follow in which Whorf describes in technical detail how stems are used in sentences before summing up rather dryly with the comment that:

All this, which depends almost entirely on the assorted grouping of Hopi stems into non-overlapping classes, is essential to the construction of Hopi sentences, but I fear it is extremely dull reading. The reader who has been kind enough to follow the argument to this point, and who will now appreciate that such a classification is made inevitable by the facts of the language, but who may still have a hankering to know what these forms mean, shall now be satisfied to the best of my ability. (Whorf 1940k:8; original underlining)

Having established the integrity of the classes by form, Whorf is now interested in investigating “massive contrasts” (rather than “fine distinctions”) of meaning between the groups. Rather than resorting immediately to the use of category names such as ‘noun’ or ‘verb’ he presents his goal as investigating whether each class refers to a particular type of experience or not. He then goes on to explain how his nonlinguistic reference frame can be applied to five of the six groups of Hopi stems to reveal their broadly semantic as well as formal integrity as grammatical categories.

He argues that class one stems refer to “visible and invisible (or visual and unvisual) things” mainly the former, and include all instances except a few meaning ‘round’, where “the thing when seen is seen enclosed in a continuous outline, and moreover does not inevitably vanish soon after it is seen”. He admits that there are exceptions to this generalization, but gives examples such as “the words meaning man, elder sister, helper, dog, tree, house, knife, window, sun, cloud, rainbow, square, triangle/triangular” as falling into this class.

Class two stems, he says, refer “to both visible and invisible in about equal degree; but all Cl. 2 stems refer to experiences of limited duration, i.e. to what we commonly call actions or events”. The zero form refers to particularly brief events, which “vanish soon after being seen”, e.g.

The term for a puff or vanishing cloud of smoke is Cl. 2; the words for wave, flame, spark(s), flash, lighting-bolt, raindrop likewise, as well as meanings we might expect like strike (or stroke), run, pull, throw, kill, eat, speak, think, remember, hope, and indeed nearly all meanings that are represented by English verbs. (Whorf 1940k:9; original abbreviations)

Class three stems are described as referring to “visible forms which have outlines, but which outlines (except in the case of stems meaning ‘round’) are not closed around the form but run off from it into surrounding forms, and which outlines and forms are of long duration”. Duration in this case refers to future persistence only according to Whorf, not past. The referent “may be one that springs into appearance quite suddenly” and then persists. Stems which may be translated as “broken, split, collapsed, crushed, spread (out), perched” fall into this category, as also those stems which translate into English as “crooked, forked, zigzag, hollow, corrugated, pointed, spotted, striped, patched, stabbed, perforated, flooded, and the Eng. nouns valley or gully (the Arizona ‘wash’) [...] curve, curl, coil, fringe”, are in class three (p.10).

Describing class four stems, he explains that:

Cl. 4 stems refer to visibles and invisibles, but the visibles refer to visual experiences that are independent of a particular outline, and that give the visual quality of the ground or filling of outlines, thus the color-names, of which there are many, terms for light and shade effects, the words for light (=illumination, not light source), day (=daytime), darkness, surface qualities like rough or smooth, spatial size classes like large, small, short, thick are all Cl. 4. The [...] non-visibles are abundant and consist of (a) the sensations other than hearing and sound (which are found in Cl. 2) [...] (b) muscular, organic and tactile experiences [...] and (c) emotions and evaluations, subjective qualities of all kinds. (Whorf 1940k:10-11)

Class five stems on the whole, Whorf considers, “refer to ‘invisibles’, and may be said to be concerned entirely with ‘non-spatial measurement’ — that is, where Eng. translations such as large, great, little, much, refer not to dimensions in space, but to degree of intensity” (p.11). His comments on this group are illuminating with respect to the much debated question of his attitudes to Hopi treatment of experiences that we are able to talk about in English in terms of time. The question of *Hopi Time* (as Ekkehart Malotki (1983) entitled his large monograph on the topic) is a complex one and because almost all commentary on it seems to have been based on faulty or superficial interpretation of what Whorf said about relations between Hopi experience, language, and metaphysics, the topic really requires separate and extensive treatment beyond what can be attempted here. However Pinker’s (1994:63) assertion that: “No one is really sure how Whorf came up with his outlandish claims, but his limited, badly analyzed sample of Hopi speech and his long-time leanings towards mysticism must have contributed” is just a recent example of the way so many otherwise reputable scholars have allowed themselves to be threatened by interpretations of Whorf’s ideas in the secondary literature. Such offhand dismissal of Whorf’s analytical capabilities says more about the denigrator than the denigrated. Helmut Gipper, Malotki’s mentor and also a debunker of Whorf’s conclusions regarding Hopi time, was more cautious, agreeing with Whorf that “the Hopi language can be said to be an authentic key to the understanding of the Hopi *Weltanschauung*” and affirming that a “careful study of the Hopi language [...] is important for the problem of the linguistic relativity principle” (Gipper 1976:227).

With this controversy about Hopi metaphysics in mind it is especially interesting to look at the way Whorf describes the interesting class 5 category. He explains that:

Cl. 5 stems with a small exception (pron.) refer to ‘invisibles’ and may be said to be concerned entirely with ‘non-spatial measurement’ — that is, where Eng. translations such as large, great, little, much, refer not to dimensions in space, but to degree of intensity, e.g. ‘large amount of power’, ‘he thought about it a great deal’, ‘he likes her very much’, a long conversation’, then the Hopi word of degree is not the Hopi Cl. 4 stem from large, great, much, long etc. but a different stem belonging to C. 5. There are almost no homonyms as between Cl. 4 and Cl. 5. Stems referring to every kind of measurement or estimation which has necessarily a time dimension, not only measurements of time as we conceive them, but of rate, speed or intensity of motion, continuity, interruptedness, sequence (in time), increasing, diminishing, etc. are Cl. 5. [...] It may be said without exception that Cl. [5] stems denote intensities and their temporal mode of

existence, its continuation and variation in time. In other words each Cl. 5 stem denotes a certain type of graph, of which one coordinate is time. No other class is so capable of succinct semantic definition. (Whorf 1940k:11; original abbreviations and underlining)

Notice that only one experiential coordinate is temporal; what is being identified here is the operation of a category of grammatical elements which play a significant role in articulating the fused space-time world view that Whorf ascribes to Hopi. In this group of stems the referent that is isolated against the backdrop of ongoing experience is not visual nor figural in a spatial sense but characterized by the experiential quality of intensity, a feature presumably of the egoic field of human experience. Such a feature is no more likely to be consciously noticed as an isolated abstraction from ongoing experience than the subjective experience of duration, or the presence or absence of figures or outlines, or the quality of the perceptual ground of what is seen. None of these are consciously attended to. Whorf's point is that the nature of the linguistic evidence is such that we are led to the conclusion that intensity (like duration) is another isolable feature of primary experience, operationalized with greater elaboration and precision in some languages than others.

Whilst Whorf may possibly have exaggerated the case for different cultural treatments of the widely varying experiences we classify in English as relating to time, at least some of his claims stand up remarkably well if care is taken to understand his reasoning. For instance, when I investigated his claims about the functions of those adverbial elements he called 'tensors' (Lee 1991), I found, contrary to conclusions Malotki himself had drawn, that they were well substantiated by data in Malotki's extensive and valuable collection of relevant texts. Tensors operate in Hopi in much the same way as Whorf describes the activity of class five stems but they are independent particles or constructions not subject to the various kinds of grammatical modulation in which stems participate. Similarly confirmatory findings have been obtained in a preliminary study of Whorf's reasoning with respect to the grammatical categories usually regarded as forming a tense system in Hopi (Lee ms). It is simply inadequate to dismiss, without taking the trouble to understand his reasoning, Whorf's claim that the primary experience of "duration, intensities, and tendencies" (Whorf 1939c [LTR]:145) are accommodated differently in different languages with concomitant differences in the way these basic aspects of human existence are understood in broader terms from culture to culture.

Malotki's argument to the contrary is based on an comprehensive demonstration of the fact that what we call 'time' (and there is apparently no equivalent cover term in traditional Hopi) is dealt with in that language through what he regards as spatial metaphor. He also documents Hopi use of calendrical devices

and ways of monitoring the progress of the sun through the sky, ways of referring to cyclically recurrent events such as days, seasons, and parts of the day, and ceremonial processes which involve carefully calculated sequences of days, all of which, of course, show responses to the primary experiences of cyclicity and duration which speakers of English characteristically relate to in terms of notions of passing (linear) time and the units or metaphorical *pieces* of time so significantly entrenched and elaborated in their own language. Whorf nevertheless argued consistently and, on the whole convincingly, that there are no references “to ‘time,’ either explicit or implicit” (1936f[LTD]:58) in the language in any sense which is directly paralleled by English constructions. He considered that the terminology which Malotki subsequently picked out for study almost never functions metaphorically but instead quite unequivocally articulates a conceptual “picture of the universe” in which space and time are fused.

Whilst some readers may have problems with the notion of a fused space-time, this seems to be a culturally bound difficulty. Physicists even within societies dominated by European languages apparently have no conceptual difficulty with the idea so it is not at all unreasonable to hypothesize that some cultures might start with it. Ordinary experience, after all, does not present us with time separated from space; every experience we have, no matter how brief, has duration and happens somewhere even if that somewhere includes imaginary locations or is regarded as being restricted to the spatial environment of our brains or other parts of our bodies. It is extremely difficult to think of time in *experiential* (rather than purely abstract) terms as totally separable from our experience of space because our foundational experiences of both are functions of our embodiment, as Johnson (1987) would argue. Similarly, the notion of an experience which has no duration at all is difficult to accommodate within the way we normally use these words. We might sometimes say that we experienced a sense of timelessness or that an experience was fleeting but such comments can only be made in the context of our ongoing experiences of continuity, sequence, and the feeling of getting later which are at least in part outcomes of our unconscious monitoring of cyclic and other occurrences in our experiential environment.

The draft paper on Hopi stems contains much more than I have covered here but enough of it has been reviewed to demonstrate how Whorf used his nonlinguistic and broadly semantic canon of reference to describe linguistic data without relying on preemptive categories taken from traditional grammars of European languages. Nevertheless at the end of the exercise he remarks that:

We now have a primarily formal but, incidentally, also a somewhat definitely semantic, outline of the stem-classes or parts of speech in Hopi and of their morphological behavior. I believe there is enough likeness to the

common I[ndo] E[uropean] distinctions to warrant dropping the numerals so far employed and bestowing familiar names. Cl. 1 may be called nouns; Cl. 2 verbs, Cl. 4 adjectives. Cl. 3 I shall call 'ambivalents', Cl. 7 'pronominals', Cl. 6 'numeratives', while Cl. 5 I shall leave unnamed for the present. [...] It is decidedly convenient to be able to speak of Hopi nouns, verbs, etc. instead of numbered classes. Yet while these terms are convenient, and even fairly appropriate, the syntactical use of the like-named parts of speech in English or other familiar languages is no guide to the use of these Hopi classes. Thus respecting the class we have called 'verb', how far is it appropriate when we may have complete and even complicated sentences without a single such 'verb'? Or when we may have complete sentences containing only one part of speech, and that any one? Certainly we cannot define a Hopi verb as a word which predicates; it has no more connection with predication than any other type of word. Again any word capable of the glottal reduplication $fV\text{?}V$ can be used as an imperative sentence, so our familiar association of verbs with command-forms disappears. The forms corresponding most ["coming nearest" inserted above this phrase] to our tenses and moods, i.e. the 'assertions', may be applied to practically any stem, with the aid of -ni- and -ya-, and in the manner of an inflection, not a derivation. We think of 'go' and 'come' as typical verbs; in Hopi these meanings are expressed by Cl. 7 words, in line with the principle that the motion is inseparable from space-orientation. (Whorf 1940k:14-15)

These remarks extend and clarify the kind of thinking Whorf had been doing in 1937 when he wrote to Trager about his interest in applying gestalt theory to linguistic description. In "The Parts of Speech in Hopi" two levels of configurative analysis are demonstrated. The first is an investigation of regularities of form, patterns of structural modification associated with particular groups of forms, and situational features of occurrence of forms in relation to other forms. It is this kind of description which is generally described as being made without reference to meaning. The second level of analysis deals with broad configurations of meaning by which whole classes of forms could be further classified in relation to a reference frame built around observational criteria likely to be "the same for all observers", i.e., whether the referent is visible or not, has an outline (is figural) or not, features of the outline if distinctive, i.e., whether it is closed or runs off into the environment, features which function as ground in the field of observation, and elements of experience characteristic of the egoic field. The Yale report written two years earlier indicates how much more wide ranging a configurative approach to language analysis can be. We will take a closer and final look at that now.

3.9 *Overview of the Yale report*

As the Yale report is reproduced in full in the appendix I will restrict myself here to summarizing its overall structure and identifying elements of particular relevance to matters raised in the better known papers included in LTR. Whorf begins Division A of the report by locating it in relation to “Language: Plan and Conception of Arrangement” (Whorf 1938c[LTR]) and “Grammatical categories” (Whorf 1937d[LTR]). He continues with a quick coverage of phonemics and morphophonemics before proceeding to a more detailed overview of grammar using the terminology explained in the other two documents. Section five then provides an overview of “Configurations of grammar as compared with experience interpreted non-linguistically” and is the section from which most of the quotations from the report in this chapter have come so far.

Division B comes next and is divided into four main sections, three of which are further subdivided. In referring to its subject as ‘Ethnolinguistics’ Whorf seems to have anticipated by more than ten years the first use of the word recorded in the public domain in 1947 by the Oxford dictionary. *Ethnolinguistic* had been in use in the United States of America since Bronislaw K. Malinowski (1884–1942) introduced the term in the 1920s but *ethnolinguistics*, defined as the study of relations between linguistic and cultural behavior, evidently came into common use somewhat later.

Section one deals with “The configuration of experience as seen in language” and is divided into three subsections covering “Segmentation of experience”, “Implicit metaphysics of a language, and, more or less, of a culture”, and “So-called primitive mentality — the concept of cultural mentalities”. Section two concerns the “Interpretation of coordination and parallelism between language and culture (the non-historical aspect)”. Whorf apparently planned to cover the historical aspect in a section of the report which appears not to have been attempted, although an outline exists (Whorf & Trager 1938:1, handwritten ms). Section three deals with “Behavior patterns as correlated with language” and section four with “Study of the supra-linguistic and quasi-linguistic mentality (collective or social) through the linguistic approach”.

The subheadings in section four indicate how far Whorf was prepared to take his configurative analysis. They cover the “spiritual emphases of a culture” various kinds of interpretations, symbolism, “Ideas not independently lexated” and a discussion of lexation, and finally, “Correct recognition of the immaterial values of a culture” (Whorf & Trager 1938:2, typescript). As in section five of Division A, it is very clear that in Division B also Whorf is primarily concerned with relations of language to experience, taking for granted that semantic patterns discovered in languages (particularly within the grammar) give access to

configurations of thought. He begins with an earlier version of the much quoted statement about the ‘flux of experience’ which has led to such serious misinterpretations of his argument over the years, making it perhaps clearer than elsewhere that, for him, ‘flux’ is composed of those perceptually configured isolates from which we make up a systematically meaningful world of experience.

The flux of experience may be classified and “chopped up” differently by different languages; this is most readily seen by going outside of Indo-European, American Indian lgs providing some of the greatest contrasts. These differences in “segmentation” — in what is treated as “one” aspect, phenomenon, substance, or quasi-whole, isolated out of the mass of presentation and fitted together with other such segmentation to make the mosaic representation of life which the language and culture take for granted — these differences may apply not only in the large outlines of the cosmic picture [...] where they are at their most subtle and hard to appreciate, but also in countless small matters of detail, where they are much more easily seen. (Whorf & Trager 1938:8, typescript; original abbreviations)

In further examples of the kind examined above in connection with Hopi and English ways of talking about ramrods and guns, he points out that the English ‘box of cigars’ and the Hopi ‘cigars plurally put inside’ “refer to the same *bit of experience*, but segment it into different constituents”. English “presents an outlined bit of the world, a “box” which “carries the implication of contents, which the relator ‘of’ discloses to be cigars” while the Hopi focus is on the cigars “referred to a generalized configuration of interiorized multiplicity” although the nature of the enclosure is not indicated. Similarly, “We ‘unbutton’ a coat, Hopi ‘causes inner-plural separation’ of it (unit term ‘separate’ with inner-plural and causative inflections) without any allusion to such bits of experience as buttons” (Whorf & Trager:8, typescript; my emphasis).

It should not need to be emphasized by now that Whorf was in no sense saying that English and Hopi wearers of coats or smokers of cigars have difficulty perceiving and interacting with these artifacts in each of their worlds of objective experience but, rather, that at a very subtle semantic, and by implication, conceptual level, their understandings of such events profile different emphases or patterns of salience.¹⁴ It is quite feasible to imagine, as Lucy’s

¹⁴ The notion of conceptual profiling is taken from Ronald W. Langacker’s ‘cognitive grammar’ (e.g. 1987, 1991) and although I have not attempted to bring Whorf’s analysis into alignment with Langacker’s such an exploration would seem to be worthwhile, at least in some respects. My own limitations have prevented me from exploring the degree to which this might be the case. The fact that cognitive grammar “presupposes a ‘conceptualist’ account of

(1992b) research on Yucatan Mayan suggests may be the case in that culture, that at least some practical ramifications of unconscious habitual patterns of attention required to use a particular language authentically, also occur. But such differences should be regarded as subtle concomitants of overall ‘fashions of speaking’ rather than features leading to “correlations or diagnostic correspondences between cultural norms and linguistic patterns” which Whorf (1939c[LTR]:159) expressly rejected as a possibility.

The focus on the ‘segmentation of experience’ structured by the specific nature of grammatical categories in a language, and the importance of a neutral ‘canon of reference’ (the essentially gestaltic framework of experiential isolates) found in this section parallels the discussion in the Shawnee paper (Whorf 1939d) written the following year. A point to be developed in more detail in the memorial article — the contrast of the English use of “nouns for ‘summer’, ‘winter’, ‘morning’ etc.” with the situation “in Hopi [where] these segmentations of experience are neither nouns nor verbs, according to the formal configuration of the Hopi noun and verb classes, but a class by themselves, a type of adverb (= when it is summer, when it is morning)” (p.8) — is interesting in relation to the debate on Hopi time.

In a further example of interest from the conceptual (and therefore experiential) perspective of a speaker of English, Whorf points out that: “The ideas of ‘waiting’, ‘remembering’, ‘inferring’ may be expressed in Hopi by adverbs; in Eng. they require verbs” (p.8). Conceptually, it can be argued, something which is feature of an activity is very different from something which is classed as the activity itself. He makes the point that: “The province of a certain grammatical class in one language may be a mere unexpressed nuance in another, in a third it may be a nuance expressed entirely by prosodic features, stress, loudness-emphasis, intonation, etc” and gave examples (p.9). This subtlety of semantic and focal contrast is the crux of the linguistic relativity question, not the possibility that elements of experience are entirely ignored or perhaps not even perceivable by persons speaking different languages.

Whorf goes on to consider the way speakers of different languages segment parts of the body differently for naming and contrasts the ways in which Hopi

linguistic semantics that properly recognizes our capacity for construing the same conceived situation in alternate ways” (Langacker 1995) suggests that there must be potential for using this approach in the study of linguistic relativity except that I would probably argue that the “conceived situation” is never subjectively “the same” when it is construed differently. Also, although gestaltic constructs are employed, Langacker’s project does not (insofar as I understand it) attempt to explain how language may be related to primary experience. Whorf’s goals were thus rather different, at least in this respect. At the level of those articles of faith which were published when the group of linguists affiliated with Dirven, Langacker, Lakoff, Talmy, and Sweetser (to name just a few of the better known members) first established themselves as a group there would seem to be, however, a pronounced degree of affinity along a range of dimensions between cognitive linguistics in general and Whorf’s preoccupations.

and English differently segment “[t]he world of natural phenomena and substance” (Whorf & Trager 1938:9, typescript). The typescript ends during this discussion and it is necessary to continue with the handwritten version of the report. Even “the most ordinary behavior and familiar human acts may be variously segmented for linguistic naming” he notes. For instance in the Great Basin and adjoining Mexico as well as Hopi “acts by individuals or dual pairs are given a different name from the performance of what to us is the same act by a group” (p.8, handwritten ms).

Whorf now moves to the topic of his paper “An American Indian Model of the Universe” (Whorf 1936f?) — whether there is a metaphysics “implicit in the very structure and grammar” of a language. In a more fully explicit statement on the topic than is to be found elsewhere (and one with its focus on European languages rather than those too often considered ‘exotic’ by SAE speakers) he remarks, again with illuminating relevance to the question of our apperceptions of time and space, that:

Every complex of a culture and a lge (or every ‘culture’ in the broadest sense, as including lge) carries with it an *implicit metaphysics*, a model of the universe, composed of notions and assumptions organized into a harmonious system which is valid for framing statements about what goes on in the world as the carriers of the culture see it. There are certain words for *large segmentations that sum up a great deal of the cultural metaphysics*, e.g. in modern SAE ‘time’, ‘space’, ‘cause’ ‘effect’, ‘progress’, ‘the past’, ‘the future’, ‘substance’, ‘matter’, *but the total picture is never given explicitly, not even in a grammar*, but is a *complex semi-conscious thought form* which is taken for granted, and acted upon without being brought into the front of consciousness for scrutiny. The grammar is harmonious with it and reflects it somewhat, but only in a scattering way. Thus the implicit metaphysics of SAE culture presupposes a uniformly flowing 1-dimensional time-order, a 3-dimension space-order distinct from it, a universe consisting of void or ‘holes’ [...] substance or matter which has ‘properties’ and forms island-like ‘bodies’, an absolute unbridgeable difference between the matter and the ‘holes’, events ‘caused’ by ‘preceding’ events, things happening to matter, nothing happening in the void. Many *experiences* do not quite fit the picture; it is inevitable that they will be overlooked or find but faltering expression, because of the nature of grammar and terminology available. (Whorf & Trager 1938:8-9, handwritten version of report; my emphases, original abbreviations)

Research forces a “somewhat different cosmic model” upon modern physics “but no language, except mathematics has been developed in its terms”. Other “culture-language complexes” have varying “implicit metaphysical systems”

different both from those of physics and SAE cultures. But Whorf emphasizes, as he was to do again in the memorial paper, that “[t]he SAE view is not naive nor grounded in universal experience, (nor is any other) except as it corresponds with the universal figural properties of visual perception — SAE ‘time’ and ‘space’ e.g. are not intuitions”. He stresses the importance of taking a “thoroughly analyzed configurative description of grammar into consideration”, together with the things people say about “their attitudes and outlook” until “at last [...] an integrated picture emerges” (Whorf & Trager 1938:9; handwritten manuscript — all quotations in the rest of this chapter are from this version).

Although Feuer claimed that he could “show how the same metaphysics has arisen among peoples with radically different languages, and how the most diverse types of philosophies have arisen among men who used the same language” (p.86), it is evident that he had not understood Whorf’s argument in asserting that Whorf’s claims implied that each metaphysics “includes within itself a unique physical universe as well” and that there is “no world of common physical uniformities and facts which is the same for all cultures” (p.94). Scholars such as Hoiijer (1953), Hymes (1983), Lucy (1992a) and Hasan (1984, 1987) have consistently reminded readers of the importance of Whorf’s reference to “fashions of speaking” (Whorf 1939c[LTR]:159). As he said in the report, the “grammar is harmonious with” the “total picture” used “for framing statements about what goes on in the world as the carriers of the culture see it”; it “reflects it somewhat, but only in a scattering way”. Specific grammatical processes may reveal aspects of the overall ‘picture’ (Whorf & Trager 1938:9).

In the next section Whorf takes up the controversial issue of Lucien Lévy-Bruhl’s (1857–1940) concept of “primitive mentality” considering it to be “a far-reaching generalization in a very important field of inquiry, otherwise little touched by either anthropologist, linguists, or psychologists, though seemingly of fundamental importance for all three”. He emphasizes however, that it is “equally unjustified” for the concept to be “either uncritically embraced or flatly denied”. He suggests that the “decided impressions of *a different way of thinking* among ‘primitives’ obtained by Lévy-Bruhl and others are based on something [...] as yet insufficiently analyzed” (Whorf & Trager 1938:9-10; my italics; original underlining).

Pointing out that: “What has been meant by ‘primitive mentality’ is ‘any cultural mentality other than SAE’”, he recommends the use of the term ‘cultural mentality’ to refer to the “vast summation” of factors including “differences in grammatical categorization, especially of covert categories, in segmentation of experience and in the implicit metaphysics of the culture-language complex”, as well as “a still more subtle mental atmosphere derived from a myriad inobvious

but deep-rooted aspects and values of the culture outside the linguistic realm". He argues that the way to understand this phenomenon can only lie in good ethnographic work combined with the kind of systematic configurative analysis by stages described in the report (p.10). This unremitting emphasis on the complexity and subtlety of the effects of differences in language stands in significant contrast to the simplistic readings so often given to the whole linguistic relativity question.

Whorf's next topic is the interlocking of language with culture, something which he clearly separates both from the topics both of linguistic thinking and the relations of language to experience. This subject, he considers, is fit "for linguistics in its broader sense, although it may be held by some to fall outside of 'straight' linguistics". Its neglect, except by Sapir, is partly because of a division of interest between "straight linguists" and "cultural anthropologists" and partly because "the field admittedly holds a certain attraction for the more fantastic and romantic theorizers, with 'Volksggeist' ideas, notions of inherent superiority of certain lgs, of a lge molding the culture, of stages of cultural 'evolution', and what not" although the very existence of these ideas, which he obviously rejects, possibly indicated "partial glimpses of truth never properly worked out or thought through" (Whorf & Trager 1938:10; original abbreviations). At this point he reminds us of Sapir's caution: "[W]e shall do well to hold the drifts of language and culture to be non-comparable and unrelated processes". Indeed the full discussion in Sapir (1921:218-219) is important reading with respect to the question of relations between language and culture.

In a crucial statement which would have reduced controversy over the years had it been known, Whorf emphasizes that:

There is no causal connection, in either direction, between language and (non-linguistic) cultural features. The plea for more correlated study of a given language and study of the culture of its community does not rest on any such considerations, but on the fact that *lge itself is culture* and the rest of culture (with language extracted from it) belong together as really inseparable parts of a great whole — the culture in a broad sense. (Whorf & Trager 1938:10; original underlining and abbreviation, my italics)

He suggests that kinship systems are an obvious example of what he means because "kinship terms must be understood in terms of the kinship system as it configures by itself, and also in terms of the language and its linguistic configurations" while "the pattern of the kinship relation might serve as a model for conceiving other sorts of relations" in the society (p.10).

Giving a totally different kind of example of a relationship between language and culture, he points out that sometimes "special jargons" employed by "strong

social or economic sub-groups” may “warp the lines of the language” and “even reach [the] status of grammatical classes, especially covert ones” if taken up by the whole community. He contrasts “economic fish”, like “trout, bass, cod, mackerel etc” which are pluralized without ‘-s’, and which are caught “en masse”, with other kinds of fish of the sort usually regarded as “intrusive in the catch”. These “are spoken of as individuals” and pluralized with ‘-s’, e.g., “sharks, skates, rays” and also some less prized, rather “queer” commercially caught fish, e.g. “eels, flounders”. His point is that:

“Straight” configurative linguistics does not attempt these cultural interpretations, but simply maps the classes and their markers — e.g. -s, which “inflection” is a “reactance” as regards the (covert, selective) fish class 2, and as “signature” as regards the (overt, modulus) class of noun-plural. The native speaker of Eng. will pluralize names of fish new to him in accordance with his sense of the cultural placement of the fish. Here appears the connection with the psychic unconscious or subconscious mentioned in A1 4. The speaker is not aware that in his unthinking talk he classifies fish, still less that he does so on a cultural basis. Nevertheless he does so classify them. (Whorf & Trager 1938:11; original underlining, my italics)

Whorf’s next objective is to demonstrate that an understanding of a culture can sometimes be deepened by studying the distribution of “simple unanalyzable or primary term[s] (e.g. plough, church, marry) or [...] complex analyzable secondary one[s] (e.g. typewriter, post-office, be engaged)”. He argues that the former “may correlate with [an] observable degree of integration, pervasiveness, or deep rootedness of the cultural feature — due usually to historical age” and points out that:

In most European lgs war is denoted by a simple term (war, guerre, Krieg, bellum), and the warfare pattern shows the signs of being deeply ingrained — large armies, elaborate equipment, high efficiency, professionalism, military prestige, war psychology, belief that war is an inborn human or masculine trait, etc., all of which might be observed without knowing the long history of warfare in Europe. A companion linguistic trait is the host of warlike and military words, even in ordinary civilian life. (Whorf & Trager 1938:11-12)

This situation is contrasted with examples from Aztec, Hopi, and Navaho where analyzable terms relating to warfare predominate. That Whorf is aware that he has not discovered an invariant rule is evident however — a marginal note draws attention to slang terms like ‘dude’ which are also simple terms, sometimes quite short lived.

Returning to an earlier discussion of “Hopi linguistic segmentation of experience with respect to the phenomena of water and rain”, Whorf develops the idea further, remarking that the patterns he had identified are “in harmony with Hopi climatic conditions, economic importance of and cultural attitudes toward water and rain”. It is evident again that his opinion is that large scale patterns of life generally need to be taken into account when investigating the language/culture interface. As he was to emphasize a year later in the memorial article, the length of time a language and its current constellation of cultural practices have been together is also important.

In this context it is interesting to note some linguistic anomalies associated with technological development although it is a pity that Whorf does not provide more specific examples. He argues that there seems to be a “negative correlation, or discrepancy with culture” between ordinary “SAE terminology and linguistic patterns” and “the great importance of machinery and mechanical-electrical systems in modern life”. Although not observable in “technological spheres” (presumably because specialist terminology avoids the problems) he considers that in general parlance:

Names refer too much to simple block-like outlines, machine-referents are segmented too much like “objects”, terms do not refer enough to ramified, cobwebby configurations, designations of functions are too narrow, meanings too limited, misleading. (Whorf & Trager 1938:12)

This observation, product not only of Whorf’s familiarity with technology but also his gestaltic approach to “the linguistic segmentation of experience”, is perhaps also applicable to some of the difficulties we have today in talking about neurolinguistic or cognitive activity. In both cases the pace of cultural change and specialist knowledge has been too great for the slower shifts in large scale fashions of speaking to accommodate. Whilst the terminology which develops most naturally may be harmonious with deep rooted features of our traditional culture and classical physics or commonsense understanding of the universe, it can be inefficient for describing innovations which have been generated by recent intellectual advances. As Whorf was to tell his *Technology Review* readers: “We dissect nature along lines laid down by our native languages”, isolating “categories and types [...] from the world of phenomena” to comply with the implicit “agreement that holds throughout our speech community and is codified in the patterns of our language” (Whorf 1940a[LTR]:213-214).

This is not to say that we cannot extend language innovatively, given time — the fact that ‘technological spheres’ are exempted in the comments above suggests as much. But culturally entrenched nonlinguistic patterns of behavior often sustain linguistic patterns, helping to embed them more deeply in the

culture and making them resistant to change or elimination. Whorf's well known description of some of the "IMPRESSES OF LINGUISTIC HABIT IN WESTERN CIVILIZATION" in the memorial article testifies to the complex ramifications between language and other behaviors (Whorf 1939c[LTR]:152-4) and suggest how intricately interrelated language is with other patterns of culture. He argues that: "Our view of time", which he demonstrates to be conceptually sustained for speakers of English by a complex of interconnected linguistic patterns, "is favorable to historicity and to everything connected with the keeping of records". He adds that: "Writing has no doubt helped toward our linguistic treatment of time, even as the linguistic treatment has guided the uses of writing", and says that the "give-and-take between language and the whole of culture" in this respect underpins a range of literary, recording and timekeeping habits fundamental to conducting our kind of social system (p.153).

Where innovations are brought into a society from outside, appropriate terminology may be imported with them as when advanced physics and chemistry studies, for instance, are taken up in speech communities which do not have existing linguistic resources to handle the exotic concepts involved. There are two dimensions of the adaptation which must be made. Firstly, members of the recipient community may not have a ready store of names which can be applied to the new ideas and, secondly, relational concepts habitually used to make connections between elements of experience may have little congruence with those of the languages in which the innovations were originally made. In 1981 Peter Logan, for instance, drew attention in an article written for science teachers, to the problem of teaching physics to speakers of indigenous languages in Papua New Guinea. He quoted studies made during the early 1970s which suggested that relational terminology like "'as a consequence', 'includes', 'essential', 'definitely', and 'contradictory'" could present problems to the university science students of the day presumably because these terms did not seem to correlate on a one to one basis with relational processes expressed in their own languages. He stressed that the solution to the problem was not an easy one, commenting that: "A new system cannot really be built up from the traditional system one concept at a time" as some have advocated, because "[t]his would be like learning a new language one word at a time without regard for differences in grammar" (p.76). The problem is again one of general 'fashions of speaking' as well as more narrowly specified features of grammar. The question of relations of language to culture is clearly a complex one and we could do worse than return to Sapir's remarks on the topic referred to by Whorf above. As Sapir explains:

Culture may be defined as *what* a society does and thinks. Language is a particular *how* of thought. It is difficult to see what particular causal

relations may be expected to subsist between a selected inventory of experience (culture, a significant selection made by society) and the particular manner in which the society expresses all experience. The drift of culture, another way of saying history, is a complex series of changes in society's selected inventory — additions, losses, changes of emphasis and relation. The drift of language is not properly concerned with changes of content at all, merely with changes in formal expression. (Sapir 1921:218; original emphases)

Here Sapir crucially differentiates between vocabulary items (the 'content' or naming function of language) and relational activity (the how or articulatory function of language and, by extension, linguistically organized thought). According to Sapir, cultural changes may be accommodated to some degree by new names for new additions to the cultural inventory while the *how* of thought remains essentially unchanged.

Hojjer (1953:261), in an early and accurate presentation of what Whorf and Sapir had said on linguistic relativity, noted that Sapir had also commented that: "It goes without saying that the mere content of language is intimately related to culture" and that the "vocabulary of a language more or less faithfully reflects the culture whose purpose it serves". In this sense, he emphasizes,

it is perfectly true that the history of language and the history of culture move along parallel lines. But this superficial and extraneous kind of parallelism is of no real interest to the linguist except in so far as the growth or borrowing of new words incidentally throws light on the formal trends of the language. The linguistic student should never make the mistake of identifying a language with its dictionary. (Sapir 1921:219)

Concepts embodied in the lexicon, in other words, are relatively minor factors to be monitored as part of the overall enterprise of determining to what degree fashions of speaking are congruent with the general culture, although it does seem that Whorf thought that even our patterns of naming have the potential to consolidate inappropriate understandings when it comes to some kinds of inventions.

In the next section of the report he tackles "Behavior-Patterns as Correlated with Language" which is also the theme of his memorial to Sapir written the following year. He begins by asserting that: "Not only collective, group behavior, but personal behavior of individuals is *largely conditioned and channeled* by the 'official' cultural meanings of the outlines (i.e. 'objects') in the environment wherein the behavior takes place" (my emphasis). His next few remarks clarify the logic of much of his best known paper and deserve close attention, given the

controversy (and ridicule) several of his examples there have occasioned over the years. He argues that the

‘official’ cultural meanings are often deposited in language sometimes in simple terms like ‘altar’, ‘lamp’, ‘bridge’, sometimes as grammatical forms [...] as in instrumentive terms, e.g. ‘heater’, ‘conveyor’, ‘accelerator’ [...] The coinage of terms by means of grammatical operations [...] actually determines much individual behavior by giving *an ostensible cue to the meanings of situations and environments*. Not only do such cues operate positively, but also negatively, for often important properties of the environment are obscured by the usual way of speaking about it, and behavior which is deficient or misdirected as regards the actual needs of the situation results — including “carelessness”, or “oversight”. Suppose the motive toward certain behavior is an interest in fire-prevention in a factory; *then the usual linguistic forms will distribute the behavior in certain ways* — the ‘heaters’ will all be safeguarded but the “conveyors” will probably be overlooked, though they may convey hot cinders, start fires in bearings, etc. Whorf has drawn on his experience in fire underwriting for many instances of this kind. (Whorf & Trager 1938:13; my emphases)

It is salutary, given the high profile in the Whorf literature of the fire prevention examples, to note his comments to the editor of the memorial volume, Leslie Spier (1893–1961), in this connection. Whorf wrote:

It was a great satisfaction to know that you found the paper stimulating and something of an eye-opener, and your comments were very much to the point. This applies also to your feeling that I may have overemphasized the role of language, for I have the feeling myself that the condensed and unqualified form necessitated for many of the statements lies open to such interpretation for many readers. I did not want to convey this impression, but in a rather short article where so much had to be said, it seemed better to run this risk for the sake of emphasis and clarity, rather than get into a too cautious, qualified milk and water sort of presentation. This is in a way after the fashion of Sapir, for he always hit the nail right on the head, taking the chance that his reader would use his thinking apparatus.

I have thought of possibly adding a brief statement or a footnote saying that I don’t wish to imply that language is the sole or even the leading factor in the types of behavior mentioned such as the fire-causing carelessness through misunderstandings induced by language, but that this is simply a coordinate factor along with others. It didn’t seem to me at first that this should be necessary if the reader uses ordinary common sense, but then one can never tell. (Whorf 1939g)

A pity perhaps that he did not take Spier's advice and add that footnote. Again Pinker is only one of the most recent to let the chance of a cheap swipe at his imagined opponent overcome his thinking apparatus:

But the more you examine Whorf's arguments, the less sense they make. Take the story about the worker and the "empty" drum. The seeds of disaster supposedly lay in the semantics of *empty*, which, Whorf claimed, means both "without its usual contents" and "null and void, empty, inert." The hapless worker, his conception of reality molded by his linguistic categories, did not distinguish between the "drained" and "inert" senses, hence, flick ... boom! But wait. Gasoline vapor is invisible. A drum with nothing but vapor in it looks just like a drum with nothing in it at all. Surely this walking catastrophe was fooled by his eyes, not the English language. (Pinker 1994:60)

The example to which Pinker refers is one of several interesting cases mentioned in the memorial paper. In evaluating Whorf's credibility we might recall that he was considered extremely successful in his profession, providing advice on fire prevention strategies at the industrial premises his company insured as well as undertaking normal assessments (Carroll 1956). His cautiously qualified observations, evidently drawn from thoughtful investigation of numerous circumstances in which insurance claims had been made, are worth comparing with Pinker's dismissive rendering of them. Whorf explained that

around a storage of what are called "gasoline drums," behavior will tend to a certain type, that is, great care will be exercised; while around a storage of what are called "empty gasoline drums," it will tend to be different — careless, with little repression of smoking or tossing cigarette stubs around. Yet the "empty" drums are perhaps the more dangerous, since they contain explosive vapor. Physically the situation is hazardous, but the linguistic analysis according to the regular analogy must employ the word 'empty,' which inevitably suggests lack of hazard. The word 'empty' is used in two linguistic patterns: (1) as a virtual synonym for 'null and void, negative, inert,' (2) applied in analysis of physical situations without regard to e.g., vapor, liquid vestiges, or stray rubbish, in the container. The situation is named in one pattern (2) and the name is then "acted out" or "lived up to" in another (1), this being the general formula for the linguistic conditioning of behavior into hazardous forms. (Whorf 1939c[LTD]:135)

One does not need to agree with Whorf's conclusions to respect his reasoning and the research in which his argument was evidently grounded.

The possibility that behavior may be “largely conditioned and channeled by [...] ‘official’ cultural meanings” embodied in language is not restricted to English of course and a Hopi example at this point illuminates discussion in other places (especially Whorf 1936f?) about the Hopi metaphysical dichotomy between the ‘subjective’ or ‘unmanifest’ realm of existence or potentiality — also referred to as the ‘causal realm’ in the theosophical paper (Whorf 1941b) — and the ‘objective’ world of ‘manifest’ existence¹⁵. Whorf explains in the report that a researcher

might be told that a certain Hopi object is a ‘prayer pipe’, that it is smoked during a prayer-ritual, especially when praying for a good harvest, etc. This information is important, but it should be coupled with the Hopi linguistic situation. Whereas a pipe, as such, is called a co’no, this object is a na’twaNpi, lit. ‘fixed outline for mutual trying, endeavoring’ (on the pattern of e.g. pa’va’Wpi ‘fixed outline for sleeping, bed’, ʔa’ʔa’cpi ‘fixed outline for closing, door’ etc., < te’wa’na ‘try, endeavor, practise’). The informant’s explanation obtained in the context of these linguistic patterns brings out that smoking the pipe is treated as an adjunct and aid to ‘concentrating’ in the mind or ‘heart’, on a desired result, usually the harvest — ‘concentrating being a focusing of the causal power of the Hopian (metaphysical) causal realm and the basic germinal form of ‘trying’, — ‘mutual’ (na-) refers to the mutual or reflexive interaction between the tryer and the not-yet-manifested result being tried for, while na’twana ‘mutual trying and being tried for’, ‘precipitation out of endeavor-power into actuality’, means at the same time ‘harvest, crops’, as the goal and result par excellence of the collective Hopi will and endeavor. (Whorf & Trager 1938:13; original underlining)

This example is particularly helpful in demonstrating Whorf’s fundamental point about ethnolinguistic work, that it needs to take quite a sprawling range of configurations of meaning, patterns of behavior, and even environmentally influenced factors of lifestyle (like the climatic difficulties associated with Hopi agriculture) into account and that this involves careful delving into patterns of meaning making entrenched in the collective consciousness of groups whose languages have been associated over a long period of time with a continuing culture.

After further discussion about relationships which may be traced between language and behavior, Whorf moves on to questions of “the finer shades of

¹⁵ Readers might note the similarities between Whorf’s and Bohm’s terminologies. Alford (1994:p.c.) claims that Bohm confirmed, when asked, that he had read Whorf before writing *Wholeness and the Implicate Order*. As mentioned previously, both Whorf and Bohm read Whitehead and all three were conversant with modern physics.

meaning and deeper intellectual and spiritual life, the values which are recognized as ideals”, which he also refers to as the “Study of the Supra-Linguistic and Semi (Quasi)-Linguistic Mentality (Collective and Social)”. Rejecting the notion, still common in his day, that this dimension of culture is restricted to ‘civilized’ societies, he argues that

just as the traditional view that supposedly given intellectual concepts (of the type of space, time, causality etc.) are really cultural forms of SAE and some other cultures affiliated, in regard to spiritual values the traditional view is also reversed; it has proceeded as if spiritual values were a cultural product of SAE or “civilization” whereas they are common, in different forms, to all men, and may represent a real intuitive level of experience. This level is admittedly very hard to get at for it is not only linguistic (and therefore one step ahead of the non-linguistic anthropologist). It is, in a sense, the most subtle aspect of the cultural mentality (q.v. supra) and the last realm reached by boring through the entire linguistic-cultural world outlook. Religion in its inward aspect, not simply its forms and ceremonies but what it deeply means, both to the individual and in the collective life, comes in here, also the ethical and esthetic values of the culture. A culture, deeply understood, presents emphases on certain large totalities or integrations of very manifold experiences, which may be called the spiritual emphases of the culture. (Whorf & Trager 1938:13-14)

He goes on to elaborate with further examples from Hopi and concludes the section by saying that:

There are very many ideas [...] which are nowhere summed up in definite words [...] yet they exist as large wholes or massive configurations of linguistic-cultural organization. Here again the road lies through the more overt patterns of language, thence through the more covert, but it need not stop there, it leads on to the deeper shades of meaning and the spiritual orientations of the culture and of personalities. (Whorf & Trager 1938:14)

In the next two sections of the report Whorf considers the topics of translation and symbolism, suggesting three kinds of translations, the ‘official’, the ‘literal’ and the ‘interpretive’. The first is likely to be that initially offered by the native speaker, the second “is systematic and in terms of a knowledge of grammar and the analysis of the form” while the third “is psychological and cultural, and takes in the informant’s detailed explanations and the interpreter’s knowledge and insight into ‘ethnolinguistics’ — native segmentation of experience, metaphysics, cultural mentality”. Although “[s]ymbolism, being a form of reference that plays upon subtle and supra-linguistic meanings, often eludes direct

questioning”, Whorf considers that since “it influences profoundly the use of language” it can also be studied through language patterning. A striking example from Aztec is offered:

Flowers do not symbolize delicacy and femininity so much as all that is proud, fiery, and aristocratic, somewhat like flags, crests or spearheads. The characterizing of flowers as sweet or fragrant need not alter this masculine symbology, and hence such ideas as fragrance and sweetness differ in connotation from with us. [...] To appreciate [another pattern of symbolism] we must not only know the culture but perform two operations of linguistic nature: (1) disabuse ourselves of the effect of our own literary language in its allusions [...] (2) assimilate the native linguistic patterns, segmentations, and meanings that are tied in with the native employment of the symbolism. (Whorf & Trager 1938:14)

The penultimate section of the report (pp.14-15), dealing with “The Correct Recognition of the Immaterial Values of a Culture” is a subtle and detailed application of Whorf’s methodology described above to the Hopi situation. As it is best read in its entirety to be properly appreciated, I refer the reader to the full text in the appendix. The final section, dealing with “Ideas not Independently Lexated” has been touched on in an earlier chapter where Whorf’s brief differentiation between the meaning of a blueprint (not a linguistic meaning) and the fact that the word *blueprint* is a lexation, was referred to. His basic point here is that “the lack of a certain type of idea cannot be argued from an apparent lack of a term for the idea”. For instance, he said, “the absence of a lexation corresponding either to our ‘God’ or ‘(a) god’, does not mean that the Hopi do not have as part of their own culture the idea of a cosmic or universal being which is deeply and as it were religiously felt”. He believed this idea to be “definitely present” lying “behind many different lexical allusions and circumlocutions” (p.16; original underlining).

To summarize, Whorf’s report to the Yale anthropology department is an important document which is essential reading in any attempt to ascertain what he meant by linguistic relativity even though the term itself is not used in it. That the material has been so poorly known to date is mostly because it was not included in *Language, Thought, and Reality*. That its full significance has not been adequately appreciated is probably because about the half the document (the handwritten sections which were evidently never typed up) were not included in the Middle American collection at Chicago University which is where most of those relatively few people who have studied the report found the nine typed pages. Nevertheless, in its systematic and comprehensive presentation of the configurative approach to linguistic analysis the report is the most detailed

account we have in Whorf's own words of the multiple sites in which linguistic relativity can manifest in those complexes of human activity we variously describe in terms of 'language', 'thought', and 'culture'. Given the not infrequent criticism of his popular approach to the same ideas in the articles written for nonlinguistically trained audiences, the more sober approach taken in the report provides a balance which will be appreciated by many. The hitherto unknown examples and more detailed explanations are particularly interesting. In the light of this report much of the commentary and even much of the research which has taken place in Whorf's name in the decades since his death must be discounted as having little to do with the theory of linguistic relativity as he explicated it himself.

The key points are that linguistic relativity has to do with the role of language in the interface of human experience and understanding. The arguments which have been presented here are firmly based in traditions of linguistic science developed during the first half of the century in American linguistics. They also offer a systematic way of tackling philosophical questions about the kind of activity knowing the world is and the role that knowing language may have in articulating that activity. That Whorf was aware of the epistemological implications of his developing methodology is evident in his comment to Leshner that the Shawnee paper "broaches some fundamental questions about our formulation of knowledge of the physical world" (Whorf 1940g:2). By incorporating gestaltism into his approach to linguistic analysis he was able to consolidate and extend the range and power of that complex of interweaving strands of theme and theory which is his contribution to the human sciences.

In the next chapter we build on the material discussed here by examining Whorf's concepts of 'covert categories' and 'cryptotypes'. These important constructs were introduced in papers written during 1937 and were explained most succinctly in the Yale report the following year. They are not only relevant to the study of linguistic relativity, but are also significant with respect to his insight discussed in chapter two that to know a language (or languages) is to be in a cognitive 'state of linkage' or 'rapport' capable of generating thinking of a linguistic kind as well as communicative behavior. As there are terminological and perhaps conceptual anomalies in his discussions of covert categories and cryptotypes some scholars may have drawn unwarranted extrapolations from what he said in places. It seems that during the period when he was actively trying to explain his new insights to his colleagues, he was also in the process of clarifying for himself how the terms might best be used in relation to each other, and their relationship to the associated concepts 'overt category' and 'phenotype'. The discussion of covert categories and cryptotypes in the next

chapter fills out and completes the analysis of configurative linguistics which has been the central preoccupation of this chapter and which is essential to a proper understanding of the ramifications of Whorf's linguistic relativity principle and its place in the theory complex.

CHAPTER FOUR

OF COVERT CATEGORIES, CRYPTOTYPES, AND THE INTERNALIZED LINGUISTIC SYSTEM

4.1 *A Whorfian psycholinguistics*

Whorf was aware that in exploring what he called ‘covert categories’ and ‘cryptotypes’ he was probably “the first to point out the existence of this submerged layer of meaning, which in spite of its submergence functions regularly in the general linguistic whole” (Whorf 1937b[LTR]:111). This concern with the more deeply convolved aspects of grammatical activity has also, of course, characterized much work since his time. His precedence with respect to this trend in linguistic science has been acknowledged by Fillmore (1968), Ogle (1973), Silverstein (1979), and Lucy (1992a) at least. No one to my knowledge, however, has commented on the possibility that had Whorf lived to clarify and elaborate his ideas on ‘psycholinguistic patterning’ (Whorf 1937c[LTR]:74), psycholinguistics might have developed with very different characteristics to the discipline which did eventually emerge under that name. In this chapter, Whorf’s sometimes anomalous nomenclature with respect to the more subtle of linguistic processes is explored, and what he said about psycholinguistic patterning and its implications for linguistic thinking is reviewed. The chapter should be read with the arguments from chapter two about the fluid and dynamic nature of linguistic thinking in mind. Careful reading of the remarkable draft paper “A linguistic consideration of thinking in primitive communities” (Whorf 1937[LTR]:65-86), and the other original documents mentioned below is also recommended.

Whorf’s best known treatment of covert categories and cryptotypes is in his paper “Grammatical Categories” (Whorf 1937d) which, according to letters from Whorf to Boas (Whorf 1937f, 1938g) was written during December 1937. Although the paper was not published until 1946 it was known to his colleagues during his lifetime and respected. Again his goal in writing it was to discourage linguists from “[t]he very natural tendency to use terms derived from traditional grammar, like verb, noun, adjective, passive voice, in describing languages outside of Indo-European”, a practice which he believed to be “fraught with grave

possibilities of misunderstanding” (Whorf 1937d[LTR]:87). The concepts of *covert categories* and *cryptotypes* were thus introduced as part of a larger framework for grammatical analysis, and this system was in turn contextualized some six months later in the yet more comprehensive methodology outlined in the Yale report.

Whorf, as we saw in the last chapter, did not want to discourage linguists from using traditional terms altogether. His point was just that one should not prejudice the study of grammatical organization in an unfamiliar language by *beginning* with the category labels. More significantly with respect to the topic of this chapter, he also encouraged linguists to look for word classes which are not marked morphemically but rather “by types of patterning: e.g. by the systematic avoidance of certain morphemes, by lexical selection, by word-order that is also CLASS-ORDER, in general by association with definite linguistic configurations” (pp.87–88). His analytical framework was built around two basic distinctions, the first between overt and covert categories and the second between ‘selective’ and ‘modulus’ categories (p.93). Whilst the framework as a whole will not be reviewed in full here, it is interesting to notice that the descriptive and theoretical expertise demonstrated in this paper is still considered by some to be Whorf’s most significant contribution to linguistics.

His contemporary, McQuown (1990, p.c.), for instance, has described “Grammatical Categories” and “Language: Plan and Conception of Arrangement” (Whorf 1938c) as a “contribution to basic linguistic descriptive conceptualization [...] parallel to (but independent of) Bloomfield’s ‘Language’ (1933), and possibly in part inspired by Sapir’s ‘Language’ 1921”. Hockett has similarly remarked that although the “Sapir-Whorf hypothesis” is

by far the most prominent and popular aspect of Whorf’s work [...] it was by no means his greatest contribution. I think he was remarkably perceptive in digging out the less obvious grammatico-lexical facts of languages [...] and consider his reports on Hopi and his few papers on grammatical theory to be his major contribution. [...] In this part of his work his most important single paper is, I think, the “Grammatical Categories” of 1937. (Hockett 1990, p.c.)

When Voegelin (1938b) first saw “Language: Plan and Conception of Arrangement” he described it as “fascinating” (p.1) and told Whorf: “I think what makes your thinking so stimulating (and difficult to follow at times) is that you do not avoid the areas between organized categories” (p.4). He similarly admired “Some Verbal Categories of Hopi” (Whorf 1938b[LTR]:112-124) commenting: “Most ingenious pyramiding and semi-sub classing” (Voegelin

1939a:1). Many of the classes Whorf identified in Hopi are covert classes and Swadesh told him that:

In your papers I feel you have an important contribution in your concept of overt and covert categories. Of course Sapir and some others have recognized such categories in specific cases, but your contribution is to call attention to the phenomenon as something special and something which can easily fool the investigator. (Swadesh 1938)

Lucy (1992a:298n), while acknowledging that Whorf's contribution in terms of theory was innovative, also notes Jakobson's "contemporaneous concern with categories lacking regular overt morphological marking" and suggests the possibility of a link between Whorf's work and that of the Prague School. Although Whorf was in personal contact with Trubetzkoy on the question of Hopi phonemes (Trubetzkoy 1937a,b,c; Whorf 1937h), there is no specific evidence in his papers of a broader influence from the Prague School or from Jakobson himself. My own opinion is that the fact that Whorf conceptualized covert categories in terms of his holistic field theory model of neurolinguistic organization suggests that the link to Sapir's thought was primary. His predilection to focus on the semantic function of all kinds of grammatical categories might be considered to have affinities with the functional approach to grammar of the Prague School but, as we will see below, even Bloomfield acknowledged such functions in terms of the 'grammatical meanings' of categories. Whorf simply gave greater salience to this aspect of grammatical investigation than some of his contemporaries did.

Should Whorf's investigative perceptiveness itself be regarded as a direct outcome of his training by Sapir? The evidence suggests not. In 1930 for instance, before Whorf had begun to work with him, Sapir wrote to Tozzer thanking him for letting him see "Whorf's paper on Nahuatl tones and saltillo". He said: "It is an important paper and I enjoyed reading it very much. It should by all means be published". On a paper called "The Structure of the Athabascan Languages" written in February 1932 a few months after Whorf began to study with him Sapir commented:

This is an excellent analysis. It shows great sensitiveness not only to the form as pattern but to the "inner" psychological form. I am greatly impressed by the, on the whole, sure intuition which has guided you in your interpretation of a far from easy linguistic structure. (Note by Sapir on Whorf 1932a:19)

Bloomfield too seems to have admired Whorf's early work, saying that his approach to Maya was "very encouraging" and that he deserved to "get the very best results" (Bloomfield 1936). This is an interesting comment considering that the Maya work has often been denigrated, not least in his own day as copious correspondence (Whorf 1979) attests, but more recently (e.g., Thompson 1972). Bloomfield's assessment is interesting in the light of McQuown's (1990, p.c.) assessment of the work in Maya as a "truly pioneering step". When, as editor, Bloomfield received the Hopi grammatical sketch which was eventually published in Hoijer (1946), he wrote: "Shall greatly enjoy reading the sketch — not part of critical duties, but my own benefit" (Bloomfield 1939b). This also suggests an unquestioning acceptance of Whorf's descriptive expertise.

Certainly there were times when Sapir considered that Whorf had overstated his case. This in itself does not imply lack of respect for Whorf's ability, however, as some (e.g. Berthoff 1988) have assumed by reading Carroll's (1956:24) report of a comment Sapir made about a set of Maya words that Whorf thought were connected semantically. Sapir had said on that occasion that he could not "feel the cohesiveness of the *sa-* set as clearly" as Whorf did, and that to him it seemed to be a "purely subjective construction". He also responded negatively in part to a "long letter on semantics" which apparently dealt with the kinds of issues which we focused on the previous chapter saying:

I was a little distressed to feel that you thought linguists in general thought given linguistic forms neatly corresponded to the actualities of experience. You really are much too hard on them. I don't think they're as naive as you make out. The non-congruity of objective experience is a commonplace in linguistic history. (Sapir 1938a:1)

After all, as Yakov Malkiel (b.1914) points out, Sapir had emphasized as early as 1926 in an *Encyclopedia Britannica* entry on "Philology" that: "The study of exotic forms of speech discloses the possibility of markedly distinct analyses of experience where one might naively suppose that our customary analysis via speech is resident, as it were, in the nature of things" (Malkiel 1989:95). The rest of the Sapir's letter to Whorf was as cordial as usual however, as were later ones, including one where Sapir commented on a talk he had asked Whorf to give on phonemics and morphophonemics, saying that he had been "particularly pleased with [Whorf's] contribution, which struck [him] as clear and original in phrasing" (Sapir 1938b).

As we will see, Whorf's comment that "covert categories are quite apt to be more rational than overt ones" (1937c[LTR]:80) reflected his opinion that grammatical categories which operate according to an elusive or submerged principle"

rather than an easily identified and labeled one, may be particularly helpful in revealing “the TRUE SHAPES of many of those forces which hitherto have been [to the psychologist] but the inscrutable blank of invisible and bodiless thought” (p.73). He argued, in other words, that investigating covert grammatical categories (which he described as working in tandem with overt categories and not underlying them as some have imagined), might be especially helpful in revealing the nature of linguistic thinking.

As early as 1932, in the Athabascan paper he wrote for Sapir, he had used the term ‘psycho-linguistic’ in relation to the kind of investigation and associated description which he undertook so competently. Commenting on part of his analysis, he said: “Fascinating psycho-linguistic questions arise. [...] Psychologists should make more study of the curious mechanisms of language” (p.18). Later that year he told Sapir that he had found “the concepts of ordinary psychology [...] practically of no help” in solving what he regarded as a problem “of meaning” associated with “behavior of the sort that causes fire when in a certain type of surroundings”. He said that “ideas derived from linguistics” had proved “a help in analyzing” the problem however (Whorf 1932b). Sapir’s interest in language psychology is well known (e.g. Darnell 1989, 1990) although his inquiry was more deeply informed by influences from psychiatry than Whorf’s was.

Whorf also used the newer term, unhyphenated, in 1937 with specific reference to the topic of this chapter, saying that:

The real originator of such ideas as rapport-systems, covert classes, cryptotypes, *psycholinguistic patterning*, and language as part and parcel of culture, was, so far as I can learn, a French grammarian of the early nineteenth century, Antoine Fabre d’Olivet (1768–1825). (Whorf 1937c[LTR]:74; my emphasis)

He also credited Fabre d’Olivet with reorganizing “the treatment of verb conjugations on a psycholinguistic basis” (p.75) in his treatment of Hebrew.

Given these comments, it is certainly interesting to speculate on the way psycholinguistics might have developed had Whorf lived, although it must be acknowledged that the reigning ‘picture of the universe’ in linguistics in the decades after his death was generated by a conceptual mode very different from his own, one which would have been largely inhospitable to his way of talking and thinking. His molar and dynamic conception of mind, employing the kind of imagery now coming into its own in connectionist and holographic models of cognitive operation, did however capture some of the fluidity that thought often seems to have when considered from the orientation of subjective experience and

is in sharp contrast to those metaphors of mind which rely predominantly on notions of clearly separate entities and interactive processes operating on the world model of classical physics.

Again it is interesting to note affinities with some of Vygotsky's insights into "the extreme, elliptical economy of inner speech" (1986[1934]:85), "the fusion of thought and speech" which does not involve either: "[n]onverbal thought" or "nonintellectual speech" (p.89), and the dynamism evident in his conceptualization of linguistic activity in the mind/brain in remarks such as the following:

Inner speech is to a large extent thinking in pure meanings. It is a dynamic, shifting, unstable thing, fluttering between word and thought, the two more or less stable, more less firmly delineated components of verbal thought. (Vygotsky 1986[1934]:249)

Somewhat similarly Whorf said of the cryptotypic idea which holds a covert grammatical class together — "its logic becomes a semantic associate of that unity of which the CONFIGURATIVE aspect is a bundle of non-motor linkages mooring the whole fleet of words to their common reactance" (1936c[LTR]:81). He thought that there was "no evident reason why such a complex should not enter into various functional relations with other material of thought without necessarily requiring the activation of any of the individual words or class marks with which it is connected" (p.69). As we saw in chapter two in relation to their comments about Watson's ideas, Whorf, like Vygotsky, also completely rejected the idea of any isomorphism between the manifest speech function and "the nature of the RAPPORT, the structure of the matrix relations" (p.67) involved in cognitive activity of a linguistic kind.

4.2 *Marking and grammatical classes*

What then, are the details of Whorf's explanations of covert categories and cryptotypes? I will start with the discussion in the 1938 Yale report as it is more concise and later than the better known statements. I agree with Lucy (1992a:28) that the distinctions made so clearly there may be taken as representing the most developed formulation we have on these topics and that variations in Whorf's use of terminology can be most confusing. Although Whorf's earlier papers have been quoted more frequently, they include terminological anomalies which allow for different readings of what he said, interpretations which may not be true to his final conceptions.

Whorf opens his comments in the report by stressing a fundamental point — that "from a grammatical configurative standpoint an entirely unmarked class

would be a fiction” even though such categories may have been “foisted upon exotic languages” on the model of categories found in the investigator’s language. He explains that classes may be marked either overtly or covertly, that “grammatical markers [...] may or may not appear with the form categorized”, and that: “The test unit is the sentence, or sometimes small group of sentences (immediate field of discourse), not the word” (Whorf & Trager 1938:5, typescript; original underlining). This focus on the field of discourse rather than the word encourages analysts to seek syntactic as well as morphological configurations of marking. As such it anticipated trends which were to become dominant in later decades but which were innovative in his own day.

With regard to developments in the 1960s, Charles J. Fillmore (b.1929), for instance, identified both “*the centrality of syntax*” and “*the importance of covert categories*” (1968:3; original emphasis) as significant features. He emphasized how important “grammatical properties lacking obvious ‘morphemic’ realizations but having a reality that can be observed on the basis of selectional constraints and transformational possibilities” were to these developments. He added that linguists “are constantly finding that grammatical features found in one language show up in some form or other in other languages as well, if we have the subtlety it takes to discover covert categories”. He said that he thought “it interesting that Whorf, whose name is most directly associated with the doctrine that deep-seated structural differences between languages determine the essentially non-comparable ways in which speakers of different languages deal with reality” should have introduced “the concept ‘covert category’ — a concept which is making it possible to believe that at bottom all languages are essentially alike” (pp.3-4). As we have seen in connection with his theory of isolates, Whorf did not consider the way “different languages deal with reality” to be non-comparable in an ultimate sense, although it is true that different conceptual ‘views of the world’ may make intercultural communication difficult. The question of whether his theory complex has room for the notion of conceptual and linguistic universals is considered in the next chapter.

Whorf clarified that the difference between overt and covert categories is that the former “are accompanied by markers in all or nearly all sentences — e.g. verbs and nouns in Eng and French”, while:

Covert categories have markers that ordinarily do not appear — they appear only in certain “test” types of sentence; e.g. Eng genders, where the markers (reactances) are the personal pronouns, but appear only when the sentence calls for such a pronoun. The pronouns mark linguistic classes, not “natural” orders of experience that could be discriminated by nonlinguistic tests — this, in spite of the considerable degree of alignment with a sex distinction is true of Eng as well as of French, Latin, Hebrew, or

Taos gender. Eng verbs belong to different covert classes of “resolution” marked by absence of nouns or pronouns after the verb and other patterns (‘I heard it’) but not (‘I listened it’) and (‘it was heard’) but not (‘it was listened’) etc., but in many types of sentence (‘I will hear, ‘I will listen’ etc.) no markers appear. Covert classes have failed of sufficient recognition both in European and in American Indian lgs; they are often of the greatest importance, and failure to recognize them may baffle or delude the investigator of a lge. (Whorf & Trager 1938:5, typescript; original abbreviations and underlining)

He emphasized that: “Covert marking is very definitely marking, and cannot be ignored” and that “features of position, and order in the sentence, and negative features — the significant absences of forms or patterns otherwise to be expected” are all possible markers. Notice that in this passage Whorf was perhaps thinking only of the markers of covert classes as ‘reactances’, seeming to give no particular name to markers of overt classes. Heller & Macris (1977) may perhaps have confused the issue when they argued from Whorf’s usage that a reactance might be taken as “*the distinctive treatment or treatments accorded any category*” (p.206; original emphasis). Their point was that this notion “is probably the central tool not only of modern linguistics or modern social theory generally but even of all scientific endeavor”. They were mistaken, however, in suggesting that the idea of a distinctive treatment for a category originated in Whorf’s analysis of covert processes.

It is evident from his remarks about category marking that Whorf worked from a well accepted assumption, at least among his immediate professional associates, that marking is the basis of category classification, and that he went from that assumption to apply the principle to the discovery of more elusive categories. The notion that indigenous configurations of marking could be taken as revealing indigenous grammatical categories had been accepted in American linguistics since Boas. The fact that Whorf thought it necessary to stress that an analyst should forswear reliance, pending further investigation, even on the assumption that there would be verbs and nouns in a language simply highlights the rigor with which he applied the method of his predecessors and contemporaries. He told a correspondent in early 1938 that linguists in general, especially “ordinary grammarians” were still moving towards the position of ethnologists who “are now used to thinking along configurative lines” and said that “the conceptions of linguistics” that he had “imbibed” from Sapir “were definitely of this sort” (Whorf 1938h:3). Most linguists involved in the study of indigenous American languages also did ethnography and were familiar with culture and personality theories of the period (Darnell 1995, p.c.).

Whorf probably culled the term ‘reactance’ from physical science where it is used to refer to the imaginary component of a mechanical or acoustic impedance which produces a phase difference between a driving force and the resultant motion, but no dissipation of energy. Like so much of Whorf’s terminology, the image is dynamic rather than static (‘marker’ is relatively static by comparison) and linguistic phenomena are treated as forces which have repercussions elsewhere within a system. They are not imagined as structures which are manipulated by the application of rules — an image requiring a manipulator or rule knower — but as (genuinely and spontaneously) generative processes inherent in the overall state of rapport or organization of the internalized linguistic system.

In the report, Whorf defined the ‘grammatical meaning’ of an overt category as a ‘phenotype’ and said that the grammatical meaning of a covert category “if distinguishable, is a ‘cryptotype’” (Whorf & Trager 1938:5, typescript). With respect to the analogy from mechanics and acoustics, we may think of the cryptotype which occasions the distinctive reactance elsewhere in the immediate discourse environment as having the ‘driving force’ of the dictionary definition. What is involved is a kind of energy, both semantic and presumably neurological, in the field theory sense Whorf used when thinking about cognitive activity.

4.3 *Terminological anomalies*

In published writings which predate the Yale report, Whorf tended to use the terms ‘covert category’ and ‘cryptotype’ interchangeably and this has encouraged some interpretations of his work which are inconsistent with his later formulations. For instance he stated specifically in “Grammatical Categories”, that: “A covert category may also be termed a CRYPTOTYPE, a name which calls attention to the rather hidden, cryptic nature of such word-groups, especially when they are not strongly contrasted in idea, nor marked by frequently occurring reactances such as pronouns” (Whorf 1937d:92). He also identified overt categories with ‘PHENOTYPES’, again with no hint of his later idea that the terms capitalized in these definitions might be used to refer to grammatical meanings shared by items in a certain class rather than the groups of words or stems themselves. He confused the issue further by saying that “when no ambiguity results” the term ‘phenotype’ may also be applied “to the mark which accompanies the overt category in the sentence” (p.93).

After 1938 he may have avoided the term ‘cryptotype’ altogether although it is incorrect to suggest as Lucy (1992a) does that the overt/covert distinction itself does not occur in his work after 1939. In the outline (Whorf 1940i) of his projected text book and in his late work on Hopi parts of speech (Whorf 1940k)

covert categories (but not cryptotypes) are mentioned. A comment in “Language: Plan and Conception of Arrangement”, written not long before the report, may hint at a possible reason for this. Here cryptotypes are briefly defined as “[c]overt word categories with subtle meaning marked only by reactances” and the comment: “Skip this in the survey except for obvious cases, as determination of cryptotypes usually requires deep study of a language” (Whorf 1938c[LTR]: 132) warns against casual or superficial approaches to this difficult area of investigation.

He took an entirely different approach to the topic of grammatical categories in his linguistic thinking paper, which seems to have been written and circulated about the same time as other documents discussed here. Referring to covert categories, he said there that:

A linguistic classification like English gender, which has no overt mark actualized along with the words of the class but which *operates through an invisible “central exchange” of linkage bonds in such a way as to determine certain other words which mark the class*, I call a COVERT class, in contrast to an OVERT class, such as gender in Latin. Navaho has a covert classification of the whole world of objects based partly on animation and partly on shape. Inanimate bodies fall into two classes which linguists have styled “round objects” and “long objects”. These names of course, misrepresent; they attempt to depict the subtle in terms of the gross, and fail. Navaho itself has no terms which adequately depict the classes. A *covert concept* like a covert gender is as definable and in its way as definite as a *verbal concept* like ‘female’ or feminine, but is of a very different kind; *it is not the analog of a word but of a rapport-system*, and awareness of it has an intuitive quality; we say that it is sensed rather than comprehended. It is possibly the kind of concept or idea which in Hindu philosophy is called *arupa*, formless. (Whorf 1937c[LTR]:69-70; my italics except for the last)

The reference here to the “covert *concept*” which is not named in the culture but which the linguist may identify as the common element of reference carried by all the words in the class, is equivalent to the ‘grammatical meaning’ of the Yale report. The reference to ‘concept or idea’ also suggests that Whorf thought that the grammatical meaning of a covert category is a semantic reality for the person who understands or speaks a language, albeit an amorphous reality, largely unavailable to conscious analysis and not always amenable to denotation by a single descriptive word.

Semantically it has become a deep persuasion of a principle behind phenomena, like the ideas of inanimation, of “substance,” of abstract sex, of

abstract personality, of force, of causation — not the overt concept (lexation) corresponding to the WORD causation but the covert idea, the “sensing,” or, as it is often called (but wrongly, according to Jung), the “feeling” that there must be a principle of causation” (Whorf 1937c [LTR]:81).

Specifying again that he called a covert linguistic class with a “very subtle meaning [...] a CRYPTOTYPE” and subsuming the question of class meaning in the category name, he added: “It is a submerged, subtle, and elusive meaning, corresponding to no actual word, yet shown by linguistic analysis to be functionally important in the grammar” (p.70). In a letter written in early November 1937 to Trager, he explained that:

In the system I am using for general purposes, applicable to almost any language, I use the term covert (I pronounce it like ‘cover’ with added -t) and covert category as meaning ‘non-overt’. Cryptic category [Trager’s suggestion] might also be used but seems inappropriate for perfectly obvious highly contrasted classes, which some covert classes are, e.g. Eng. genders. Also it suggests my term cryptotype, with which it might be confused, and I want to keep ‘cryptotype’ for a *special, highly-concealed subdivision of covertness, amounting sometimes to a second degree of covertness*. Thus I have the terms overt, covert, cryptotype and phenotype (= non-cryptotype).

Transitivity, activity, etc. (in Eng.) come under the rubric of covert (your ‘cryptic’) categories. (Whorf 1937g:1; my italics, original underlining and abbreviations)

A different focus more like that of the Yale report is evident in the letter to Carroll written probably in the fall of 1937 but which Carroll first saw when he was preparing the Whorf collection (Carroll 1956:102). This letter (Whorf 1937b) is a detailed discussion of several inceptive cryptotypes in Hopi, the reactances of which manifest in patterns which translate as ‘begins doing it’ in English. Different suffixes are applied to subgroups of verb stems according to the patterns of an elusive logic which speakers of the language have internalized unconsciously. The discussion is extremely detailed, and will not be summarized here although it is treated at some length in Lee (ms). Whorf’s synoptic statement about the phenomena in question is particularly interesting however, and suggestive of the kind of psycholinguistics he might have developed further had he had the opportunity. He told Carroll:

From phenomena of this sort, which are not confined to the inceptive problem but pervade all Hopi grammar, I conclude that there must be to

the Hopi speaker a dimly felt relation of similarity between the verb usages in each group having to do with some inobvious facet of their meaning, *and therefore itself a meaning*, but one so nearly at or below the threshold of conscious thinking that it cannot be put into words by the user and eludes translation. To isolate, characterize, and understand the operation of these *dimly felt, barely conscious (or even unconscious) meanings* is the object of my further analysis. *Such an elusive, hidden, but functionally important meaning I call a CRYPTOTYPE.* (Whorf 1937b[LTR]:104-105; my emphasis)

Here the usage is in harmony with that of the Yale report.

It is interesting that although Voegelin (1938a) told Whorf with respect to his “MSS on thinking” that he hoped he would “follow up on this paper” and that he thought “that this is the most important aspect of linguistics” (p.1), he was dubious about some of the concepts in it. He said for instance, that:

Unless the linguistic “linkage bond” is productive, I should expect it to be overridden by a cultural “linkage-bond”. That is, I question the power of your unproductive “covert class” in thinking, but I do not controvert it. What we need is techniques for discovering specifically where the “covert class” enters into thinking. [...] Your “crypto-type” is only rhetorically a sub-type of the “covert class”. Your analysis is just good linguistic analysis, and I fail to see the need for new terminology. [...] Nor am I a friend of the term “phenotype” if it is the “‘classical’ morphological category”. (Voegelin 1938a:3-4; original underlining)

Voegelin was mistaken, as we will see below, in thinking that covert classes are unproductive and was perhaps unclear about how a cultural ‘linkage-bond’ might operate apart from the mediation of linguistic processes. His comments however, coming as they did at the beginning of the year in which Whorf was to test out some of his new ideas on the graduate class at Yale and later write the report on configurative linguistics, may have been at least partly instrumental in encouraging Whorf to clarify what he had been trying to say about covert categories and cryptotypes over the previous six months or so. Although a distinct impression is gained from the Whorf correspondence that Voegelin was a poor match for Whorf in intellectual terms, Whorf seems to have valued his friendship and support over the crucial period (1937–1940) in which they were in regular contact and during which Whorf became ill but also produced most of his major papers.

To summarize the main points made in this section, it seems right, as Lucy suggests, to take the Yale report as the definitive document on the question of

covert categories and cryptotypes although the other documents illuminate the ideas expressed there in the kind of detail necessary for proper understanding of the complexity of Whorf's claims and their implications.

A key point is that in all Whorf's explanations it is clear that both covert and overt categories are groups of words or stems which are formally identified by markers associated with them in the 'immediate field of discourse'. The distinctive marking of overt categories is usually closely associated with the occurrence of the item in question and appears in all or most circumstances of use. The distinctive marking of covert categories may, however, manifest only in certain patterns of occurrence and then in a characteristic reactance of some other element in the discourse environment to the item in question. Compared with the usually more immediate linkages between elements of overt categories and their markings, considerable separation between the elements of covert categories and their reactances is possible. Although there may also be considerable differences in the frequency with which marking occurs, the differences between the two kinds of category are of degree, not of kind.

Another basic point is that it is possible, although generally more difficult, to identify a common semantic notion shared by items in a covert category (the grammatical meaning) just as is attempted with overt categories. The meaning, if identified, is a cryptotype just as the meaning of an overt category (e.g., that a verb tends to denote an action of some kind in broad terms) is a phenotype. Both cryptotypic and phenotypic meanings are the systemic concomitants of grammatical categories as these may be observed operating in speech or in verbally explicit linguistic thinking. Although their semantics may not be easy to characterize in precise terms, such meanings are part of the genuinely generative system which allows people to understand, and also make, utterances acceptable in their speech community.

We turn now to the question of whether covert categories necessarily underly overt categories, an assumption which is quite common in the literature.

4.4 *Grammatical meaning and the problem of levels in linguistic description*

In a comprehensive analysis of Whorf's discussions of covert categories and cryptotypes, Lucy (1992a:27) argues that "The term cryptotype, then, had two senses, one referring to a relative lack of marking and the other referring to relative obscurity of meaning". Halliday (1983[1988]:38) also comments on "a connection between the two senses in which Whorf used 'crypto-'" saying that "a category may be hard to define precisely because it is hidden from view". Halliday also emphasizes that "it is something that escapes the notice of the

speaker of the language” and that this is more important than the fact that it may be difficult for the linguist to isolate. There thus seem to be three cryptal aspects of Whorf’s concepts of covert categories and their cryptotypes.

From the linguist’s perspective the categories themselves are hard to identify because they are neither inevitably nor overtly marked. Their grammatical meanings or cryptotypes may also be difficult for the linguist to define because the semantic ramifications of items in the category may be so diffuse that choosing a word or phrase to characterize what is communicated when they manifest in speaking, writing, or thinking is problematic. Finally, for individuals who have internalized a cryptotype, its mode of operation is so far from conscious awareness that it is, in effect, an undercover or secret process — active, but unmonitored and, indeed, almost unmonitorable as we speak and think.

In thinking about cryptotypes it is important to remember that phenotypes are also out of awareness as we speak and think because we operationalize them unconsciously, as we do all grammatical meanings. Whorf’s point was only that it is generally easier for a person interested in becoming more metalinguistically aware to become conscious of phenotypes rather than cryptotypes. For instance, once having had our attention drawn to the way English nouns and verbs categorize isolates of experience, or complexes of isolates, it is possible to monitor the effects of these automatic processes in our thinking, speaking, and writing and, as Halliday (1987a) shows, bring it under more conscious control in order to achieve particular communicative objectives.

Furthermore, as Lucy (1992a) points out “[o]vert and covert categories do not operate independently of each other”, languages may “use covert categories to different degrees” (p.29), what is overt in one language may be covert in another (p.28), and it is not the case that cryptotypic categories can be simplistically equated with deep structure and phenotypic with surface structure (p.124). He draws attention to Whorf’s comment, made in relation to his analysis of Hopi verbal categories, that “The meaning of a PHENOTYPE, though ostensibly plain, can really not be completely understood in all its subtlety until the cryptotypes that go with it have been dredged up from their submerged state and their effective meanings to some extent brought into consciousness” (Whorf 1937b[LTR]: 109). The concept here is of a complex meshing of categories, some more and some less easily defined, achieving interactive semanticity together. The covert categories do not underly the overt categories in the sense in which transformations in deep grammar are said to underly surface phenomena.

The model is not one of levels but interpenetration and Michael Silverstein’s (b.1945) notion that some of the phenomena in Whorf’s studies are “transformational (Harris) relationships” (Silverstein 1979:198) does not seem to be the kind of point Whorf wished to focus on. His opinion was that “any scientific

grammar is necessarily a deep analysis into relations" (Whorf 1936f?[LTR]:68), such analysis surely not being limited to covert categories. It is important to keep the notion of a 'state of linkage' or 'rapport' in mind when thinking about Whorf's treatment of grammatical categories of any kind. Although there is no doubt that he regarded covert processes as deep and "elusive" (p.70), especially where their reactances are few and occur infrequently, his sense of 'deep' may be best understood as meaning deeply enfolded and pervasive through the system or state of linkage which constitutes internalized linguistic competence.

Similarly, when Whorf (p.67) contrasted 'motor reactions' with the neuro-linguistic 'factors of linkage' to which they owe their resonance activating power he was not making an overt/covert dichotomy between motor reactions and linkage factors but between different sets of motor reactions whose linkage factors are more or less deeply enfolded in the system. The notion of a deeper *layer* of cognitive operation is not out of keeping with what he described and notions of hierarchies of levels are similarly compatible to a certain degree with what he said, but any imagery which encourages too definitive a separation of cryptotypic activity from phenotypic activity would be out of harmony with his conceptions, which is why Bohm's 'enfolded/unfolded', 'implicate/explicate' and 'unman-ifest/manifest' terminology is useful in relation to these constructs.

Lucy & Shweder (1979) (also Lucy 1992a) have drawn attention to the importance of Whorf's 'hierarchical view' and certainly his explicit comment that "the cosmic picture has a serial or hierarchical character, that of a progression of planes and levels" invites this interpretation, as does his assertion that "the facts of the linguistic domain compel recognition of serial planes, each explicitly given by an order of patterning observed" (Whorf 1941b[LTR]:248). Recall, however, that when Whorf wrote of hierarchical 'levels' he seems to have imagined them as interpenetrating and also nested. These references are not references to completely separate layers of phenomena in quite the usual sense.

Hall's (1983) remarks about levels are pertinent. Calling attention to "the presence of the time-factor in all human use of language, and hence in linguistic structure itself" (p.146), he argues "that what we are accustomed to call 'levels' of structure are actually differences in the DURATION of the various linguistic phenomena" (p.147). He explains that "all the different types of activity" involved in speaking "are going on at the same time" and asks why there should "be any a priori objection to discussing or treating the interrelations between them". He argues that 'upwards' and 'downwards' terminology led to a futile debate and recommends replacing "misleading" terminology (e.g. "left-hand branching" derived from "pencil-and-paper manipulations") with "discussion of 'earlier' and 'later occurrences of elements in time" (p.148). As Hockett (1979:305n) comments: "we do not know the syntactic dimensionality of the

programming stage (if, indeed it can meaningfully be said to have any): conventional transformational-generative doctrine uncritically assumes linearity, but that may all be wrong.” Today, of course, the notion of parallel processing has become commonplace.

It may be useful to imagine invariably and overtly marked categories (like English nouns and verbs) as ranged at one end of a descriptive cline, with covert categories having only occasional reactances at the other end. There is no absolute border between the two kinds of categories. What differs is both frequency and overttness of marking and also concomitant differences associated with the ease or difficulty of identifying the categories and ascertaining their grammatical meanings.

A misreading of Whorf seems to be represented in Rosch (1974:258) where cryptotypes, covert categories and “the underlying concepts of the language” seem to be equated and regarded as the “semantic correlates of form classes” and where it is also argued that “the pervasive, covert influence of cryptotypes on thought [...] may be one relatively concrete interpretation of what it might mean for grammar to influence metaphysics”. Apart from the confused terminology which comes from Whorf’s earlier formulations, there are two other problems with this statement. Firstly, it is not clear what Rosch meant by ‘concrete interpretation’ in the context of Whorf’s theories about psycholinguistic organization and, secondly, there is no place in this account for Whorf’s specific differentiation between phenotypes and cryptotypes, which are both semantic correlates of form classes.

To take up another of Rosch’s points, Whorf was indeed of the opinion, as we saw above, that “covert classes may have a far-reaching connection with the type of thinking, ‘the philosophy’ or ‘implicit metaphysics’” of a language, but this does not mean that he discounted the possibility of connections also between overt classes and world view. His discussion of the pervasive influence of ‘objectification’ brought about by the tendency in English to nominalize intangibles is an example which Lucy (1992a) explores in detail. Whorf said of the more subtle influence of covert categories in thinking that:

The manifestations of these class-distinctions in thinking and the character of the sometimes rather deeply-hidden and seldom-appearing reactances suggest the phenomena associated with the unconscious, subconscious, or foreconscious in psychology, though on a more socialized and less purely personal plane, and may connect in a significant manner therewith. (Whorf & Trager 1938:5, typescript)

There is a conceptual link in these comments to the notion of ‘inner form’ which Whorf inherited from Sapir and their European predecessors, and also a

link to Sapir's interest in the unconscious which Lucy identifies and Darnell (1989, 1990) explores in more detail. Lucy (1992a:30) considers that Whorf, in discussing "specific, empirically investigable covert linkages among the forms in a language" was able to bring a greater sophistication to Sapir's "generalized somewhat vague references to form-feeling, intuition, or relational feeling arising from the overall patterns of relations in a language". Whorf, in other words, had once again taken Sapir's ideas a stage further in a theoretical as well as a technical sense by introducing the concepts of covert categories and their cryptotypes to linguistic science and demonstrating their use.

Like Fillmore, Richard D. Ogle (1973) has pointed out that in investigating phenomena which are observable only by reference to their effects in other parts of the discourse, Whorf anticipated the kind of work Chomsky and others have done. He states correctly that: "Whorf's views on cognition are inextricably bound up with his conception of the nature and status of linguistic patterning" and says that: "An impressive example of how advanced his thinking was in this area is to be found in his theory of 'cryptotypes'" (p.318). He refers to Whorf's demonstration that words like "uncover, undress, unroll, untie, but not *unwaste, *unhit, *uncut, *unheat, and so on [...] suggest that there is some semantic principle, a 'cryptotype', which determines whether a verb belongs to the un- class or not" (p.319; original underlining). (Whorf's discussions of this phenomenon is in 1937c[LTR]:71).

Ogle took Black (1959:247) to task for saying that although "The heuristic value of the notion of a cryptotype is manifested in its capacity to induce verifiable predictions", the fact that "the man in the English street simply uses 'un-' in happy ignorance" means that apart from the predictive power of the example, "the rest is mythical psychology". Whorf had pointed out that according to the principle he formulated for the 'un-' pattern, we can predict that:

If *flimmick* means, let us say, 'tie a tin can to', then it falls into the cryptotype and I can say, e.g., 'he *unflimmicked* the dog.' But, if it means 'to take apart,' there will be no tendency for anyone to make a form *unflimmick* meaning 'put together'; e.g. 'he *unflimmicked* the set of radio parts.' Such a form will appear strange and unacceptable. Similarly a knowledge of this cryptotype previous to the adoption of the new words 'camouflage' and 'wangle' would have enabled us to predict that it would be possible to say 'uncamouflage it,' but not 'unwangle it'. (Whorf 1937c[LTR]:71)

As Ogle noted with respect to this demonstration of the productive potential of this cryptotype, "if the English speaker uses un- 'in happy ignorance', we are left with the problem, as Whorf well realized, of accounting for his ability to do so correctly, not least the 'creative' aspect of that ability manifested when newly

coined verbs are encountered". It was his opinion that Whorf "postulates that the speaker in some sense 'knows' the cryptotype (it exists on 'its own plane of thought formations', to use his rather quaint locution) and that this knowledge underlies his intuitions about the distribution of prefixes such as un- in both their actual and potential usage" (Ogle 1973:322; original underlining).

Interestingly, Ogle also noted that: "In principle, at least" Whorf's insight appeared to have anticipated "by more than two decades the development within generative grammar of a lexicon consisting not of unanalyzed lexical formatives, but of entries composed of combinations of semantic and syntactic features" (p.320). He argued on that basis that "cryptotypes are essentially abstract entities" and "psychologically real concepts, accessible, on an intuitive basis at least, to the native speaker" (p.321). A cryptotype, or for that matter any kind of grammatical meaning (phenotypical or cryptotypical), is certainly an abstraction, even within the parameters of Whorf's conception of neurolinguistic organization, if we take 'abstract' to mean that it is a projective function of a system as a whole, a system which has the capacity to generate it in appropriate communicative or cogitative circumstances. When not manifest in thinking or speaking, it is indeterminate in the sense explained in chapter two.

But in spite of those affinities with Chomsky which can be identified in Whorf's work (and see Darnell 1974 for a reminder of the importance of taking into account the intellectual climate and historical circumstances of what can, in retrospect only, be seen as a contribution to later theoretical debates), it is unlikely that Whorf thought of the conceptual concomitants (the phenotypes or cryptotypes) of either overt or covert categories as mental 'objects' or 'entities' in the traditional philosophical sense which has been paramount in linguistics in recent decades — that is, as items characterized by lists of features stored in mental filing cabinets. Whilst cryptotypes or "covert concepts" (Whorf 1937c[LTR]:70) can be thought of in terms of patterns of psychophysical rapport or bundles of "non-motor linkages mooring the whole fleet of words to their common reactance" (p.81), as we saw in chapter two, the "analog of a word" — a 'verbal concept', is also a matter of patternment. To reiterate, Whorf's point was that:

Sense or meaning does not result from words or morphemes but from patterned relations between words or morphemes. Isolations of a morpheme, like "John!" or "Come!" are themselves patterns or formulas of a highly specialized type, not bare units. (Whorf 1937c[LTR]:67)

He also explained that:

That part of meaning which is in words, and which we may call "reference," is only relatively fixed. Reference of words is at the mercy of the

sentences and grammatical patterns in which they occur. And it is surprising to what a minimal amount this element of reference may be reduced. The sentence "I went all the way down there to see Jack" contains only one fixed concrete reference: namely "Jack." The rest is pattern attached to nothing specifically; even "see" obviously does not mean what one might suppose, namely, to receive a visual image. (Whorf 1941b[LTR]:259)

Thus, according to Whorf (1937c[LTR]:67n), even "[a]pparent isolations of words in a vocabulary list also derive what meaning they have from the patterned 'potentials of linkage,' which ramify from them and connect them with complex patterns of linguistic formulation". If a concept associated with a word is emergent from, or a projection of, the matrix of connections internalized in a person who knows the word, the element of grammatical meaning shared by each item in the category would have to be the more complex subsumation of ramifications of sets of items within the category as a whole. These may also be conceptualized as 'resonances' in line with Hockett's theory.

Although formal criteria may be found which suggest that certain words function similarly in discourse it is not always easy to say precisely what kind of semantic principle informs their operation. It might be argued that discovery of a formal category need not be taken to suggest that a semantic function is shared by items in the category. But Whorf's entire investigative project implied, as is made clear by his emphasis on the importance of trying to relate formal configurations of linguistic patterning to configurations of experience, that he assumed that any patterning of elements of utterances is a clue to the presence of some kind of shared meaning associated with those elements. His theory did not allow for semantically or functionally empty grammatical categories. The point may be familiar but is worth restating, as Laura Janda does in the course of explaining the primary role of semantics in "the organization of all linguistic phenomena". She adds that this

point might seem trivial until one considers how frequently linguists posit empty categories and "hodgepodge" categories that have a random inventory of members. Both constructs attenuate the role of semantics. One suggests that a linguistic category can be semantically void, and the other that such a category can be a semantic jumble. Few have questioned the role of such categories in the system of language. If the purpose of language is to communicate meaning, what purpose could elements that are semantically void or confused have in this system? A further question poses even more serious barriers to the acceptance of such categories; can we construct a cognitive model that would explain how human beings store and

manipulate vacuous or confused signs? If we cannot, then perhaps we should not postulate the existence of such elements. (Janda 1990:270)

Whorf would have agreed with Voegelin & Harris (1947) who said that: "Having learned to recognize a part of speech by its formal features and its distribution, it is possible to return to a generalization of meaning of a class of words sharing the same features and distribution". The relevant point in the context of this discussion is that one does not start with meaning and see whether there are patterns of occurrence which fit expectations about what kind of meanings might be made linguistically. As Voegelin & Harris pointed out: "By beginning with meaning Malinowski arrives at the curious conclusion that the parts of speech of Trobriand are precisely the same as those of English". They concluded, as Whorf no doubt would have done, "that Malinowski has failed to make a linguistic analysis of Trobriand" (p.591). But as Joseph H. Greenberg (b.1915) explained:

The rejection of semantic criteria as *defining properties* for grammatical class does not necessarily involve the rejection of meaning itself as a proper subject for linguistic science. In fact, it cannot be avoided if linguistic descriptions of individual languages are to have any practical or scientific usefulness. (Greenberg 1963:165; my emphasis)

Whorf's reason for taking particular care to identify even the most subtly marked categories of grammar is that he believed that ascertaining, or even attempting to ascertain their cryptotypic meanings can be of practical and scientific use in understanding thinking, whether the thinking of one's own cultural group or another. His application of this principle is evident throughout Part B of the Yale report and the unconscious linguistic structuring of experience is of course the dominant theme in the articles he wrote later for non linguists. Commenting on research in the decades since he died, Clarke et al. (1984:56) stress that "productive scholarship in the area of linguistic relativity will be accomplished only to the extent that researchers take into account the distinction between phenotypes and cryptotypes in their investigations." This is an important point and it is interesting to notice how the value of Whorf's approach to linguistic analysis has been demonstrated recently in a number of projects, including some not directly focused on the linguistic relativity question.

For instance, Bowerman's research in child language acquisition is relevant to Whorf's theorizing in that she investigates the balance between nonlinguistic factors involved in the acquisition of semantic categories and the influence of language data itself. Her investigation of children's acquisition of the 'un-'

prefix is especially pertinent in the context of this chapter. She argues, with interesting implications for adult use of the cryptotype also, that:

A child learning to use *un-* appropriately is faced with five basic problems: (1) She must identify *un-* as a separate morpheme with a combinatorial potential independent of the particular verbs to which she has heard it attached; (2) she must figure out the basic meaning of *un-* — that it is “reversative” (that it can “undo the result of the verbal action,” or “cause the object of the verb to be non longer *-ed* [Marchand, 1969, p.205,] original square brackets); (3) she must learn how to order *un-* with respect to the base form (learning to order affixes apparently takes place rapidly and with few mistakes; see Slobin, 1973, p.179); (4) she must learn the syntactic category of the base forms to which *un-* may be affixed; and (5) she must learn that *un-* cannot be attached to simply any member of this syntactic category to convey a reversative meaning but is, rather, restricted to the covert semantic class of verbs with a “covering, enclosing, and surface-attaching meaning.” [Whorf 1937c[LTR]:71]. (Bowerman 1982: 325)

Bowerman has carefully tracked various stages in the acquisition of this cryptotype (as well as those of several other interesting phenomena) coming to the conclusion that “The coalescing of fragments of knowledge into larger systems [...] indicates that working out the semantic categories of a particular language may require experience with that language, and may in fact be accomplished only well after the ‘forms’ to which the categories correspond seem at least superficially to have been acquired” and, further, “that the child’s nonlinguistic way of viewing the world without language cannot serve *directly* as the semantic basis for language”, the semantic system being “a highly structured network of interrelated categories of meaning that vary in many nontrivial respects from one language to another” (Bowerman 1982:334; original emphasis). She emphasizes that it does not seem that meaning in language is “isomorphic with the nonlinguistic way of viewing the world” but points out that this should not be taken as requiring a return to linguistic determinism since the child is certainly capable of “structuring and interpreting the world without language” (p.331). It is just that a complex of social and cognitive factors is involved in learning to speak a particular language and coming to function competently within its network of resources for making and sharing meaning. Some of these factors are nonlinguistic in essence and others are concomitants of linguistic experience in a speech community.

Other research has been used to argue that the notions of covert categories and cryptotypes may be useful in facilitating second language learning. By applying a system of interrelating semantic and morphophonemic classifications to

a huge corpus of inanimate nonfeminine plurals in Romanian and by tracing a variety of patterns in the data Jan Louis Perkowski & Emil Vrabie (1986) believe that they have been able to identify a range of “semantic groups in which” ten “islands act as *nuclei of grammatical masculinity*” (p.56 original emphasis) in the language. This, they claim, should enable learners to take “one significant step closer to a full command of Romanian” by helping them to cope with new formations in open categories in a manner approaching that of a native speaker”, that is, on the basis of “linguistic categories previously locked in the subconscious”. Commenting in effect on the value of a metalinguistic awareness of one’s own automatic ways of making meaning of experiential data, they also say that their work “deepens the native-speaker’s understanding of the distribution” of these items, and they point out that their results “reinforce the view that capriciousness in language is often merely apparent” (p.66).

In a different area, Johanna Nichols (1988) has demonstrated the value of Whorf’s approach to grammatical analysis in typological work. She has found that across languages it is the formal or “structural fact of head-marked possession that gives rise to the grammatical category of alienability” and that “‘alienable’ vs. ‘inalienable’ possession is a Whorfian grammatical category whose meaning is a generalization over the semantics of participating nouns rather than an independent feature about which the speaker has a choice”. She states that although “There is no invariant semantic content to ‘alienability’” (p.582) it “displays a strikingly consistent correlation with form: it does not arise in the absence of the relevant formal structure.” From this she concludes that

for one small area of grammar, form determines the possibility of occurrence of a grammatical category, i.e. of grammatical meaning. This means that the Saussurean dogma is wrong and that form can limit meaning. (Nichols 1988:583)

In an argument reminiscent of Whorf’s point that while a category ‘agent’ may be identifiable in a range of different languages, the precise semantic function shared by items in the category is likely to be language specific, Nichols explains that although the opposition inalienable/alienable is a useful analytical tool, no conclusion about the precise semantic function of items in the categories as they are identified in any particular language should be drawn from the formal deployment of these labels by linguists (p.561).

Halliday (1983) has developed an elaboration of the notion of cryptotype in his discussions of ‘cryptogrammar’. Whilst this investigation is an interesting exploration of Whorf’s central notion that automatic (and therefore unconscious) linguistic processes in cognition are significantly involved in making the data of

experience and memory coherent, there are terminological differences compared with Whorf. In Whorf's model of neurolinguistic organization all overt speech phenomena and even consciously accessible processes of cogitation can be conceptualized as different kinds of unfoldings out of what we can regard as a Bohmian implicate order into that explicate order of manifest existence which is accessible to conscious awareness. This means that all generative activity in Whorf's state of linkage or rapport (the implicate order of the neurolinguistic domain) is hidden, difficult to conceptualize or access directly via metacognitive introspection. It is cryptotypic in the ordinary sense of that word. Halliday's notion that the natural and automatic operations of the lexicogrammar may be regarded as operations of a cryptogrammar is logically sound given this way of talking and thinking. The term 'cryptotypic' is used more restrictively however by Whorf, as I argued above.

There are many respects, however, in which Halliday's holistic, multi-dimensional way of thinking about linguistic activity is compatible with Whorf's overall conception and also Bohm's way of talking about reality. Halliday's assumption that all lexicogrammatical activity realizes semantic functions is also in keeping with the focus on semantics maintained in Whorf's writing. However by specifying that: "The significance of [the] concept of a cryptotype is that it is something that escapes the notice of the speakers of the language", Halliday (1983:38) could be taken as implying that phenotypes do not similarly operate out of awareness in the normal course of things. That he does not think this is clear in his discussions of cryptogrammar. He states that: "The meaning of a typical grammatical category [...] has no counterpart in our conscious representation of things" (p.39) and also draws attention to the Boasian emphasis on "the unconscious nature of language" and "the fundamental relationship between the unconsciousness of language and the nature of its semantic categories" (p.38). These remarks evidently apply to all categories of grammar and as such they are broadly compatible with Whorf's formulations.

To apply the term 'cryptogrammar' in this way to the full range of lexicogrammatical activity generated by the state of linkage which constitutes one's knowledge of language is, nevertheless, to undermine the usefulness of Whorf's distinctions between overt and covert categories of grammar, his distinctions between phenotypic and cryptotypic kinds of grammatical meaning, and even, perhaps, the distinctions he sustained between the more accessible meanings of lexical items compared with the more elusive, automatic, and ultimately more influential semantic potential of processes which articulate relational mental activity. Of these relational or connective (as opposed to naming) operations in linguistic thinking, the patterns which generate the most tenuously definable categories are likely to be the least accessible to metalinguistic examination.

These comments should not be allowed to obscure the value of Halliday's demonstrations of the way grammatical meanings participate in what Grace (1987) calls "the linguistic construction of reality". Halliday's study of the way "the syntax enunciates the theme" in William Golding's (1955) novel *The Inheritors* reveals, for instance, how Golding creatively manipulated transitivity resources in "the meaning potential" (Halliday 1971:291) of English to present a linguistic construction of the world as it might have been experienced by the Neanderthal protagonists. In detailed analysis of the distribution of transitive and intransitive verbs and clausal patterns associated with these in the narrative, Halliday shows how Golding created contrasting realities within a single language implicitly through the grammar as well as explicitly via choices of lexicon, a possibility explored also by Basil Bernstein (1973) with respect to differences which can be observed in patterns of code or register selection from the resources of the language.

In the postulated Neanderthal experiential reality, "The picture is one in which people act, but they do not act on things; they move, but they move only themselves, not other objects" (p.281); "there is no cause and effect" (p.285). Halliday argues convincingly that "it is the syntax to which we are responding" and the reality which is presented in this way suggests "the inherent limitations of understanding, whether cultural or biological" of the Neanderthal people (p.282). By contrast, the world of "the inheritors" is a world we can recognize, where human agents act on external objects (p.288). In a conclusion which articulates a central theme of his work, he states that:

Transitivity is the set of options whereby the speaker encodes his experience of the processes of the external world, and of the internal world of his own consciousness, together with the participants in these processes and their attendant circumstances; it embodies a very basic distinction of processes into two types, those that are regarded as due to an external cause, an agency other than the person or object involved, and those that are not. [...] Transitivity is really the cornerstone of the semantic organization of experience. (Halliday 1971:290)

With respect to the discussion in this chapter, the significant features of Halliday's argument are, firstly, his claim that it is grammatical operations which are at the core of the organization he describes (and not primarily the naming function operationalized in the bulk of the lexicon) and, secondly, that these processes generally work subliminally. The activity of grammatical meaning is essentially 'ineffable' according to Halliday and trying to talk about it is necessarily constrained by the very processes we attempt to describe. He points out (Halliday 1983:32) that it is "language turned back on itself" or "language as its

own metalanguage”, quoting John R. Firth (1890–1960) and Uriel Weinreich (1926–1967) respectively.

In a detailed analysis of “grammatical conspiracies in Tagalog” which acknowledges and uses Whorf’s contrast between ‘phenotype’ and cryptotype’ but otherwise uses a Hallidayan approach to linguistic analysis as its foundation, James R. Martin shows in fascinating detail how complexes of grammatical operations work together with as ‘conspiracies’ to both realize and symbolize prevailing features of what Sapir called ‘social reality’ within Filipino society. Martin traces the effects of complex grammatical networks associated with “a family conspiracy oriented to participation, a face conspiracy concerned with appearances, and a fate conspiracy preoccupied with the external determination of events” and argues convincingly that these “function subliminally, unconsciously predisposing Filipinos to ways of saying, meaning and behaving which taken as a whole constitute their culture” (Martin 1988:296) and which are distinctively contrasted with the mode of social being promoted through English, for instance.

Like Lucy (1992b) too, whose demonstration that Yucatec Maya and English differently organize a similar ‘semantico-referential domain’ (that dealing with number and material composition of referents) on the basis of culture specific grammatical processes which seem to have repercussions in habitual patterns of attention of their users, Martin’s investigation is firmly contextualized in Whorf’s insistence that nothing of significance can be drawn from the study of isolated processes of grammar. Cryptotypes work together with phenotypes and elements of the lexicon as well as with nonlinguistic patterns of social behavior to create “ways of analyzing and reporting experience which have become fixed in the language as integrated ‘fashions of speaking’ and which cut across the typical grammatical classifications, so that such a ‘fashion’ may include lexical, morphological, syntactic, and otherwise systemically diverse means coordinated in a certain frame of consistency” (Whorf 1939c[LTR]:158).

Finally, in another recent and “unashamedly” Whorfian approach to the empirical study of “relations between language and world view”, David P. Wilkins (1993) has catalogued some of “the linguistic reflections of the overtly stated philosophical theme concerning the bond between kinship, land, and totemism in Aboriginal Australia” (p.91) revealed in the Central Australian language, Mparntwe Arrernte. He demonstrates that “linguistics can be used in the study of traditional ecological knowledge and, in particular, to provide linguistic evidence for a holistic approach” to that knowledge. He shows how “the social system of kinship extends to places and, through totemism, to animals, plants, and other naturally occurring objects” (p.90). Examining, for instance, the deployment of kin possessive pronominal suffixes, verbs of

naming which categorize places and totems with people, and judicious use of some classifiers to treat significant places in the same way as people, he argues that an 'ethno-semantic regularity' of patterning may be observed in the data. It forms a complex network of meanings which penetrate every aspect of mundane and esoteric affairs and within which "minor irregularities or oddities in one area of the grammar are explicable in terms of regularities operating" in quite different areas (p.85). The whole process serves to sustain and generate a view of the world in which the physical environment is humanized. Philosophically central cultural knowledge is "coded for efficient transmission" from generation to generation "by building it into the fabric of the language" (p.88), which is not to say that language is not also the means by which such knowledge is *consciously* transmitted but only that it is also unconsciously reinforced in everyday usage.

The recency of these investigations which use Whorfian approaches to analyzing the role of grammatical meaning in articulating world view, and the diversity of fields in which his theories are being found useful suggests that their potential is yet to be fully realized. To conclude this section on grammatical meaning, however, and to return us to the ideological milieu of Whorf's day, it is interesting to consider Ogle's (1973:321) opinion that cryptotypes would not have been allowed "by Bloomfield's widely accepted postulate which required that a theory refer only to physically measurable entities". Bloomfield like other linguists of his time accepted the Sapirean account of phonemes which (as we saw in chapter two) postulated the existence of abstract 'points in the pattern' of the sound system of a language on the basis of observed regularities in the patterning of sounds in utterances. These points are not physically measurable entities but abstract and indeterminate potentialities implicit in the organization of the system until 'actualized' by situations, to paraphrase Whorf.

Whorf's discussions reveal that he regarded any grammatical category as founded on a grouping of elements either observable in speech or internally in thought and having formal criteria of identification which are themselves observable, although difficult to isolate in some cases. If it is valid to say as Bloomfield (1933:146) did that "all English substantives belong to a form-class" and that every form in the class "contains an element, the *class meaning*, which is the same for all forms" of the class, and "which, once it is defined for us (say, as 'object'), we can attribute to every substantive form in the language" (original emphasis), then it is also valid to attempt to define a class or grammatical meaning for form classes which are less easy to identify and describe. As a cryptotype is a grammatical meaning of a covert category, we may assume that Bloomfield would have been quite happy with Whorf's formulations, contrary to Ogle's opinion, which seems more likely to be based on prejudices prevailing in the 1970s than careful reflection on what Bloomfield actually said.

Furthermore, it is implicit in Bloomfield's statement that speakers of the language operationalize the class meaning of the form class whenever they utter an item belonging to the category in question. Hearers similarly operationalize that meaning, along with other dimensions of meaning which might be specifically generated within their own internalized system, or prompted by other aspects of the situation in which the item occurs. This happens on the basis of what Bloomfield (1933:143) was only prepared to call "obscure internal stimuli". What Whorf did with so much more daring than his contemporaries was attempt to develop ways of imagining and talking about the internal activity involved. In this context we may again recall his remarks to Hibben. Whorf was a mentalist in that he could say that "all language is of mental nature", but at the same time he deplored explanatory resort to "the bogus coin of emphasis on 'ideas'" and advocated instead the investigation of "formal patterns and automatic phenomena occasioned" by reason of "the large systemic wholes they are part of" (Whorf 1940h:2). In his investigation of the mental nature of language Whorf was quite unequivocally empiricist.

Through the kinds of investigations he advocated, insights can be gained not only into the more subtle ways in which language helps to constitute the social realities of groups of speakers, but also into the nature of linguistic thinking within cognition as a whole. But what sometimes becomes obscured is that all the conclusions we are able to draw about internalized systematicity are drawn from the data of utterances (or linguistic expressions in general, including those elements of internal linguistic behavior which we are able to monitor consciously). Anything else is a matter of conjecture. In this respect modern linguists and cognitive scientists are in precisely the same situation as their predecessors, and the notion held by some that normal linguistic data can in any sense be chaotic is a fundamental failure in logic which has subverted much theoretical work (in language acquisition in particular) in recent decades.

4.5 *The data of utterances*

Given Whorf's ideas about the conceptual implications of different ways of talking there is perhaps no better place to start reflecting on what this means for human knowledge and understanding than in linguistic science itself where nothing can be more basic than talk about the data of utterances. Chomsky's insistence on describing the language data naturally available to children acquiring a language as characterized by 'poverty of the stimulus' is a case in point. For instance, in a variation of a core statement made repeatedly in his work and in that of his followers, he says in *Knowledge of Language* that "[t]he problem is to discover explanatory principles, often hidden and abstract, to make some sense

of phenomena that seem on the surface chaotic, discordant, lacking any meaningful pattern” (Chomsky 1986:xxviii).

Certainly, the qualification ‘seem on the surface’ makes it clear that he does not consider the phenomena to be chaotic and lacking in pattern when examined in depth. Nevertheless, it is the assumption that the information available to infants in their language environments is too inadequately structured to allow acquisition of complex grammatical features on the basis of exposure to it which led him to postulate the existence of innate ‘principles’ and their ‘parameters’. He claims that the nature of the “relatively stable steady state” of neurolinguistic organization which characterizes mature knowledge of language (Chomsky 1986:25) is determined not simply by the biological predilection of humans to be languaging beings but, more definitively, by genetically inherited principles of universal grammar available in the ‘initial state’ of the language faculty which “converts experience to a ‘steady state’” (p.24). He argues that the effective mechanism for this conversion is a minimal ‘triggering’ and ‘partial shaping’ of dormant principles into activation (Chomsky 1980:32-33). He also explains (1988:172) that “the experience” “does not determine how the mind will work but it triggers it, it makes it work in its own largely predetermined way”. One only has to look at the writing of followers of Chomsky (Norbert Hornstein, for instance, provides plenty of examples) to see that strong assumptions about “extreme deficiencies in the data available to the child” contrasted with the “rich and highly structured linguistic system” attained (Hornstein 1984:3-4) have influenced the way research questions are set up and have often predetermined the general character of research findings and theoretical conclusions.

By contrast, the logic of the points in the pattern/resonance theory model of internalized linguistic organization grows out of quite different ideas about the data of utterances. In this case the central assumption is that data available to language learners are patterned in such a way that, over time, exposure to naturally generated linguistic phenomena is sufficient to build the state of linkage or rapport which characterizes mature neurolinguistic organization in normal individuals. This is not to deny that the general predilection to become languaging beings is inherited, nor indeed the possibility that some details of language structure and organization may be inevitable in languages (a matter we will consider in more detail in the next chapter) but merely to assert that it is not logically impossible for complex internalized systematicity to arise in response to patterned input. Taking cultural configuration in behavioral data for granted and understanding utterances as instances of patterned behavior, Whorf (1937c[LTR]: 66n) emphasized, as we saw in chapter two, that “the linguistic aspect of thinking is not a biologically organized process, ‘speech’ or ‘language,’ but a cultural organization, i.e. *a language*” (original emphasis). The

precise nature of some patterning may be elusive, as with cryptotypes, but the fact that it is present in speech data — whether manifesting through remote reactances or through more easily observable or frequently occurring markers — is sufficient for it to be internalized eventually, according to this way of reasoning. Once this internalized information has sufficient generative power it provides a basis for interpreting what is heard and for producing utterances which can be understood in one's speech community. There is no need in this model to assume anything more specific in the way of inherent principles than the fundamental predilection to acquire language, which is not to say that some specific principles may not exist or that reorganizing processes (see for instance Bowerman 1982) may not be involved as the system matures, but only that they need not be regarded as the core phenomena in the story about language acquisition.

The theoretical implications of the term 'internalized' are also worth thinking about. Although Chomsky places much greater emphasis on the importance of possible innate factors in the determination of 'inner form' than Whorf or Sapir seem to have done, his use of the word 'internalized', as in 'internalized language' or the 'I-Language' which characterizes the 'steady state' (Chomsky 1986), tends to subvert his analysis insofar as it suggests that a process has taken place in which something from outside has become established inside. This is exactly what *is* implied in the points in the pattern model and Whorf's and Hockett's elaborations of it, but Chomsky's proposition that something which is inherently internal is *made to work* by something which impinges on the organism from outside is a different notion, better characterized perhaps by the term 'activated' than 'internalized'.

Another interesting terminological point may be drawn from Chomsky's assumption that explanatory principles may be discovered rather than invented, as though explanations, or indeed principles for that matter, could somehow exist independently of people talking or engaging in linguistic thinking. Whorf's rather Bloomfieldian remarks that "science begins and ends in talk" (Whorf 1940d[LTR]:220) and that scientific activities reduce to "sets of sentences which then become the basis of further exploration into the unknown" (p.221) suggest that he was less likely to reify scientific formulations as possible laws of nature than Chomsky's formulations might encourage some to do.

The ideological oppositions in the work of Chomsky and Whorf may seem insurmountable on first consideration but in the end there is no argument between them on the question of whether the data of utterances is chaotic. This is because, in spite of Chomsky's operational construct 'ideal speaker-hearer' and his postulation of innate principles of grammar, the evidence for his claims is ultimately grounded in observations of regularities (admittedly often subtle and

generally unnoticed) made in connection with utterances which have been, or which might validly be made, by native speakers of a language.

Although Chomsky (1986:25) argues that what he calls 'E-language' or 'externalized language' is "an epiphenomenon at best" and that the real object of interest is the 'I-language' or the internalized 'steady state' of mature knowledge of language (1986, chapter 2), data about the internal system can only be obtained from the study of language in its manifest forms — spoken, written, or signed. Although Chomsky considers that in principle "evidence concerning the character of the I-language" (p.36), or the "relatively stable steady state" of linguistic knowledge "could come from many different sources apart from judgments concerning the form and meaning of expressions", the primary data of linguists remains the data of utterances. Of the other sources he suggests, data from "the study of acquisition and deficit [...] creoles, or of literary usage or language change" are also speech data in the broad sense and not something different at all, a point perhaps easily forgotten. Even the data of neurology, which he also mentions, are generally (in practice) speech data from which understandings about the workings of the brain are deduced, rather than the reverse. Which leaves only the data of "biochemistry, and so on" (p.37) and it is not at all clear how these will illuminate the nature of the internalized system. The data of utterances and expressions in general are not chaotic because they are patterned and it is only by observing this patternment in action that linguists can make extrapolations in the form of postulated principles of operation and constraints on occurrence. Or putting it the other way round, what explanations purport to explain are regularities in utterances which can be described; these regularities must therefore be observable in some sense and, also, available to both first and later learners of languages in some way.

In a paper in which he argues convincingly against claims that the Chomsky-an paradigm constitutes a revolutionary break with its immediate past in terms of its basic approach to linguistic investigation, Koerner (1989) draws attention to an early statement in which Hockett (1948b:270) clarifies the difference between linguists and children in terms of what they do with language data:

[...] the linguist has to make his analysis overtly, in communicable form, in the shape of a set of statements which can be understood by any properly trained person, who in turn can predict utterances not yet observed with the same degree of accuracy as can the original analyst. The child's 'analysis' consists, on the other hand, of a mass of various synaptic potentials in his nervous system. The child in time comes to BEHAVE the language; the linguist must come to STATE it.

Probably the most central of Chomsky's (e.g. 1986) arguments is that the real object of linguistic analysis is the system entrenched in the human mind/brain (that mass of potentials for linkage) and not some relatively arbitrarily delineated social entity such as a specifically named language designated as such on the basis of analysis of typical utterances of large groups of language users. It is claimed that research will eventually deliver detailed knowledge of the human language faculty abstracted away from all actual instances of language use and, indeed, all individual internalized systems. But what is assumed, firstly about the nature of the internalized system of a speaker, secondly about the systems of groups of speakers who share linguistic patterns, and thirdly, at a greater remove still, about the language faculty itself, is all deduced on the basis of extrapolation of patterns from externally or internally observable linguistic behavior.

It is an artifact of Chomsky's method, in other words, to describe data as seeming to be chaotic or discordant. The apparent chaos with which he starts is simply an outcome of expectations that linguistic processes will occur in certain patterns according to criteria of organization which might seem at first to be superficially valid upon examination of some of the data. For instance, an observation that two words may be allocated to the same category on a formal basis, e.g., as verbs or even transitive verbs, might be taken to imply that they will both function similarly in all discourse environments but there is no necessary basis for assuming this. Such expectations are not different in kind from those of investigators such as Malinowski who expected to identify familiar parts of speech in data from languages very different from their own.

With experience and training the naive linguist presented with apparently chaotic data begins to find patterns of occurrence which can be described as having a logic internal to the system which produces them. In a basically similar fashion the resolution of so called discordance even in the most complex or subtle phenomena investigated today reduces to finding ways of describing the data which allow pertinent regularities of occurrence to come into focus. For instance separate subcategories of verbs may be identified on the basis of quite subtle features of occurrence. This does not preclude the possibility of categories with one member but, as Andrew Schiller (1987:316) observes, a language where every item had "a unique but predictable behavior [...] would be nearly impossible to learn." Linguistic science is based on assumptions of a more generalized systematicity than that, and so is language acquisition.

It is useful to reflect on how the difference between description and explanation might be discussed from an orientation which uses Whorf's notions of isolates of experience and meaning. We might think of description as a way of talking about experiential data so that others in one's speech community agree that what is said is accurate in relation to what is mutually observed — so that

not only are the same isolates of experience mutually held in focus but speakers operationalize these as isolates of meaning in similar ways. Very idiosyncratic descriptions about which there is little agreement are also possible but these would not be particularly useful as a basis for further inquiry in association with other people.

By contrast, explanations propose reasons for what is observed. They remain useful as long as they continue to predict events successfully. Anyone can attempt to summarize descriptions of data by formulating explanatory principles which generalize across similar events. Any such attempt is the formulation of a theory, “however minuscule”, as Hockett has put it. Explaining what he means in relation to linguistic inquiry, he states that:

Accurate reports of observations [...] are not theories: their sole importance for theory is that they enable the theorist to examine the evidence at leisure. The linguist seeks theories, which are generalizations from observations and are about *speech*. They yield predictions, and are corrected by subsequent observations. The linguist is led to posit that the observable regularities of actual speech are the matter of habits, resident in the users of the language — rather than, say, a matter of automatic chemical response to impinging sunlight. He calls those habits ‘language’. This proposal is part of our theorizing about *speech*. It makes no sense to pretend that there can be a separate and distinct theory of *language*. (Hockett 1968:65-66; original emphasis)

As we will see in the next chapter, it can be argued (Popper 1972) that even our initial observations of data are driven by expectations or assumptions about reality which amount to unconsciously held theories about phenomena. The point I wish to make here is that whether reports of observations are considered accurate or not is essentially a matter of agreement about which ‘bits of experience’ count and which do not — which isolates are focused on and which are backgrounded in the process of understanding the world. Explanations are analysts’ inventions, created as part of the on going process of making the data of existence coherent, and because of this they are useful for thinking about the future or for extrapolating to situations which seem to parallel the ones which generated them.

Hockett’s remarks above are part of the analysis and rejection of Chomsky’s theoretical stance presented in the historically significant 1968 monograph *The State of the Art*. He further emphasizes that an “idealization is [...] not what we are analyzing, not part of our subject-matter; rather, it is part of the terminological apparatus with which we analyze and discuss real objects and systems (p.66). Halliday suggests the term “grammatics” (Thibault 1987) to highlight the

difference between a linguist's way of talking about regularities observed in communicative data (grammatics) and the articulatory principles linguists assume must exist to produce those regularities (grammar). A grammar or explanatory principle is adequate to the degree that it allows accurate prediction of configurations of data within a particular speech community or idiolect.

It is, in other words, a useful way of talking, not necessarily about facts of internal organization, but about possibilities which seem credible in view of the predictive reliability of what is postulated. If linguists hope that their postulations fit the reality which is 'the same for all observers' better than some other way of talking, that is another matter — one which has to do with the personal needs of linguists. The progress of science does not depend on this possibility. For instance, explanatory talk of rules or of knowledge of rules or principles of operation carries with it certain conceptual implications which are concomitants of the way this kind of language is normally used. Assumptions that linguistic patterns which appear to be related semantically have been derived one from the other according to sequences of rule applications are similar in this respect. The result is that inquiry conducted according to such ways of talking must follow certain paths to remain coherent. Talk of linkage bonds, configuration, and elusive or submerged activity generated by a state of linkage or rapport in the brain operates according to a different kind of logic which cognitive science is now able to explore through connectionist modeling and investigation.

Whether one way of describing linguistic events and explaining the principles by which they might operate is better than another is not a question of truth or falsity but utility. Whorf's theory complex developed as part of his interest in explaining the data of ordinary speech and thought. It did not require the postulation of an ideal speaker-hearer nor did it need to assume deficiency or chaos in observable data. It has the potential, therefore, to explain a wider range of natural data than a system which restricts its explanatory power to speech occurrences which meet certain externally imposed criteria, for instance that they must conform to a linguist's definition of a well formed sentence. But in order to assess the predictive validity of Whorf's way of talking about linguistic activity in communication or cognition it is necessary to come to terms with his logic. The discussion of covert categories and their cryptotypes has been an attempt to familiarize readers with some of the central concepts involved in his discussions of grammatical organization. This final section has been included to draw attention to some of the theoretical implications which result from choosing to talk about data in particular ways. Further ramifications of Whorfian psycholinguistics are considered in the next chapter.

CHAPTER FIVE

ABSTRACTIVE PROCESSES AND THE QUESTION OF UNIVERSALS

5.1 *Abstractive processes in cognition*

Whorf's field theory of language and mind is so different from the still dominant paradigm in cognitive science that its implications for investigations which attempt to penetrate the mysteries of linguistic behavior in communication and thinking are profound. For Whorf, as we have seen, the fact of patternment in any kind of linguistic data provides the starting point for further investigation. The fact that humans are pattern processing beings is a concomitant he took for granted, as the gestaltists did and as connectionists do today. That learning has to do with the ability to form generalizations is also commonplace in the social and mind sciences. But the actual cognitive processes involved in abstracting essentials from presented data, whether that data be a function of experience in the world, or internally presented by the workings of the mind/brain, is not something we normally think about, in spite of the fact that it is this activity which provides the wherewithal from which generalizations can be made.

In this chapter we explore the insight, hinted at in some of the things Sapir and Whorf said, that abstractive processes lie at the core of human understanding and learning. Whilst the exploration will be a tentative one, it is not without considerable interest, including relevance to the questions of experiential, conceptual, and linguistic universals. There are grounds, I will argue, for including notions about abstraction as an important, if largely implicit and undeveloped, strand in the complex of themes which constitute Whorf's theorizing about relations between language, mind, and experience. We will be using the verb 'abstract' in the sense explained by the philosopher, Hubert G. Alexander, also a student of Sapir, when he said that: "To abstract means literally to draw away in the sense of selecting some part or aspect of a concrete object or event and making this selected part or aspect the special object of attention" (Alexander 1969:47). Thus, in Sapir's terms, English, for instance,

is a hierarchy of simple patterns abstracted away from concrete situations which grow in complexity. Patterns are abstracted from an event; they are not a record of an event. (Sapir 1994[1930s]:54)

Although Sapir may have been thinking here of the patterns linguists abstract from data in the course of studying language, his comments apply equally to the patterns abstracted by learners as they come in contact with language in use. Abstractive activity in the sense discussed in this chapter is generally unconscious but it is useful to regard it as a species of cognitive process, some representatives of which are more amenable to conscious monitoring and control than others may be.

As Robert H. Robins (b.1921) explains, with a focus on the products rather than the processes of abstraction, it is a commonplace in linguistics, as in any other science, that analysis proceeds

by making abstractions, at different levels [...] of elements having the status of constants and of categories and rules expressing the relations between the elements, to which the continuous flux of the phenomena comprising its subject-matter can be referred, and by means of which the phenomena may be explained and accounted for. At any level the abstractions can be of different degrees of generality. (Robins 1989[1964]:43)

The status of the abstractions is a matter of interest. It is variously held that they “are in some way inherent in the actual material of the language under analysis”, that the linguist’s abstractions are, indeed, the same as those of learners and are thus “part of the content of speakers’ minds or brains”, or that they “have no other status than as part of [...] scientific terminology”. These viewpoints, Robins reminds us, “follow somewhat along the classical philosophical lines of realism, conceptualism, and nominalism respectively (p.44). He considers that each standpoint possesses “some degree of validity in relation to the work of the linguist, and probably most linguists, whether they expressly intend it or not, maintain some part of each, tending to give preference in scientific attitude to one of them (p.45).

In Whorf’s case it certainly seems that all three apply. As an empiricist he necessarily assumed the reality of patterning as it may be discerned in the interface of primary experiential data and human biology (and, we might add, its extension — human technology). As a conceptualist he was in no doubt about the instantiation of those patterns in some form in the human mind/brain. And as a relativist he was aware that the very process of isolating ‘constants’ and their relationships is selective and dependent upon which ‘bits of experience’ are held

to count and which are not in a given climate of scientific inquiry. Although the precise nature of abstractive activity may be unclear, there is value in taking it into account and exploring its relationship to understanding and learning.

The logic shared by Sapir's points in the pattern model of cognitive organization, Whorf's adaptation of gestalt theory to linguistic investigation, and Hockett's resonance theory, implies that when human beings organize experiential data automatically, the fundamental cognitive processes involved must be abstractive. If this is accepted — that extrapolative activity with respect to experiential data is our foundational mode of response to the environment, then it follows that processes such as conditioning (of any degree of sophistication) or rule following (at any level of automaticity or conscious control) are secondary mediations of learning. The significance of this idea is not only that it brings to conscious attention something which may have been implicit all the time in talk about learning and knowledge but that it may have direct practical application to problems of teaching and learning.

The idea that abstraction is at the root of understanding is not in itself unusual. Abstract concepts are often thought of as having been arrived at by the unconscious application of rules which allow generalization from particular experiences to existence in general. An alternative orientation holds that concepts are innate and are brought into active operation by experiential triggers. Both notions have their origin in classical Greek thought. But philosophers and psychologists have generally regarded abstraction as a higher order cognitive process only. Whorf and Sapir, however, do not seem to have regarded the process of abstraction at its most fundamental level as involving the application of rules but, rather, as a matter of unconscious, automatic (and not necessarily sequential or 'linear') mental activity associated with inbuilt perceptual operations. This, at least, is the line I take here as we explore the things they said about abstraction. Similarly, although they might have considered some concepts to be engendered by invariant biological factors, there is no evidence to my knowledge that they meant by this that the concepts themselves predate experience.

To summarize in advance the points which may be drawn from what they said and thus to provide a conceptual framework for reflecting on the arguments to follow, I would say that when abstraction is mentioned by Sapir or Whorf what seems to be implied is that it is a function of:

- a) the inherent patternment of experiential data,
- b) automatic extrapolation of salience from presented data,
- c) repeated occurrences of similarly configured phenomena in a person's experience,

- d) a tendency for information to be organized in the mind/brain in terms of clusters or constellations connected n-dimensionally by systemic ramifications to other points or clusters, all of which are implicated in any activation of any point in the system no matter how peripherally or indirectly, and
- e) an augmentational effect of accumulated experience, including cultural input, on b).

According to the logic of these themes, an abstractive capacity — a capacity to draw information selectively from presented data — lies at the core of our ability to make sense of what happens. This capacity is augmented over time by accumulated experience which, by the very nature of its organization in cognition, recursively (and therefore reflexively) fosters shifts of emphasis over time in what is selectively extrapolated. Hockett (1987) is explicit in stating that he thinks that every extrapolation of salience from the external or internal linguistic environment occasions a readjustment of the linguistic system as a whole, no matter how infinitesimally small in effect. A similar, although more general notion about the alterative yet homeostatic effect of every activation of the system is found in connectionist and holographic reasoning.

Human abstractive capacity, by this way of thinking, is a dynamic, constantly readjusting function at the core of understanding. The process may be thought of as a manifolding one where new gains are compounded or incorporated systematically into a cohesive whole with previous ones, causing adjustive shifts in the internalized, relatively steady, cognitive state as incorporation takes place. Not only does what has been internalized in turn mediate understanding of events, but it also functions as a generative matrix to produce constellations of behavior appropriate to the social milieu from which it was abstracted in the first place. Whilst the operation of abstractive processes is normally automatic and out of awareness, this does not mean that at least some of these processes might not be amenable to conscious control and manipulation.

I must emphasize that neither Sapir, Whorf, nor Hockett wrote of abstraction in quite this way. It is my own opinion that to postulate the centrality of abstractive processes in cognition follows logically from the things they said. Additional treatment of the topic by Alexander provides support for what I am suggesting and is considered in some detail below. It also seems very likely that Sapir and Whorf would have been familiar with the importance Whitehead (e.g., 1926, 1933) gave to abstractive processes in the perception and understanding of events. Alexander would certainly have known this work in which Whitehead argued, for instance, that the factors of time, space, and matter are “not posited for us in sense-awareness in concrete independence” but are abstracted from events (which he regarded as more concrete) by our training — “both by

language and by formal teaching and the resulting convenience” so that “the true unity of the factor really exhibited in sense-awareness is ignored”. In an examination of what he called ‘the method of extensive abstraction’ he pointed out that what we perceive in nature is only that “something is going on then-there” (Whitehead 1926:75).

With respect to the absolute theory of time Whitehead observed:

I cannot in my own knowledge find anything corresponding to the bare time of the absolute theory. Time is known to me as an abstraction from the passage of events. The fundamental fact which renders this abstraction possible is the passing of nature, its development, its creative advance, and combined with this fact is another characteristic of nature, namely the extensive relation between events. These two facts, namely the passage of events and the extension of events over each other, are in my opinion the qualities from which time and space originate as abstractions. (Whitehead 1926:34)

Whitehead considered that the abstraction of space “differentiates itself from time at a somewhat developed stage of the abstractive process [...] as an abstraction from the relations between material objects” (p.37) and that ‘recognition’ and ‘abstraction’, in the senses in which he used these words, involve each other in an intrinsically complementary way (p.189). Language plays a significant role in the process as it “habitually sets before the mind a misleading abstract of the indefinite complexity of the fact of sense-awareness”, explicating as follows:

For example, I perceive a green leaf. Language in this statement suppresses all reference to any factors other than the percipient mind and the green leaf and the relation of sense-awareness. It discards the obvious inevitable factors which are essential elements of perception. I am here, the leaf is there; and the event here and the event which is the life of the leaf there are both embedded in a totality of nature which is now, and within this totality there are other discriminated factors which it is irrelevant to mention. (Whitehead 1926:108)

It is not difficult to notice in this way of thinking about our relation to experience a distinct similarity to Whorf’s isolate theory of perception and understanding and the role of language in relation to these things, dealt with in chapter three.

The most intriguing of Whorf’s references to abstraction is a boxed marginal note in the handwritten draft of his letter to Carroll published in LTR as “Discussion of Hopi Linguistics”. The note was not incorporated into the published version. With respect to plans for his Yale lectures the following year, Whorf explained that:

Methods of investigating language which reveal something of the psychic factors or constants of the American Indians in the given linguistic community will be emphasized. I say psychic instead of mental, since affect as well as thought, insofar as it is linguistic, will be treated. I expect to give a good deal of attention to the subject of the organization of raw experience into a consistent and readily communicable universe of ideas through the medium of linguistic patterns. (1937b[LTR]:102)

In the margin next to the line beginning 'communicable universe of ideas' Whorf (1937b:1, manuscript) noted:

- a) universe as conscious thinking abstracted from experience
- b) universe as unconscious thinking projected upon experience

In contemplating what Whorf might have had in mind here I think we should first notice the significance of his restriction of the term 'universe' to the world of ideas readily communicable through linguistic patterns, the universe of linguistic thinking, in other words. His note indicates that this cognitive universe is characterized by two fundamental relations to 'raw experience', the one *abstractive* and the other *projective*. Later discussions made it clear, as we have seen, that he thought that what is extrapolated for use in conscious thinking are 'isolates from experience', operationalized in thinking and speaking as 'isolates of meaning'. The second part of his note is a Sapirean reference to the projective effect of 'unconscious thinking' on experience. In this case the focus is on the projective effect of unconscious *linguistic* thinking on the processing of experiential data. This effect can only come into operation after a person has begun to internalize linguistic patterns, just as isolates of experience are only operationalized in communicable form as a result of linguistic socialization.

The two contrasting relations to the environment in Whorf's formulation may be understood as dialectically compounded in a single but complex cognitive operation once internalized experience begins to work in association with biologically given perceptual processes. Whilst Whorf may have been concentrating here on linguistic thinking, there is no reason why we should preclude the possibility that a general cognitive principle is involved, one which takes on a particular character with language acquisition. What would seem to be implied when we consider isolate theory in the light of these comments is that linguistic thinking is predicated on an abstractive capacity which exists prior to language development and which is modulated and augmented during socialization. I argued as much in earlier chapters without identifying the capacity to abstract isolates from experience as a fundamental cognitive operation at the base of understanding. But it is also reasonable to assume that any kind of experience,

by feeding back into this biologically endowed capacity, modifies the way it operates with regard to experiential input — shifting apperception of salience in accordance with patterns of expectation developed on the basis of previous experience. These patterns of expectation are likely to be largely unconscious although patterns of consciously applied attention must also, of course, play a part in modulating abstractive operations.

Whorf (1935?e:1) also used 'abstraction' in its sense of drawing salience out of presented data in an outline of an experiment he devised and entitled: "An Experiment in Linguistic Abstraction and/or Assimilation". Working again from Sapir's notion that "the sounds of a language are thought of by its speakers not in isolation but as points in a pattern", he proposed an empirical investigation in which it seems he hoped to find that for Aztec, the language to be used in the experiment, the 'points' might also have semantic import. He explained that: "One object of the experiment would be to see if the subjects abstract a common element from the various ideas, this common element being mentally associated with the common phonetic element ZE" in the words of the test set. Subjects were to be provided with a list of Aztec words starting with ZE, and their meanings, and encouraged to introspect about the way they arrived at any conclusion of connection between items in the series, if they did indeed arrive at any such conclusion. Whorf was curious to know what use would be "made of logical approaches, of classificatory abstraction, of peculiar aesthetic reactions, and so on" (p.2). It is clear that he thought that "a common element" may be abstractable by a variety of cognitive strategies.

In late 1939 Whorf was embroiled in a controversy over the difference between 'terms of abstraction' and 'abstract thought' which flared up between linguists who attended the monthly meetings at Colombia, held there to accommodate Boas who "could not easily travel" (Hockett 1980:101). Apparently Whorf, Trager, and Murray Emeneau (b.1904) had been prepared to stay away from the October meeting on the strength of their belief that a Columbia group view on "abstract thought" would prevail. Writing from Columbia, George Herzog (1901–1983) told Whorf that he had "just assumed" in selecting this topic for the discussion that the differences between the two terms "would be taken for granted in advance by everybody". He chided the Yale contingent for their reaction, urging discussion as the proper response in the face of disagreement. He suggested that perhaps "the distinction is not as clear to Boas as it is to some of us" but cited his own association with Sapir over the years as an indication that he should not be automatically included in any "Columbia 'group'" on the matter (Herzog 1939:1). The controversy evidently had its basis in a deep opposition between modes of analysis promoted by Sapir and Boas. (See Darnell 1990 for more detailed insights into the tensions of the period).

Herzog urged Whorf to attend after all and to “give an exposition of the difference between talking of ‘abstract thought’ and of *abstraction as it may be observed in linguistic phenomena*” (my emphasis). He added:

Boas is the chief sinner when it comes to ‘abstract thought’, and others here follow suit simply because they never thought the thing out clearly. This is the occasion to make them do so, but there is no need to try and club them into it. (Herzog 1939:2)

Whorf must have attended for his disgruntled jottings have been preserved:

Boas — completely haywire — confusing Eng. translations with native categories. In Chinook says we have no adjs but ‘abstract terms’ e.g. ‘smallness’ — thinks it is different from references ‘small’ because you say ‘his small(ness)! Also discusses terms of very broad meaning like ‘size’ and stems of very vague meaning combined with a more explicit stem. (Whorf 1939f; original abbreviations and brackets)

As Boas’ remarks seem to have been reminiscent of his foundational (1911) comments on “Language and Thought” (pp. 64-67) it is useful to see what he said there. He stated that:

It has been claimed that the conciseness and clearness of thought of a people depend to a great extent upon their language. The ease with which in our modern European languages we express wide abstract ideas by a single term, and the facility with which wide generalizations are cast into the frame of a simple sentence, have been claimed to be one of the fundamental conditions of the clearness of our concepts, the logical force of our thought, and the precision with which we eliminate in our thoughts irrelevant details. (Boas 1911:64)

Saying that: “Apparently this view has much in its favor”, he gave some examples which might support it and then asserted a contrary opinion that: “It seems very questionable in how far the restriction of the use of certain grammatical forms can really be conceived as a hindrance to the formulation of generalized ideas”. He then went on to argue that speakers of non-European languages had little need to discuss “abstract ideas” (p.64) and explained that he had found it “perfectly easy to develop the idea of the abstract term in the mind of the Indian”. Also in languages where “possessive elements appear as independent forms” he said “pure abstract terms are quite common” (p.65). He argued that “European languages as found at the present time have been moulded to a great extent by the abstract thought of philosophers [...] terms like *essence* and

existence” being “by origin artificial devices for expressing the results of abstract thought” (p. 66; original emphasis).

Boas evidently conceived of abstract thought as a mental operation quite separate from linguistic activity, which he imagined as providing a vehicle for it. His attention was on the product of abstractive processes rather than the abstractive activity itself. What he had done with the person in whom he had tried to encourage a European style of thinking was to show him how grammatical elements in his language could be artificially omitted to create an utterance which was no longer automatically and obligatorily contextualized in the kind of specificities the language fostered. In this way Boas believed he had shown his consultant how to free himself from particularities as a preliminary step to achieving the kind of logic which characterizes European ways of speaking and thinking.

Boas’ stance was frustrating for the Yale group but for Whorf (and Sapir) a more important issue seems to have been at stake. For them the main problem with the Boasian approach to linguistic analysis was probably its failure to investigate the relationship between language and experience. (See Lucy 1992a however for ways in which Boas shared the focus developed more fully by Sapir and Whorf). Whereas Whorf’s research objective was to investigate ways in which the complementary processes of abstraction and projection relate understanding to experience, Boas seems not to have had a focus at all on the way language and experience interpreted nonlinguistically might be connected. Although Whorf made a significant advance when he incorporated gestalt concepts into his theory complex to achieve greater insight into these relationships, in more general terms his investigation was thoroughly grounded in earlier insights of Sapir.

For instance, the sense of a dialectical tension at the heart of the relationship between language and experience which is suggested in Whorf’s notes about conscious and unconscious thinking is also evident in Sapir’s most succinct statement on the topic. The abstract of a talk he gave in 1931 presents that relation which “is often misunderstood” as a series of oppositions, stating that:

Language is not merely a more or less systematic inventory of the various items of experience which seem relevant to the individual, as is so often naively assumed, but is also a self-contained, creative symbolic organization, which not only refers to experience largely acquired without its help but actually *defines experience for us* by reason of its formal completeness and because of *our unconscious projection of its implicit expectations into the field of experience*. In this respect language is very much like a mathematical system, which, also, records experience, in the true sense of the word, only in its crudest beginnings but, as time goes on, becomes elaborated into a self-contained conceptual system which pre-visages all

possible experience in accordance with certain accepted formal limitations. [...] [Grammatical categories] are, of course, derivative of experience at last analysis, but, *once abstracted from experience*, they are systematically elaborated in language and are not so much discovered in experience as *imposed upon it* because of the tyrannical hold that linguistic form has upon our orientation in the world. (Sapir 1931a:578; my emphasis)

Not only is the complex nature of the abstractive/projective tension in the relation between language and experience explained in these statements but Sapir specifically identifies grammatical categories as abstractions from experience — as linguistic/cognitive operationalizations of what Whorf was to call “isolates from experience”.

The conclusion we are encouraged to draw is that isolates of meaning must include ‘relational’ as well as ‘concrete’ concepts (Sapir’s 1921 dichotomy) and that both Whorf and Sapir understood these as being ‘derivative of experience at last analysis’. In other words, the grammatical linkage processes which articulate relationships between other elements of our utterances are also ultimately isolates from experience, although different in character from the kinds of isolates which are operationalized linguistically as names (for instance of shapes, qualities, or actions). The sense in which a relation may be regarded as an isolational gestalt is considered further below. Here I shall concentrate on the way Sapir elaborated on the projective aspect of language. He said that:

It is highly important to realize that once the form of a language is established it can discover meanings for its speakers which are not simply traceable to the given quality of the experience itself but must be explained to a large extent as the projection of potential meanings into the raw material of experience. (Sapir 1933[SW]:10)

We may assume that in writing of the form of a language becoming ‘established’ Sapir was referring to the internalization of linguistic processes in individuals during the process of language acquisition — the established ‘form’ being the mature state of neurolinguistic order. In explaining how internalized information modifies apperceptions of data, he was drawing attention to the way information which has become incorporated into the internalized system feeds back into primary processing capacities, altering them as a function of experience — linguistic experience in this case.

Sapir also described the same kind of abstractive/projective relationship between people and their observed environments when warning culture analysts about the dangers of generalizing too glibly from observations of behavior. He said that “numerous threads of symbolism or implication connect patterns or

parts of patterns with others of entirely different formal aspect” and that: “Behind the simple diagrammatic forms of culture, is concealed a peculiar network of relationships, which, in their totality, carve out entirely new forms that stand in no simple relation to the obvious cultural table of contents”. This statement concerns the network of social relationships sustained between members of a group (although of course some schematic representation must also be internalized to enable individuals to cope with social expectations). The terminological similarity between Sapir’s remarks and Whorf’s description of the network of relationships which stand in no simple relation to words or morphemes and which make up the internalized linguistic state of linkage or rapport is interesting and provides further evidence of the distinctive conceptual mode they shared. Sapir explained further that:

If it were the aim of the study of culture merely to list and describe comprehensively the vast number of supposedly self-contained patterns of behavior which are handed on from generation to generation by social processes, such an inquiry as we have suggested into the more intimate structure of culture would hardly be necessary. Trouble arises only when the formulations of the culture student are requisitioned without revision or criticism for an understanding of the most significant aspects of human behavior. When this is done, indissoluble difficulties necessarily appear, for *behavior is not a recombination of abstracted patterns*, each of which can be more or less successfully studied as a historically continuous and geographically distributed entity in itself, *but the very matrix out of which the abstractions have been made in the first place*. (Sapir 1934[SW]:594; my emphasis)

We can relate these comments about the way we extrapolate patternment from experience, internalize these patterns, and project them in turn upon experiential data, to Sapir’s (1924) remarks about “a certain innate striving for formal elaboration and expression” and the “unconscious patterning of sets of related elements of experience”. He said that the “kind of mental processes” involved are “of that compelling and little understood sort for which the name ‘intuition’ has been suggested”, specifically, the “types of mental activity which lead to the problem of form”. He continued:

probably most linguists are convinced that the language-learning process, particularly the *acquisition of a feeling for the formal set of a language*, is very largely unconscious and involves mechanisms that are quite distinct from either sensation or reflection. There is doubtless something deeper about our feeling for form than even the majority of art theorists have divined, and it is not unreasonable to suppose that, as psychological

analysis becomes more refined, one of the greatest values of linguistic study will be in the unexpected light it may throw on the psychology of intuition, this 'intuition' being perhaps nothing more than the 'feeling' for relations. (Sapir 1924[SW]:156; my emphasis)

Evidently Sapir understood this innate striving for form — for patternment, for making connections or relations which cohere systemically — as underpinning the acquisition of culturally patterned behavior, including language, and perhaps underpinning learning in general. What I am suggesting is that implicit in his and Whorf's work is the notion that the fundamental cognitive process which operationalizes this striving for form may be an automatic, abstractive function which draws configuration (patterns of salience) from experiential data and which, with accumulated experience, becomes socially and individually modified according to the life circumstances of individuals.

Sapir may have had Locke in mind in his reference to 'sensation or reflection', being concerned perhaps that Locke had not provided an adequate argument to explain the transition from random experiential input to organized knowledge. The logic of the points in the pattern model puts abstractive processes between the data of sense, memory, and reflection, and organized knowledge. The gestaltists also affirmed the primacy of configurative organization in human experience, regarding it as an automatic selective extrapolation of pattern from presented data. What is implied in each way of thinking is that abstraction of salience is an active cognitive operation. Bloomfield also identified the "abstract character of language" with the fact that it is actively abstracted from experience when he pointed out that:

Since the ranges of stimulation and of predisposition are to all practical purposes continuous, and language can provide only a discrete set of forms, this *abstract* character of language is inevitable: not all the features of a situation appear in the report. (Bloomfield 1939:37; original emphasis)

In a statement which anticipates modern schema theory in its various forms, Sapir conjectured that the roots of human language might lie in the "power of the higher apes to solve specific problems by abstracting general forms or schemata from the details of given situations" and that instead of thinking that a predilection for vocal expression might have led to the evolution of language in humans, a more useful way of understanding it is to imagine it as the

actualization in terms of vocal expression of the tendency to master reality, not by direct and *ad hoc* handling of this element but by the reduction of

experience to familiar form [...] [language being] what it is essentially, not because of its admirable expressive power but in spite of it. (Sapir 1933[SW]:14)

This variation on Sapir's argument about the human tendency to apprehend realities symbolically places abstractive abilities at the center of human cognition. The reference to 'general forms or schemata' would seem to include relational or connective gestalts as well as the more concrete abstractions of shape or form usually associated with gestalt theory. If it is legitimate (and I concede that it may not be) to link these remarks with the notion of an innate 'striving for form', then again we may conclude that abstractive activity is the basic cognitive mechanism which underpins human understanding and learning.

Is abstraction in the sense in which it has been outlined here merely induction under another name? As much is suggested in Swadesh's remarks that:

The phonemes of a language can be discovered only by inductive procedure. This going from particular instances to general conception is as characteristic of the unconscious process of a native acquiring his language as it must be of conscious scientific study. But the scientist studying an alien language will make more rapid progress if he understands the essential details of the inductive process involved. (Swadesh 1934:123)

Swadesh then gives a set of criteria which might be applied to language data as part of the process of identifying phonemes in a particular language.

Induction is generally conceived as a rule following process, a method of objective reasoning by which general conclusions may be drawn from sets of premises by repeatedly observing particular events and thinking about their characteristics. Karl R. Popper (b.1902) argues however that it is an error to imagine that we ever come expectation free to the observation process. He claims that an "immensely powerful *need for regularity*" (Popper 1972:23; original emphasis) which is "clearly, inborn, and based on drives, or instincts" forms a basis for "expectations [which] may arise without, or before, any repetition" (p.24). His opinion is that these primordial expectations operate as 'theories' which drive the observation process, directing attention to certain features of the array of phenomena available to be observed and drawing attention away from other aspects. Although the original innate basis for structured observation is modified or abandoned on the basis of further experience, new generalizations or expectations take the place of those which drop out of active use.

Popper's thinking in this respect is compatible with the logic of a points in the pattern model of language acquisition, were such to be developed. The infant, by this way of thinking, would not be regarded as coming totally free of

'expectations' to the process of acquiring the phonemes of a language, or any other aspect of linguistic patterning for that matter. Popper's innate 'need for regularity', Sapir's 'feeling for form', and the predilection to perceive configuration which gestaltists ascribe to human functioning, are essentially the same activity — one which predates exposure to linguistic data as well as operating throughout later life in conjunction with language. To add to points made in the previous chapter, until it has been exhaustively shown that a feeling for form as a general orientation to linguistic experience is logically inadequate in explanatory terms to account for the amount of pattern that language learners are able to draw from presented data (and this has *not* been conclusively demonstrated to date) there is no need to posit innate endowment of specific linguistic structures as essential factors in language acquisition.

Although some may like to think of rule following (whether inductive or deductive) as happening automatically and unconsciously in the ontogenetically earliest extrapolations of salience from experiential data, there are problems in talking in this way because of the resonances of words like 'thinking' and 'reasoning' which are intimately associated with notions of rule following. These words are associated with rational activity of the kind which is capable of being consciously monitored and controlled to some degree, whereas the earliest abstractions of salience and, arguably, most ongoing activity of this nature throughout one's life, is automatic and rarely subject to conscious attention.

An abstractionist theoretical approach to the extrapolation of significance from presented data clearly assumes a genetically given mode of operation but it is one which does not tangle with the resonances of words like 'reasoning' or 'rational'. At the core of gestalt theory and Whorf's application of it to linguistics is the notion that experience for the human organism is patterned, because our sense organs (of all kinds) interface with the environment (both internal and external) in ways which function to extrapolate configured information from what is presented. We may like to say that this means that all our perceptual processes operate according to inbuilt rules, but this adds nothing of intellectual substance to the basic assumption, since these 'rules' are not consciously known or under any kind of conscious control.

To say that something which happens in a predictable way is operating according to rules can be a useful way of talking and thinking but that is all it is. It is not very useful at all if it discourages us from more wide ranging cogitation about research problems. In the course of describing what we observe as patterned occurrence we may use words like 'principle' or 'rule' to make our description precise and to help it fit into the explanatory conceptual framework which is paramount in European culture and which finds its way today into other cultural milieus as well. But we have not actually observed any rule or principle;

our inference that there is such a thing is just a manifestation of habitual patterns of explanation and understanding. If we take abstractive activity as a starting point for thinking about cognitive operations it might open up investigation of human behavior and knowledge in interesting ways.

The general notion of abstraction with respect to socially generated behavior (with the implication that it is a cognitive function) is not unfamiliar in anthropology however much it might have been overlooked in psychology. For instance Hoijer said that:

What the human learns, in the process of enculturation, is an organized (or structured) set of ways of behaving which he abstracts from and applies to situations of his daily experience as they arise [...] It is this feature of cumulating abstracted ways of living that so clearly distinguishes man's culture from the pseudo-culture of the primate. (Hoijer 1953:260)

Hoijer's final comment can probably be considered an exaggeration in the light of more recent knowledge of primate capacity to teach learned behaviors to their young but the important point to notice is the centrality he accorded abstractive activity. Remarks of Kluckhohn and Bidney add to the picture of an internalized system, socially acquired. Kluckhohn said that:

On the one hand, "culture" denotes a logical construct, the network of abstracted patterns generalized by the anthropologist to represent the regularities distinctive of the group in question. On the other hand, "culture" designates these patterns or "norms" as internalized in the individuals making up the group. As Bidney (1953) says:

[...] culture patterns may well be considered in abstraction from actual behavior for the purpose of comparative study and analysis, this does not imply that culture is *nothing but* a logical construct of patterns or forms [...] the unit of culture is the *patterned process* and [...] culture comprises the patterned behavior of man in society. Only by combining pattern and process as distinguishable but inseparable elements of cultural behavior will it be possible to discover and understand the "dynamic mechanism". (Kluckhohn 1954:924; original emphases)

The authors of these comments evidently understood internalized systems of behavior with the genuinely generative function of producing socially acceptable behavior to be products in the first place of abstractive processes in cognition. Like Swadesh and Sapir they also understood acquisition of elements of these behaviors to be fundamentally similar to what the culture analyst does in isolating and systematizing configurations of culturally conditioned behavior, except that in the case of the analyst the activity is at least partially a function of methodological control and conscious investigation, whereas the natural process is

largely unconscious. Their focus on abstraction as a process and Bidney's mention of a 'dynamic mechanism' in cultural phenomena contrast with Swadesh's talk of induction, although reference to culture as 'a logical construct' harmonizes with it.

We may enhance our understanding of abstraction in the sense in which it seems to have been used by Whorf and Sapir, by referring to Alexander's (1945) abstractionist analysis of concept formation. His study includes a detailed philosophical examination of processes of abstraction which may underly concepts of time and space. It is probably no coincidence that his talk of 'abstractional isolation' (p.122n) is remarkably congruent with Whorf's discussions about 'isolates from experience' for he was a student of Sapir in 1933/34 and corresponded with him in 1936 about the metaphysical implications of Navaho morphology (Alexander 1937:648n). He almost certainly met Whorf, who attended Sapir's classes on a regular basis, but it is not known at this stage how much contact they might have had or how much of his work he knew and, as suggested above, it seems likely that all were influenced by Whitehead, at least to some degree.

Alexander argues that the 'key image' is fundamental in human understanding, saying that:

The key image represents an insight very near to the perceptual level, that is, to our psycho-physiological contact with the world. The key image is, however, already a focalized abstraction, usually given a simple linguistic symbol. But an abstraction is only an isolated or selected fragment of perceptual experience; and, indeed, *the act of isolation is performed as part of the act of perceiving itself*. Moreover, the act of isolating a fragment of experience by focusing attention upon it, does not in any way lessen the reality of that experience. We must insist, therefore, that there is nothing more fictional about an abstraction than about the immediate experience. Hence, key images, as abstractions from genuine perception, are not fictions.

Nevertheless, every abstraction is at least a reduction or simplification of reality. Every key image is a restriction upon reality. And yet it is only through key images that conceptualization is possible. It follows that the real universe is in some measure always inscrutable. But on the positive side, each key image is like a special lens, which enables us to probe the world in some particular manner, viewing and comprehending as we go; for each key image may be used to give us a perspective upon other experiences. Key images are our intellectual instruments. (Alexander 1945:116-117, my emphasis)

He clarifies that “abstractionism does not require that the perception be equal to or limited to ‘points of stimulation’; only that the perception be a *psychic product of the perceptual act*”, and that: “Certainly we do perceive extension, distance, shape etc.” (p.122n; my emphasis). Notice that focusing of attention does not necessarily imply conscious awareness of the process; we can use the notion of ‘attention’ with respect to any isolating or abstractive activity without importing consciousness with it. The degree to which conscious attention may be actually or potentially involved in basic level abstraction is a matter for further investigation.

Alexander also argues that “not only is each key image the creator of a special perspective, it is also subject to an analysis for the other key images which are implicated in it (i.e., abstractable from it)” (p.117). Key images themselves, in other words, become experiential data from which further isolates may be abstracted. “[T]he mental activity of abstracting” and the recursive process of modifying abstractions and in turn applying the modifications to experience, enables us to “create” our “intellectual perspectives” — our “major hypotheses”. These in turn are “subject to constant testing and alteration in the hope that ultimately they will increase understanding”. He notes:

We might say that those images which seem to carry us furthest, which seem to explain most, to give the clearest pictures and the deepest penetrations of meaning, are the truest. Yet not only is this a matter of faith, but eventually we shall need a more accurate criterion for significance. (Alexander 1945:118)

What we must come to inevitably is “a *credo*” (original emphasis). His own thoroughly Whorfian *credo* is “simply that the more perspectives we have, supplementing and augmenting each other, the better will be our true understanding of the universe”. Although different perspectives must surely “conflict with each other from the point of view of strict logic”, in the end it is necessary to “sacrifice complete consistency to the reality of a universe which, for our intellects at least, is too complex to be reduced to any such consistency”. A reason for this lies in the nature of the process we use to refine key images. The train of successive abstractions and modifications of the original key image involve a succession of limitations to the concept “until at the end of such process we reach a minimal end-concept, barren of significance” (p.118). We may surmise that any metalinguistic analysis which has the effect of taking us back to the experiential basis of conceptual activity (such as that done with respect to the operation of metaphor in concept elaboration by Lakoff, Sweetser, Johnson, and others, to take some recent examples) perhaps has some prospect of ameliorating the effects of over proliferation of such barrenness in our discourse and thinking.

Alexander argues for a pragmatic attitude to this feature of our intellectual functioning, saying that

we may pursue our various perspectives to a certain point without necessarily denying others. This point is reached experimentally, by trying out each perspective, by exploring it and pursuing it further even than it should be followed. But in the end we must have the strength and wisdom to fall back to the point of maximum significance. (Alexander 1945:118-119)

He emphasizes the importance of differentiating “between abstractions and the abstractive process itself” saying that; “Abstract concepts are the result of the process, not the process” (p.121). He also points out that

every act of abstractional isolation is also an act of synthetic integration; for the moment a type-trait is fragmented out, as it were, it is immediately synthesized. The very act of isolation, in excluding other traits, necessarily acts as an integration of the isolated fragments. (Alexander 1945:122n; my emphasis)

He explains his experientialist stance further:

My thesis has been that experience and concept are equally real so long as the process of conceptualization remains faithful to the elements found in the experience. This does not limit true concepts to the restricted range of perceptual experience; for elements of the latter may be justifiably extended or reduced, the justification of such manipulation being ultimately pragmatic. It simply means that if the experiences are genuine, the abstracted concepts are just as genuine. (Alexander 1945:125)

Alexander’s analysis can be taken as an expansion of Whorf’s tentative formulations. This is not to say that Alexander was aware that his work was related to Whorf’s isolate theory in particular, although his respect for Whorf and knowledge of at least some of his work is attested by his reference to “the very interesting testimony and analysis of Hopi time concepts by the late B. L. Whorf” (Alexander 1945:35). His (1936, 1945) treatments of the question of time also augment Whorf’s discussions in an interesting way. Whilst Alexander’s notion of the ‘key image’ was restricted to linguistic concepts which manifest as nouns in English, there is no reason why key images should not include relational isolates of meaning as well as those which name objects, actions, states, or recursively processed nominal abstractions from experience. His discussion of abstraction as an innately endowed function provides us with

a more secure basis for exploring and developing the concept than is found in Whorf's or Sapir's work alone. When Alexander's ideas are linked with his predecessors' holistic conceptions of abstractions from experience as elements of internalized systems with projective capacity, the result is a theoretical orientation with considerable potential. His own dialectical fusion of isolative and integrative (abstractive and synthetic) relationships to experiential data echoes to some degree Whorf's and Sapir's dialectical balancing of the abstractive and projective aspects of our epistemological relationship to reality.

The notion that extrapolative or abstractive cognitive processes lie at the core of human understanding of the world is implicit in much of the literature on perception, epistemology, and learning, but may prove more productive as an intellectual and investigative tool if isolated and given explicit status in research. Discussion about abstraction has generally focused on what has usually been regarded as conscious 'higher order' cognitive functioning, especially that involved in reasoning. What I have argued here is that attention to basic level abstraction may reveal a species of cognitive operations (mostly automatic and unconscious, but some at least potentially amenable to conscious attention and control) which have tended to remain transparent in discussions of understanding and learning. The notion of abstraction as a basic function seems to be emergent in Sapir's original discussions of relationships between language and experience and was elaborated by Whorf and Alexander in ways which may prove amenable to further development and investigation today.

5.2 *Experiential, conceptual, and linguistic universals*

We saw in chapter three how Whorf postulated the linguistic relativity principle as a function of linguistically generated and sustained differences between people in the nexus of biology and the environment. He argued that between these two invariants of human existence, experience (as subjectively apprehended by human beings) is relative to our ways of talking and thinking about it. The question we will now look at briefly is whether his theorizing allows for experiential, linguistic, or cognitive universals.

Firstly, isolate theory is certainly a theory of universals with respect to subjective experience. All human beings within the normal range of perceptual functioning (using perception in its broadest sense to accommodate an ability to monitor all kinds of internal and external events) have access to the same potential stock of isolates from experience by virtue of their common biology. If conceptual activity is an elaboration upon primary perceptual processing of experiential data, as Whorf and Alexander argued, then we are all *potentially* liable to generate the same stock of concepts from primary experience. In this

context we may also like to include Johnson's (1987) arguments about the way we form foundational patterns of understanding on the basis of recurring complexes of primary experiential data. He argues that any 'image schemata' is a 'gestalt structure' — by which he means an "organized, unified whole within our experience and understanding that manifests a repeatable pattern or structure" (p.44) — and that image schemata are operationalized as metaphors which structure our understanding of events of all kinds. He (see also Lakoff & Johnson 1980 and Lakoff 1987) provides evidence that recurring patterns associated, for instance, with experiences of containment, boundedness, and differentiation, or experience of force in its many manifestations, provide the basis for patterns of understanding and explanation which are operationalized automatically and unconsciously. As with Whorf's isolates, the claim is that these schemata are universally available on the basis of human bodily structure and its usual interface with the rest of the world. How widely or homogeneously they might unfold as patterns of language across cultures has yet to be fully investigated however.

In considering how often experiential universals might be realized as conceptual universals which manifest in linguistic form we need to take account of the degree to which, in the nexus of biology and the environment, one's personal life circumstances intervene. Environmental contingencies, including geographical and climatic circumstances, cultural patterns specific to the group into which one is born, socialization constraints (including strictures on what one may and may not do), and the linguistic matrix which mediates our knowledge of all these things from early childhood, all serve to modulate our biological interface with the environment. Not only are all potential universals not necessarily operationalized in an active cognitive sense in each person's lifetime, but other concepts, both idiosyncratic and socially generated, are also formed in the course of social interaction and other experience. Tyler Burge argues as much in the course of establishing that "the natures of many of our thoughts are individuated *non-individualistically*" (original emphasis), socially, in other words. He argues in convincing detail that "an individual's idiolect and concepts cannot be fully understood apart from considering the language and concepts of others with whom he interacts" (Burge 1989:186) and that "(s)hared idiolectal meanings and shared concepts derive from a shared empirical world and shared cognitive goals and procedures for coming to know that world" (p.187).

When Chomsky (1988:191) argued that the concept associated with the word 'climb' is "just part of the way in which we are able to interpret experience available to us before we even have the experience" it was part of his reasoning about the innateness of concepts. But the only way we can make sense of a comment like this from a realist orientation is to agree with Burge who considers it

plausible that some meanings of words are universal to the species in that if a person *has the requisite perceptual experience* and acquires language normally, the person will have words with those meanings. *A likely source of such universality is perceptual experience itself.* It appears that early vision is language-independent and constant for the species. Because of the evolution of our species, we are fashioned in such a way that perceptual experience will automatically *trigger the application of perceptual notions associated with innate dispositions.* Linguistic expressions for such perceptual notions as edge, surface, shadow, under, curved, physical object, and so on, are likely to be tied to elementary, universal perceptual experience, or to innate states fixed by species-ancestor's perceptual interactions with the world. (Burge 1989:179; my emphases)

Hockett too has commented on the notion that genetically produced 'innate states' can be regarded as functions of the species/environment interface, saying:

Against the claim that private patterns can derive only from an internalization of overt activity and experience, one might propose that some may be innate. But that only renders the line of causality more circuitous. "Innate" is an old-fashioned word for "genetically inherited." What is genetically inherited is a matter of natural selection, and selection is at bottom an exogenous process: that is, it is the external conditions of life that determine whether an organism shall survive and reproduce and pass on its genes. So here, again, we have the internal deriving from the external. (Hockett 1987:160n)

Turner (1994) goes further when he talks of the "mapping of the body in the brain" on the basis of "necessary experience". He argues that: "By virtue of our shared phylogenetic past and our similar ontogenetic experience we share some fundamental ways of attributing meaning" (p.96). He further claims that "some of our experience is so constant and universal that it must count as innate, in a certain sense" (p.100). He draws on William Wimsatt's (1986) notion of "degree of 'generative entrenchment'", degree of entrenchment depending upon the degree to which other features or capacities depend on the patterns in question. Patterns are inevitable where experience is invariant and in terms of effects on the development of the individual, difficult to differentiate from patterns imprinted in the genes.

Upon original configurations of experience, uniformly structured according to our perceptual capacities, experience itself intervenes and introduces variation both phylogenetically and ontogenetically. Potential conceptual universals need not necessarily become *actual* universals, nor is it inevitable that they manifest as

linguistic elements in a given idiolect, or even in the shared resources of a particular speech community. But since the possibility of human communication must be predicated upon congruencies of experience and understanding, and since communication does take place across cultural barriers as well as within socially circumscribed groups, we need to ask whether Whorf's formulations allow for actual conceptual universals of a communicable kind in the way Burge suggests, and the cognitive linguists and their associates assume.

For conceptual universals to exist, and for Whorf's relativistic line of argument to be valid at the same time, it would have to be demonstrated that certain isolates of experience have a degree of salience which is invariably operationalized in the conceptual elaboration of primary data. For these isolates of meaning to occur also as linguistic universals it would have to be shown that they manifest (or are operationalized as) linguistic elements in all languages. Conceptual universals ought therefore to be discoverable in utterances, in some form, as projections of the internalized system of any person who can communicate linguistically and these linguistic concepts in turn ought to be relatable to primary experiential data, at least in the final analysis. It is worth noting that while *non-linguistic* conceptual universals may also be part of our cognitive repertoire there is no way that we can know this with any precision if they cannot be talked about.

Whorf did not explicitly argue a case along these lines. However, in addition to the kinds of examples suggested by Burge, we might also think of the apperception, conceptual elaboration, and communication of causal relations as potentially universal features of human experience brought into being by inevitabilities generated in the interface of biology and the environment. We can argue feasibly that the perceived relationships of contiguity and sequence, or juxtaposition and consecutiveness, are inevitably abstracted as isolates from experience, or as complexes of isolates, or schemata. This is reasonable because it is axiomatic in Whorf's way of thinking that perceptual processing is patterned spatially and temporally. It follows from this that contiguity and sequence in patterning in general would be among the most salient regularities of all over time, since these features occur in all patterning of all stimuli, no matter how varied in origin or type. These regularities therefore, are equally available to be abstracted from experiential data by everyone, regardless of particular contingencies of experience.

It is a short step from saying that everyone is likely to extrapolate the twin regularities of juxtaposition and consecutiveness from experiential data to hypothesizing that they might also uniformly modify those apperceptions at a secondary level of abstraction and that the modification might have a common element which we, in English, call the notion of causality. This concept would not need to be explicitly named in each language however for it to manifest in

discourse as a universal aspect of linguistic thinking. Or so Sapir argued at any rate. Elaborating on a notion he expressed in several places, that “the formal completeness” of any language is adequate to all the communicative requirements of its users, he pointed out that the “ability to feel and express the causative relation is by no manner of means dependent on an ability to conceive of causality as such” (Sapir 1924[SW]:155). He stated that the “form-feeling of such a word as ‘causation’ is perfectly familiar” (p.154) to people who might have had no metacognitive access to the notion involved. The actual means by which the relation is operationalized in language — whether the concept is lexicalized, morphologically mediated, or syntactically articulated — are diverse. The result is that “functionally equivalent expressions” all “canalize into entirely distinct form-feelings” (p.155).

Whilst there might be some ambiguity in Sapir’s various uses of the terms ‘form-feeling’ and ‘feeling for form’, his 1921 reference to the “distinction between essential or unavoidable relational concepts and the dispensable type” clarifies that he accepted that conceptual universals of a relational kind (as well as more idiosyncratic relational concepts) may be linguistically articulated. He said that: “The former are universally expressed, the latter are but sparsely developed in some languages, elaborated with a bewildering exuberance in others” (Sapir 1921:94). He concluded his instructive analysis of the sentence, “*the farmer kills the duckling*” (pp.82-94 original emphasis) with the remark that: “There is no known language that can or does dodge [the issue of who is doing the killing], any more than it succeeds in saying something without the use of symbols for the concrete concepts” (p.94). We may conclude that Sapir believed that expression of causality and indication of the doer in utterances are universal elements of what Whorf was to call ‘linguistic thinking’ and that they manifest in a variety of formal configurations in speech.

Both functions are ultimately relatable to the primary level of perceptual processing. We have considered the train of reasoning which might be used to argue this for causality. If the notion of doer is universal, it is feasible to say that it may be so on the basis of the fundamental perceptual relevance of the observer as reference point in the organization of experiential data. From this unavoidable existential base it is possible that we project the notion of *actor* or *agent* into presented experience, making this projection an invariant feature of the way we make sense of what happens. This reasoning applies also to the universality of ego centered categorizations in language, a matter on which Whorf commented. He referred to “a distinctive trait, appearing through every language [...] namely, that it organizes its systems around a nucleus of three or more pronominal ‘person’ categories, centered upon one we call the first-person singular (1941b [LTR]:258). This is a statement about the universality of a

linguistically articulated concept, that of *ego* and the associated second and third person concepts as these manifest in pronominal systems.

His remark was made in the context of a discussion about ‘the higher mind’, which he referred to as an unconscious substrate of mental activity and which he suggested might be conceptualized as a ‘higher ego’ on the basis of the universal appearance of person categories centering on the first person. The discussion as a whole was contextualized in his explorations of the notion of ‘patternment’, examined in detail in chapter two, and also the idea that linguistic patterning is one expression of a cosmic background of patternment which subsumes existence in general. Whether we find his thinking on this matter congenial or not, the comment which follows is particularly interesting. He said that the higher mind

can function in any linguistic system — a child can learn any language with the same readiness, from Chinese, with its separately toned and stressed monosyllables, to Nootka of Vancouver Island, with its frequent one-word sentences [...]. (Whorf 1941b[LTR]:258)

From one perspective this postulation of ‘higher mind’ as the ultimate foundation for language acquisition seems remarkably similar to Chomsky’s notion of the ‘universal grammar’ which characterizes the “initial state” (1980, 1986) of the human organism capable of acquiring language. Certainly both opinions may be reduced to affirmations of a belief that human beings have a built in predilection to become languaging beings. There is an important difference between the two concepts however. Chomsky’s construct refers to a highly specified and articulated inner ‘organ’ capable of determining the character of what is acquired in considerable detail. Whorf’s construct refers to a general predilection to patternment, specific ‘linguistic facts’ (including the facts of linguistic organization) being described as a cultural rather than a biological matter, as we saw previously.

As a young man, probably still captivated by his theories about access to cognitive universals through the study of Hebrew, but also almost certainly familiar with other literature where the term ‘stock of concepts’ occurs, Whorf wrote of the importance of “the stock of conceptions common to people” and made it clear that he thought the possibility of linguistic communication must be predicated upon such a foundation. He said:

The very existence of such a common stock of conceptions, possibly possessing a yet unstudied arrangement of its own, does not yet seem to be greatly appreciated; yet to me it seems to be a necessary concomitant of the communicability of ideas by language; it holds the principle of this

communicability, and is in a sense the universal language, to which the various specific languages give entrance. (Whorf 1927a[LTR]:36; my emphasis)

As he also came to the opinion, much later in life, that “different languages segregate different essentials out of the same situation” (1939d[LTR]:162), it follows that he may have conceptualized different languages as giving *different* entrance to ‘the universal language’. This idea does not mean that Whorf had abandoned the notion of ‘a common stock of conceptions’ as the necessary basis for linguistic communication. The fact that he conceptualized isolates of meaning as semantic operationalizations of experiential isolates, and the fact that these primary abstractions from experiential data — Sapir’s ‘latent content of language’ or ‘intuitive *science* of experience’ — are universally available, indicates that he had not.

But it is possible that he no longer conceptualized that inchoate stock of potential conceptions as *Language* in a broad sense. For instance, he said:

Just as cultural facts are only culturally determined, not biologically determined, so linguistic facts, which are likewise cultural, and include the linguistic element of thought, are only linguistically determined. They are determined not merely by language, but by languageES”. (1937c[LTR]:67)

Four years later, he was more specific, saying:

It may even be in the cards that there is no such thing as “Language” (with a capital *L*) at all! The statement that “thinking is a matter of LANGUAGE” is an incorrect generalization of the more nearly correct idea that “thinking is a matter of different tongues.” The different tongues are the real phenomena and may generalize down not to any such universal as “Language,” but to something better — called “sublinguistic” or “superlinguistic” — and NOT ALTOGETHER unlike, but much unlike, what we now call “mental.” This generalization would not diminish, but would rather increase, the importance of intertongue study for investigation of this realm of truth. (1941a[LTR]:239)

What he was prepared to call ‘mental’ in an article for *Technology Review* readers, is undoubtedly what he was happy to call ‘higher mind’ when writing for theosophical readers. The state of linguistic science at the time meant that these ideas would have been very difficult to communicate to those of his professional colleagues who would not tolerate references to ‘mind’ or ‘mental activity’ at all.

As Lucy (1992a:21) points out, Sapir also assumed a “common psychological ground” for all languages, a ground which we can access by studying the

forms found in different languages. In Whorf's work this common ground was explicitly conceptualized (as we have seen) in terms of realms of patternment which subsume and generate the world of everyday reality. He linked the notion of 'higher mind' with the Eastern philosophical concept 'Arupa' which denotes the ultimate realm of existential patternment, from which "patterns that can be 'actualized' in space and time" are generated to become manifest in the world of shape and form (Whorf 1941b[LTR]:253). Physicists similarly conceptualize the world of manifest substance and activity — the reality of classical physics — as being precipitated out of the subatomic order of existence.

Whorf's ideas about what might be universal in human experience have two aspects. On one hand there is the notion of experiential isolates as the gross physiological realities of our interface with the environment and, on the other, there is the highly rarefied notion of patternment as the ultimate character of the cosmos. Linguistic and conceptual universals involve a compounding of these two although in a sense the one underlies the other. What is significantly and biologically innate with respect to linguistic thinking or cognition in general is the predilection to patterned cognitive activity which underlies our ability to abstract salience or configuration from experiential data in the first place. This conclusion is supported by a statement made in a talk at Yale in 1938 when Whorf concluded an explanation of the difference between phonemes and morphophonemes by saying:

The phoneme is no analytic device. It is a configurative entity. It probably proceeds from something even more deeply rooted in human beings than language itself — the principle of configured perception. (Whorf 1938i: 12; my emphasis)

It may be useful to regard the 'principle of configured perception' which underlies language as allied to, or perhaps congruent with, the principle of cognitive abstraction explored earlier in this chapter.

We may conclude that Whorf's theory complex allows for experiential, linguistic, and conceptual universals although some of his reasoning would still be regarded as alien by many linguists. Given that the notion of abstractive isolates from experience is central to arguments for universals logically entailed by Whorf's theorizing, I would suggest that Lucy was mistaken when he said that the

implicit perceptual level created by Whorf is more or less a residual category in his writings that he uses to account for the absence of linguistic relativity in certain cases or at certain levels of analysis. Such perceptual regularities, if and when they exist, do not tend to be particularly

significant because of the more important, complex overlay of higher level conceptual structures which are to a large extent linguistically based. [...] Thus, the conclusion here is that Whorf's primary interest is in concepts and that percepts are of minor or secondary importance in that the locus of linguistic influence is on conceptual structure. (Lucy 1992a:42-43)

On the contrary, if Alexander's elaboration of basically Whorfian and Sapirean lines of thought is valid, concepts are necessarily linked to percepts no matter at how great a remove from primary perceptual processing, and therefore percepts are primary.

Although Whorf was interested in conceptual activity of a linguistic kind it is always evident that this interest was focused on the relationship of concepts to experience. Certainly, linguistically articulated concepts feed back into abstractive processes to facilitate culturally modified extrapolations of salience from experiential data, but what is still at stake is the relationship of linguistic concepts to experiential data which is "the same for all observers".

One of the fundamental points of Whorf's gestaltic analysis and the central theme of his 1937/38 articles is that perceptual processing is figural and more fundamental even than the perceptions of 'objects' or 'events', the categorization of which is itself part of the 'linguistic classification of experience'. It is generally taken for granted that all languages have nouns and verbs and with this dichotomy the core semantic distinction often broadly characterized as being between 'object' and 'action'. Asking whether there can "be languages not only without selective nouns and verbs, but even without stativations and verbatations", Whorf pointed out that in certain languages, perhaps "Nitinat and the other Wakashan languages", "(t)he power of making predications or declarative sentences and of taking on such moduli as voice, aspect, and tense, may be a property of every major word, without the addition of a preparatory modulus" (Whorf 1937d[LTR]:98). He said that there was no point in saying as some had done "that all the words are verbs, or again that all the words are nouns with verb-forming elements added" for "the terms verb and noun in such a language are meaningless" (p.99).

M. Dale Kinkade (1983) takes up the claim made by "some linguists [...] that a noun-verb dichotomy must be present in every language, at least in underlying structure" (p.26) and refutes it by showing that in Salishan languages "only predicates and particles can be distinguished" (p.25) and that the predicate forms "are rather like gerunds in English, which are both noun and verb at the same time" (p.28). It seems that words in the central category of linguistic concepts in Salishan languages refer to apperceptions of states rather than entities or actions. Kinkade argues that "unprejudiced attention to full treatments of these languages could well lead to important new insights and advances in

linguistic method and theory” (p.38). One such investigation might involve considering what kind of conceptual relationship to experience is manifested in a style of linguistic thinking which does not categorize isolates of experience into different kinds at the naming stage and in which, it seems, particles that articulate connections between what is namable are much more flexible in application than they are in a language like English.

Whorf seems to have planned a fourth *Technology Review* article on the topic of cognitive universals. A part of a draft written apparently only a few months before his death is extant and although much of it is not fully coherent, a reflection no doubt of the advanced stage of his illness at the time of writing, it is pertinent to the questions we have been exploring in this chapter. The draft begins:

This does not mean that no general laws of thought can ever be discovered. It merely means that what we have hitherto taken to be general laws of thought are not, but are special rules for discourse in certain particular tongues or families of tongues. (Whorf 1941f:1)

Saying that it was possible that such laws, “the same for all languages” might yet be discovered, he presents some arguments for the possibility “that there may be something akin to geometry about them”. He points out that “we always regard the vertical dimension of space as more important for an axis of symmetry than the horizontal dimension”, seeing an identically symmetrical figure with its central axis lying horizontally as less symmetrical than when it is placed with the axis in the vertical position. He suggests that: “This has, no doubt, something to do with the fact that we are all living in a strong gravitational field on the earth’s surface, and so this is a fact of relativity also, but it is generally true for all us humans.” He comments that although “dim realizations about horizontality, verticality, symmetrical and non-symmetrical” [...] “are not exactly thoughts in the ordinary clear-cut sense [...] they only need to be put into language to determine the thoughts and they provide or belong to certain universal starting points for all languages”. It was his opinion that, by contrast, “much of non-geometrical mathematics”, for instance “operations with numbers, may turn out to be wholly linguistic and not connected with general laws of thought” (Whorf 1941f:1).

In an intriguing attempt to explore the difference between apprehending a state of affairs (such as recognizing the relationships of parts to each other) and thinking, he offers an example of the way he might realize “as soon as I looked at a certain door, that the door was jammed or could not close because a rope was tangled up on it”. Although the realization might come “in a single flash [...] to compose sentences to tell another person just what was the matter with

the door would take appreciable time and effort". He wonders whether: "Thinking in the proper sense might perhaps be a resultant developed out of this universal type of realization" (Compare the notion of 'recognition' in Whitehead 1926 discussed at the beginning of this chapter). Whorf's next few remarks are confused, but he seems to be trying to articulate an idea that language perhaps forestalls direct communication of the realization through its "systematic forms" and determines to some extent our response to what we see. He gives examples (p.2) of the now familiar geometrical figures which are perceived quite differently when they have been named or described to a person than when they have been presented without comment (e.g., the vase shape which a shift in focus reveals as also depicting two human profiles facing at each other).

In their discussion of factors which might determine linguistic universals, Herbert H. and Eve V. Clark (1977) also consider the possible significance of our relationship to the earth's gravity field suggesting that it may be a factor in the way we name dimensions. They list a range of dimensional terms which they argue are functions of our existence in this field, our vertical stance in relation to ground level, and the symmetry of our bodies (pp.533-535). They also cite research which shows that the pattern of "dominance relations" in English is paralleled in "children's first perception tactics". They hypothesize that "languages pick their terms for perceptual reasons" and state in a rather circular fashion perhaps that "(d)imensions that are perceptually salient are the easiest for children to acquire terms for". They admit however that "unrelated languages have not been systematically examined for the dimensions they make use of" (p.2). Although their summary of relevant research is presented as more of an itemization of possible candidates for universality than an integrated theory of linguistic universals, several of their suggestions could be accommodated in the Whorfian analytical framework and investigated further on the basis of theoretical principles included in the theory complex, particularly isolate theory.

What is required in order to understand relationships between experiential, linguistic (and therefore conceptual) universals better, are systematic attempts to correlate patterns of species specific perceptual processing with linguistic patterning across a range of different languages. Such studies could include investigations of possible relationships between relational mental activity as it is expressed in the articulatory or connective function of languaging behavior as well as relationships between the naming function and experiential isolates. My work (Lee 1991) on Hopi tensors is a tentative example of the first kind of investigation. I have attempted to show how certain kinds of adverbials seem to linguistically crystallize apperceptions of coherence in presented experience. While the perceptual basis for these apperceptions is available to everyone, their unusually prolific linguistic elaboration in Hopi seems to contribute significantly to

a distinctive articulation of subjective experience for Hopi speakers. Further research would be required to investigate how widespread tensor-like elements are in languages and whether there are any which seem to articulate the same kind of relationship to experience in a large number of languages.

Another example of a link between relational activity in talking and thinking and isolates of experience from which the relevant linguistic elements seem to be derived is Wick R. Miller's (1988) analysis of the Guarijio orientational system. He describes a range of adverbial elements derived from experience of the rugged terrain of the region. These participate in a culture specific orientational frame which is automatically activated in discussions of position or movement. What he demonstrates, although not in precisely the terms I am using here, is that perceptual invariances such as those designated in English as 'up', 'down', 'near', 'far' may be operationalized in some languages in such a highly environmentally contextualized way that the universal concepts which seem to be involved are implicit rather than explicit in those particular modes of linguistic thinking.

Carroll's (1958) investigations with Joseph B. Casagrande (1915–1983), which looked at relationships between the "the boundaries between the parts of our experience [...] which are created by our perceptions" and language, are important early examples of studies along Whorfian lines. Obligatory linguistic "segmentations of experience" operationalized in grammatical morphemes which allocate a shape category to items referred to in Navaho were examined. Lucy's (1992b) investigations of relationships between "nominal number marking patterns" and "the cognitive activities of attending, classifying, and remembering" (p.8) in Yucatec Maya and English are an interesting recent example of relevant work. The numerous color studies (e.g., Lenneberg 1953, Brown & Lenneberg 1954, Rosch 1974, Lucy & Shweder 1979 etc.) are studies of relationships between naming and normal apperception of color variation. The study of projective effects of naming on recall by Santa & Baker (1975) is also of interest. It should be remembered, however, that work which focuses on naming tends to deal with aspects of experience which are relatively marginal in terms of one's total 'picture of the universe', compared with the more pervasive effects of relational activity in making sense of what happens.

All this research attempts to delineate relations between cognitive behavior and experience through studies of biologically given perceptual processing and its selective linguistic elaboration in particular languages. Such work could be related more precisely to Whorfian principles if reformulated in terms of the abstraction of isolates from experience and their deployment as isolates of meaning in cognition. It is important to remember what is implicit in all this work; that the search for universals is intimately linked with the discovery and

description of variation in relationships between language, thought, and experience.

By comparison with the Chomskyan notion that grammatical processes, and even concepts, are given genetically and merely triggered into activity by social interaction, the approach to studying universals tentatively explored in this chapter is likely to be more satisfying for scholars who feel that excessive resort to the construct of innateness with respect to conceptual activity is an explanatory luxury. It also promises to be more empirically investigable than allegations of innateness tend to be. Whether one considers that it delivers truth or not depends on an act of faith of the sort Alexander referred to. I believe, however, that it helps to “keep the conversation open” (Rorty 1979) in a more interesting way than reliance on innateness as an explanatory principle can do. As Locke suggested three centuries ago, the benefit of hypothesizing the existence of innate ideas is that it has “eased the lazy from the pains of search, and stopped the inquiry of the doubtful” (1690:1,iv,25,41).

Whorf’s approach to linguistic analysis was always firmly anchored in a desire to find out more about how we think and the relationship of that activity to the world which, in its essentials, is ‘the same for all observers’. Although his insights into differences between languages and concomitant behavior in respect of this relationship are the better known, it is salutary to remember that his initial interest in language as a very young man was generated by a drive to find out about universals of thought, or ‘fundamental root ideas’ through study of Hebrew and Aztec. The evidence of his last attempt to plot out an argument for a paper on ‘general laws of thought’ suggests that he never lost interest in the search for universals and that it underpinned the intellectual and empirical work he did on the relativity of subjective experience to linguistically mediated conceptual activity. One of the attractions of the Whorf theory complex is that it allows us the flexibility of relativism along with the comforting (and necessary) affirmation of universality in core dimensions of human experience and thought.

CHAPTER SIX

METALINGUISTICS: THE INTERCALIBRATION OF AGREEMENT THROUGH LANGUAGE AWARENESS

6.1 *Introductory comments*

Fully developed human cognition, in Whorf's terms, is a function of a social, languaging being, capable of self reflection. It is not only our capacity to language, in other words, which distinguishes human cognition in a species specific sense, but also our capacity for self consciousness and our ability to turn conscious awareness of what we do back onto behavior in order to modify it in a purposeful way. We have explored Whorf's ideas about linguistic thinking and the degree to which its automaticity is a function of operations generated by the internalized, systematic, and inherently dynamic cognitive base which develops in the course of linguistic socialization. We have also looked at the way languaging as a cognitive and social activity mediates a place for subjective human reality in the nexus of the impinging world and the contingencies of biology.

In this final chapter we take a closer look at Whorf's ideas about the reflexive, augmentative power of language awareness in cognition. Although what he hoped for were eventual species wide "developments of thinking" of a sufficiently dramatic kind to ensure the continued "duration of human existence on the planet earth or in the universe" (Whorf 1937c[LTR]:83), it is also clear that he was concerned about the implications of language awareness for individual cognitive growth and enhancement. Indeed, the results he hoped for at species level are predicated on changes of individual consciousness. They are also predicated on changes in scientific thinking. For it is through repercussions of individual language awareness in the day to day conduct of science, technology, and human relations that the planetary gain Whorf hoped for may be achievable. It was his opinion "that linguistics is fundamental to the theory of thinking and in the last analysis to ALL HUMAN SCIENCES" (Whorf 1937c[LTR]:78)

In his own way this seems to have been Trager's understanding too when he called the Sapir-Whorf approach to semantics 'metalinguistics' in 1949. It is

also, in my opinion, the end to which Bloomfield's (1933) discussion of the role of language in science leads. The term 'metalinguistic awareness' has only come into currency since the 1970s but Whorf did write about the benefits of "a multilingual awareness" (1941a[LTR]:244) — the contrastive metalinguistic awareness which linguists are able to develop through reflection upon their research and which many bilinguals and multilinguals achieve to greater or lesser degree with minimal conscious effort.

Taken together, the constellations of ideas about language awareness in Whorf's writing epitomize the humanism which pervades his work, counterpointing his analytical expertise and theoretical daring in an interesting way. To clarify what is at stake: Whorf not only thought that language awareness has the potential to improve intercultural relations (a point which would seem to flow naturally from the insights we have gained into the differences between the ways experiential isolates may be extrapolated from presented data) but also that it has the power to enhance scientific practice. At the individual level he thought (Whorf 1940i:2) that "acquaintance with linguistic devices increases ability to conceive theories", and in doing so augments cognitive power. He also believed that language awareness can have therapeutic effects in circumstances where individuals are trammled by compulsive patterns of verbal thinking (Whorf 1941b[LTR]:269). (See also Perls, Hefferline, and Goodman 1951 for an explication of this line of reasoning). We will not follow all these strands of Whorf's research program through in detail here. We will begin however, by considering what is involved in achieving the kind of language awareness he was interested in.

6.2 *Three kinds of agreement*

A useful place to begin is with the things Whorf said about 'agreement' in language, and the 'calibration' of meanings between people. He wrote about agreement in three senses, all of which need to be identified and clarified before we can go on. Firstly, he referred to agreement in an ordinary, overt sense. Making a point which may at first appear counterintuitive, he emphasized that:

Whenever agreement or assent is arrived at in human affairs, and whether or not mathematics or other specialized symbolisms are made part of the procedure, THIS AGREEMENT IS REACHED BY LINGUISTIC PROCESSES, OR ELSE IT IS NOT REACHED. (Whorf 1940a[LTR]:212)

His point was that although we can communicate without language, "true AGREEMENT" (1941a[LTR]:239) cannot be achieved without it. Communication

is the much more general context in which only certain kinds of communicative processes can lead to agreement.

It is important in thinking about this question to differentiate between fellow feeling (which may be engendered by all kinds of communicative activity, linguistic and nonlinguistic) and agreement. Fellow feeling often amounts to nothing more than general emotional harmony; agreement is something which can be much more precise. But although we need to have actually heard other people state their opinions and we need also to have formulated our own (at least mentally) in order to be able to say that we agree with someone, this is only the overt sense in which agreement is a linguistic matter, as Whorf made clear. He explained that

the effortlessness of speech and the subconscious way we picked up that activity in early childhood lead us to regard talking and thinking as wholly straightforward. [...] We use speech for reaching agreements about subject matter: I say, "Please shut the door," and my hearer and I agree that 'the door' refers to certain part of our environment and that I want a certain result produced. Our explanations of how we reached this understanding, though quite satisfactory on the everyday social plane, are merely more agreements (statements) about the same subject matter (door, and so on), more and more amplified by statements about the social and personal needs that impel us to communicate. There are here no laws of thought. Yet the structural regularities of our sentences enable us to sense that laws are SOMEWHERE in the background. [...]

The WHY of understanding may remain for a long time mysterious; but the HOW or logic of understanding — its background of laws or regularities — is discoverable. It is the grammatical background of our mother tongue, which includes not only our way of constructing propositions but the way we dissect nature and break up the flux of experience into objects and entities to construct propositions about. (Whorf 1941a[LTR]:238-239)

Underlying agreement in the overt sense, in other words, and underlying all talk about communicative activity and the ways in which its effectiveness may be assessed, is a second, deeper kind of agreement which is not usually accessible to awareness and through which communicative activity is made possible. This, as we saw in chapter three, is the unconscious 'agreement' between members of a speech community about which 'bits of experience' count and are to be elaborated automatically in the lexicon and through relational processes which structure particular ways of speaking and thinking, and which bits are to be backgrounded. In one of his best known statements, Whorf explained:

We cut nature up, organize it into concepts, and ascribe significances as we do, largely because we are parties to an agreement to organize it in this way — an agreement that holds throughout our speech community and is codified in the patterns of our language. This agreement, is, of course, an implicit and unstated one, BUT ITS TERMS ARE ABSOLUTELY OBLIGATORY; we cannot talk at all except by subscribing to the organization and classification of data which the agreement decrees. (Whorf 1940a[LTR]:213-214)

Notice that he did not say that we cannot *think* at all, simply that we cannot share ideas without sharing categorizations which provide the framework for their formulation. It is evident that this kind of agreement has to do with congruence or overlap between individually entrenched systems of linguistic competence. Where people share the same dialect, agreement in this sense will be greater; where they speak mutually incomprehensible languages, agreement will be almost impossible to establish with certainty.

What Whorf wanted to emphasize in several of his final articles is that: “The amazingly complex system of linguistic patterns and classifications” which two people “must have in common before they can adjust to each other at all, is all background” to them (Whorf 1940a[LTR]:211). It is this background which is “calibrated” (p.214) before communication can take place. Complete agreement between two people is not possible according to this way of thinking, but, as Hockett points out,

if idiolectal divergence never ceases, neither does intercalibration. So we come again to the intimate dialectic interplay between the individual and the social, and see that much of that interplay is made possible exactly by the nature of language. (Hockett 1987:106-107)

Commenting further on the essentially idiosyncratic and dynamic nature of a person’s psycholinguistic base, Hockett says that Saussure, though “right in his insistence on the difference between code (system, institution, pattern, culture) and message (act, event, structure, behavior) [...] made a serious error when he identified these two oppositions under the single pair of terms *langue* and *parole*, implying that the system is only social, not individual, and that individual conduct is only idiosyncratic, not patterned”. His next point about the internalized idiolect is crucial:

In fact, an individual’s speech habits, at any moment, constitute a system which underlies and conditions what the individual says and how the individual interprets the speech of others; and every such episode of the use of language modifies the individual’s system at least a little. Furthermore, a

language as a system in this sense of the word exists ONLY in individuals. When we — quite properly — call a language a social system we are implying a somewhat different use of the word: there are a great many agreements and parallels among the systems of the participating individuals (whose usages as we have seen, are constantly being intercalibrated); by virtue of these parallels the participants can ordinarily manage to understand one another and although the whole set of parallels is only roughly defined, it can validly be called a “system” in this slightly different but related sense of the word.

But, quite clearly [...] there is not such thing as a stable *etat de langue* of the sort Saussure proposed, in either an individual or a community — or, if there is, it is stable for only a fraction of a second. (Hockett 1987: 157-158n)

As we noted previously (Burge 1989:187), “Shared idiolectal meanings and shared concepts derive from a shared empirical world and shared cognitive goals and procedures in coming to know that world”. One of the main goals of language awareness is to bring the degree to which that world is not, in fact, subjectively shared by different people (whether they operate in the same speech community or from different cultural bases) into consciousness.

There are thus three senses in which agreement is a linguistic matter. The first has to do with being sure that we do agree when we think we do; this can only be ascertained with certainty by checking statements against other statements, either overtly or mentally. The second has to do with calibrating linguistic processes in relation to experiential data; each language embodies ‘implicit and unstated’ agreements about how this is done. The third has to do with keeping in tune with the way other people use words and relational patterns in the speech communities within which we participate. Meanings shift constantly and as we monitor the range of connotations suggested to us in the linguistic behavior of other people, so we modify and adapt our own internalized systems constantly in order to maximize our chances of communicating effectively with them and making the first kind of agreement possible.

6.3 *Metalinguistics*

Upon reflection it is clear that the bulk of Whorf’s investigations can be broadly described as tracing patterns of implicit agreement through languages and investigating the conceptual (and therefore experiential) implications of those patterns. As we have seen, he gave particular attention to the way unconsciously sustained congruencies of meaning work together to subsume and reinforce patterns of reaction within the communities in which they are found, i.e. the way

linguistic processes interpenetrate with and sometimes seem to direct, other constellations of behavior at either the individual or societal level.

Trager (1949, 1959) called Whorf's pioneering work in the investigation of large scale patterns of meaning 'metalinguistics' because he believed that Whorf had attempted to carry precise scientific investigation of language beyond the confines of the sort of meaning which is language internal or systemically determined to an analysis of the full complex of meanings which constitutes the operation of language in society at large. His discussions make it clear that he intended the 'meta' prefix to indicate that the kind of semantic analysis Whorf and Sapir did (and which he believed still waited to be developed to a fully scientific state) was *beyond* the range of linguistics proper, which he called 'microlinguistics', yet within the general field of 'macrolinguistics', a term he used to accommodate the full range of possible scientific approaches to the study of language.

Trager's publication of several of Whorf's papers as *Four Articles on Metalinguistics* (Whorf 1949) was the occasion of one of the first published, non-philosophical uses of the word 'metalinguistics'. Koerner (1995c:27-30), discusses the use of the term 'metalanguage' in linguistic historiography and philosophy, pointing out that it had been used by several prominent philosophers in the English and Polish speaking worlds by 1931. Trager explained his use of the term 'metalinguistics' in a short paper of the 1949 entitled *The Field of Linguistics*, where he identified three separate arenas of linguistic investigation within the macrolinguistic endeavor as a whole. He described the first, 'prelinguistics', as including "physical and biological events from the point of view of the organization of the statements about them into systems of data useful to the linguist" (p.2). 'Microlinguistics', which he described as dealing "with the analysis of language systems" (p.4), was, as Newman (1951) pointed out, essentially Bloomfieldian descriptive linguistics.

Trager regarded the third area, 'metalinguistics', as the eventual outcome of a yet to be achieved state of knowledge where rigorously formulated statements of the "patterned relationships" of phrases and clauses, "the occurrences" which "constitute the discourse" (Trager 1959:33) might be compared with equally rigorous statements about patterns of phenomena evinced in other cultural systems within a particular society. As Hockett later argued:

language is one part of culture [...] patterns of behavior transmitted not through the germ plasm, but socially. Methods which have been worked out for the analysis of language ought to apply, at least in part, to the study of other phases of culture. (Hockett 1948a:11)

Trager believed that metalinguistics could not be developed until other social scientists began to analyze the cultural systems they studied within the frame of the “kind of over-all analytical model” he advocated for linguistics (1959:34) and he noted their reluctance to do so. But if this goal could eventually be achieved, then he considered that:

In theory, when one has arrived at the separate statements of each [...] cultural system, one can then proceed to a comparison with the linguistic system. The full statement of the point-by-point and pattern-by-pattern relations between the language and any of the other cultural systems will contain all the ‘meanings’ of the linguistic forms, and will constitute the metalinguistics of that culture. (Trager 1949:7)

Until the state of knowledge which might allow for such large scale meta-analysis of systems is achieved, Trager thought the practice of metalinguistics was still possible within more restricted frames. He considered that Whorf’s investigations of interrelationships between particular linguistic, conceptual and behavioral patterns in English speaking and Hopi societies provided a suitable model. Until an enhanced ability to make more precise statements about cultural patterns had been developed, Trager’s opinion was that it would not be possible “to test what has been called the Sapir-Whorf hypothesis, and to find out what it really means” although if such a time should come he for one did “not doubt that the greatness of insight and perspicacity shown by Sapir and his disciple Whorf will then be verified” (1959:34).

The kind of analysis Trager had in mind depends crucially on what we describe today as highly developed metalinguistic awareness. Whorf stressed the importance of having awareness based, not necessarily on knowing how to *speak* different languages, but on investigation of the way different segmentations of experience are accomplished in different ways of speaking and thinking. But the activity of talking about statements is, by definition, a meta-lingual one and whether Trager intended his term to include meta-awareness of language as well as the idea that metalinguistics is an activity beyond the normal operation of scientific linguistics as it was practiced in his day I do not know. He did not bring this point out in published work, which he might have done in response to colleagues who, in criticizing the term, seem to have ensured that his insights into the nature and value of Whorfian semantics would be discredited and ignored as the linguistic relativity empirical research program got under way in the 1950s.

Haugen (1951), for instance, in his presidential address to the Linguistic Society of America in December 1950, commented on the regular introduction of new terms “whose purpose has been to make research techniques explicit, so

that we may talk not merely about language, but also about how to talk about language.” He pointed out that “logicians [...] refer to such a terminology as METALANGUAGE, which is defined as ‘a language which is used to make assertions about another language’.” He urged that American linguists adopt the term and that they appreciate that

the discussion of linguistic research techniques is not a linguistics as we have known it, but rather a metalinguistics. It is merely unfortunate that Trager already has proposed the term metalinguistics for a field which has generally become known as semantics. This usage should be rejected in view of the quite different meaning given the word by the related discipline of logic. If semantics should be an undesirable term, there is always ‘ethno-linguistics’ or perhaps ‘socio-linguistics’. In the present paper I shall find it convenient to apply the term METALINGUISTICS to the kind of research that has brought forth such new terms as PHONE, MORPH, SUBSTITUTION, CONSTITUTE, FOCUS CLASS and TACTICS.

These words are part of a new metalanguage created by American linguists. (Haugen 1951:212-213)

Although Haugen’s remarks were valid in a general way they completely obscured the degree to which the activity Trager proposed to call metalinguistics was not semantics in the traditional sense nor, for that matter, sociolinguistics or ethnolinguistics as these have since developed. Certainly the term ‘ethnolinguistics’ was appropriate to some degree and, as we saw in chapter three, Whorf himself had used the term in 1938 in relation to configurative linguistics. Nevertheless, none of these terms captures Trager’s point about the kind of precision which would be needed if meanings were ever to come within the compass of a scientific linguistics of the kind he aspired to.

With hindsight, one could argue that Trager’s use of ‘metalinguistics’ was very much an extension of the philosophical use whether he was aware of this or not. As such, it has broader conceptual implications than Haugen allowed. This is especially so if the thematic importance of language awareness throughout Whorf’s work is taken into account. The importance of metalinguistic awareness in the practice of Trager’s style of metalinguistics can be appreciated by considering what it is that should be correlated “point-by-point and pattern-by-pattern” in determining meanings of linguistic forms.

Trager explained that each cultural system “constitutes an independent system whose patterning may be described” even though each system other than language is also “dependent on language for its organization and existence” (Trager 1949:7). A description is a set of statements and, as we saw in his definitions above, metalinguistics cannot take place until comparable *statements* about

different systems are available. It is relevant in this connection to consider Whorf's opinion about the practice of science in general. Saying that "revolutionary changes" in science "have been due not so much to new facts as to new ways of thinking about facts" (or more accurately, "new ways of TALKING about facts") he emphasized that: "It is this USE OF LANGUAGE UPON DATA that is central to scientific progress" and continued:

We must face the fact that science begins and ends in talk [...] Such words as 'analyze, compare, deduce, reason, infer, postulate, theorize, test, demonstrate, mean that, whenever a scientist does something, he talks about this thing that he does. As Leonard Bloomfield has shown, scientific research begins with a set of sentences which point the way to certain observations and experiments, the results of which do not become fully scientific until they have been turned back into language, yielding again a set of sentences which then become the basis of further exploration into the unknown. This scientific use of language is subject to the principles or the laws of the science that studies all speech — linguistics. (Whorf 1040d[LTR]:220-221)

If science is the 'use of language upon data', then metalinguistics is certainly the use of language upon language data, i.e. statements, and Trager's innovation is a legitimate extension of the philosophical use of the term. It is also compatible with modern usage which refers to the metacognitive activity of treating language as an object of attention rather than simply a means of expression.

In a statement which amounts to an act of language awareness raising of the kind Whorf often undertook and which anticipates modern concerns in an interesting way, Trager argued that "all the special fields of social science, and of the so-called humanities, are special problems in metalinguistics". He elaborated by saying that:

The psychologist concerned with the learning process must necessarily be aware of that part of metalinguistics dealing with the relation of the linguistic system and its parts to the entities — material or nonmaterial — presented for learning. The political scientist deals constantly with metalinguistic data. The analyst of style or of art trends is doing metalinguistics, though badly and pre-scientifically. The logician and mathematician must be aware of certain metalinguistic data about linguistic systems to avoid being carried away into nonsense.

Metalinguistics is then a greatly expandable field of science which can come to serve as the means whereby linguistics, and language, can become the tool for the scientific description (= measurement) of all phenomena in the universe. Its data will serve to connect the physical and biological

sciences on the one side with linguistics, and the latter with the other social sciences (and humanities) on the other side. (Trager 1949:8)

It is evident that Trager was discussing the benefits to scientists and communication analysts of metalinguistic awareness of their own language behavior.

It is also clear that Trager's 'field of linguistics' encompasses a consideration of the extralinguistic world of human experience and was not therefore restricted, in principle anyway, to the study of autonomous linguistics quite as exclusively as some (e.g., Hall 1987) may have suggested. Carroll (1953:27) was correct in saying that "metalinguistics would necessarily be an interdisciplinary field" of investigation, but when he added that: "Trager seems to have fallen into the Bloomfieldian error of supposing that one cannot talk about meaning unless one has a complete scientific description of the objects, events, and relations to which linguistic forms refer", I think he was only partly correct.

It is interesting that the undoubted influence from Bloomfield evident in Trager's formulations draws attention, surprisingly perhaps, to aspects of Whorf's semantics which are fundamentally Bloomfieldian. His remarks about what scientists do with language paraphrase and elaborate on points made in a more sober way by Bloomfield in his 1939 monograph *Linguistic Aspects of Science*. To appreciate the significance of these links it is useful to reconsider Bloomfield's best known remarks about meaning and also some of his less frequently quoted statements about meaning and science where his emphasis on agreement is noteworthy in the context of matters we are considering here.

For instance, in the remark Carroll may have had in mind when writing about Trager, Bloomfield stated: "We can define the meaning of a speech-form accurately when this meaning has to do with some matter of which we possess scientific knowledge" (Bloomfield 1933:139). Writing in his monograph about the "General Character of Scientific Languages" and (by implication the nature of scientific knowledge) he pointed out that:

Scientists [...] are speakers and may agree to utter speech in certain ways; thanks to the simplicity of phonetic structure, they are able quite accurately and uniformly to adhere to these agreements. Accordingly, they treat their own utterances not as an object of science but as a part of scientific procedure. In this sense, and to the extent that social agreements about speech can be maintained, scientists may be said to "control" the forms of their technical dialect, in contrast with the world of meanings — that is, the world of events including the utterance of speech other than that which forms part of the scientist's own activity. This outside world is reportable and predictable only to the extent that earlier acts of science have mastered it — at best imperfectly. (Bloomfield 1939a:45-46)

He added that in some kinds of scientific discourse, for instance pure mathematics, "the speech-forms have no meaning beyond that which is created by the scientific agreements governing their use". We can be sure of the correctness of calculations made within such a system "because it moves only within the verbal agreements upon which it is based". But "As soon as we admit meanings of the outside world, we risk error, and our certainty is then only such as may result from earlier acts of science". With a surge of poetic incisiveness he argued that it is necessary "to discover which of our terms are undefined or partially defined or dragged with fringes of connotation, and to catch our hypotheses and exhibit them by clear statements, instead of letting them haunt us in the dark" (p.46).

This way of talking and thinking about scientific knowledge makes it clear that science is precise and certain just insofar as agreement occurs among scientists and scientific knowledge is a function of that agreement. Therefore when he described scientific classification as "universally recognized and accurate" (1933:139), it is unlikely that Bloomfield conceptualized the kind of accuracy he was talking about as a function of the fortuitous selection of terms which in some inherent sense correlate with the nonlinguistic world more accurately than nonscientific terms do. For instance he stated that:

A thoroughgoing comparison of speech-forms, say in some one language, with features of the non-linguistic world is impossible at the present state of our knowledge. Our system of responses, with its neat discriminations of objects, classes, position, qualities, movements, etc., results very largely from our use of language. We cannot return to the animal's or the infant's state of speechless response.

In order to find out how much of our world is independent of any one language, we might try to compare the grammars and lexicons of different languages. At present we have reasonably complete data for a few languages only; at some future time, when this task can be undertaken, the results will be of great interest. The forms of any one language could scarcely serve as a frame of reference: we should need, instead, a non-linguistic scale by which to measure. (Bloomfield 1939a:30-31)

That Whorf appreciated the validity of this concern is of course evident in the work he did in 1938/39 to develop such a 'scale' through his gestaltic isolate theory.

These affinities between Whorf and Bloomfield have rarely been noted. To summarize: Bloomfield acknowledged the problems inherent in trying to classify experiential elements according to grammatical patterns familiar from our own language, he understood that a neutral frame of reference is required if we are to

have access to a world which is not conditioned linguistically, and he was aware of the importance of a multilanguage database for the advance of science. It is not surprising that Whorf admired his work and recommended it to others (Whorf 1940g) or that he thought of Bloomfield as a conveyor, with Sapir, of “a new type of emphasis in linguistics [...] though Boas enunciated it decades ago” (Whorf 1937c[LTR]:65-66). It was mainly in his far more sophisticated conceptualization of the nature of mental activity that he was out of alignment with Bloomfield and others whose imaginations were constrained by behavioristic and mechanistic views of the world. Yet even here, Whorf agreed with Bloomfield (as we have seen) that “‘mentalism’ tries to substitute the bogus coin of emphasis upon ‘ideas’” for “insight into linguistic patterning” (Whorf 1940h:2).

In a famous, and I would suggest partly misunderstood definition, Bloomfield referred to “the *meaning* of a linguistic form as the situation in which the speaker utters it and the response which it calls forth in the hearer”. As “[t]he situations which prompt people to utter speech include every object and happening in their universe” (Bloomfield 1933:139), and as it is impossible to include in a definition all features of all situations in which a speech form may be uttered, we are led to the impossibility of defining the meaning of a linguistic form in an exact sense by reference to all the linguistic and extralinguistic factors which could possibly have had a bearing on that particular occurrence. Thus the kind of agreement on which at least some kinds of scientific discourse is predicated is precluded in ordinary language. Whilst Bloomfield’s formulations undoubtedly come straight out of the limited form of behaviorism of his time, this should not prejudice us against considering their implications carefully.

His point may be clarified by thinking about his opinion that “we acquire our native language by hearing and speaking in a myriad of real situations” (Bloomfield 1943:405), taking in the whole situation each time (1939a:19) until we are able to distinguish

between *non-distinctive* features of the situation, such as the size, shape, color and so on of any one particular apple, and the *distinctive*, or *linguistic meaning* (the *semantic* features) which are common to all situations which call forth the utterance form, such as the features which are common to all the objects of which English-speaking people use the word *apple*. (1933:141; original emphases)

Consistent and shareable meanings, in other words, are extrapolated from a range of situations, each of which is apprehended as a whole, at least initially. As a result, our basic assumption that “each linguistic form has a constant and specific meaning [...] is only true within limits” (p.145).

Notice that Bloomfield's distinctive features are, in the first place, features of *situations*. Distinctive semantic features, by this way of thinking, only accrue to linguistic forms to the degree that reference for such forms can be extrapolated from situations in a consistent way over time. Further, Bloomfield's features of situations would seem rather similar to those abstracted isolates of experience which Whorf regarded as forming the original basis for making meaning in social interaction. Although hearing a word once in a situation where it is clearly contextualized, or even explicitly defined, may establish it in our personal lexicon with relatively clear cut meaning, we usually find that we prefer to experience a word in use several times in different situations before attempting to use it ourselves.

Bloomfield's point is clarified by thinking about it in more detail from a resonance theory orientation. It is particularly interesting that he wrote about child language acquisition in terms of repeated exposure to situations which involve languaging. Bowerman's work, for instance, suggests that it is indeed exposure to language data in use which provides the basis for increased proficiency to use some grammatical patterns at least. An acquisition theory compatible with Whorf's thinking (and with connectionism) would have aggregations of resonances set up by repeated exposure to communicative situations coalescing as resonance points in a child's developing system until they begin to function projectively to achieve interpretation or production of utterances. These attempts at understanding and communication will be efficient to the degree that they are intercalibrated with comparable resonances in other people's systems of linguistic thinking.

Bloomfield (1939a:55) argued that it is language which, in establishing systems of interconnections between people, "produces human society, a structure more complex than the individual, related to him somewhat as the many-celled organism is related to the single cell". He said that linguistics "even more than other branches of science, depends for its range and accuracy upon the success of science as a whole" (p.5455) and emphasized, like Trager, that consistency and rigor of agreement within "specialized uses of language" are prerequisites for semantic investigation. In a remark which seems to be the precursor of Trager's statements about the relation of linguistics to other fields of inquiry, Bloomfield said that, as the "chief contributor to semiotic", linguistics "intervenes between biology, on the one hand, and ethnology, sociology, and psychology, on the other hand: it stands between physical and cultural anthropology" (p.55).

When Trager formulated his outline of metalinguistics therefore, he drew together strands of theory coming from Bloomfieldian as well as Sapirean influences. What Voegelin (1939a:2) referred to as Whorf's 'configurative

semantics' is metalinguistics. It is meta-analysis of the way patterns of speech suggest conceptual configurations of a pervasive kind within a culture or illuminate individual behaviors which might otherwise seem illogical in relation to other aspects of situations in which they occur. In arguing that attention to the patterns revealed in this kind of analysis can assist in making scientific practice more precise and consistent, Whorf was merely emphasizing the component of language awareness implicit in Bloomfield's discussions about scientific language. Similarly, Whorf's many elaborations of Sapir's (1929[SW]:162) statement that: "The fact of the matter is that the 'real world' is to a large extent unconsciously built up on the language habits of the group" were essentially awareness raising exercises.

The implication that it is useful to become aware of the way unconsciously acquired and perpetuated patterns of behavior operate at the core of cultural and personal identity is pervasive in Sapir's work, occasionally surfacing in explicit form. For instance, he commended Charles K. Ogden (1889–1957) and Ivor A. Richards (1893–1979) on the 1923 publication of *The Meaning of Meaning*, saying that they had

done philosophy a signal service in indicating how readily the most hard-headed thinkers have allowed themselves to be cajoled by the formal slant of their habitual mode of expression. Perhaps the best way to get behind our thought processes and to eliminate from them all the accidents or irrelevances due to their linguistic garb is to plunge into a study of exotic modes of expression. At any rate, I know of no better way to kill spurious "entities". (Sapir 1924[SW]:157)

Whilst Sapir used the metaphor of language as 'a garment' here — which he had tended to reject in favor of that of language as a "prepared road or groove" in (1921:15) — it is nevertheless evident that in saying that features of thought are *due* to their linguistic garb, he was emphasizing their dependence on linguistic processes rather than suggesting that language simply clothes otherwise autonomous thoughts. He was also suggesting that when these processes are brought to conscious attention through juxtaposition with 'exotic modes of expression' there is a beneficial result in terms of thinking proficiency for the people concerned.

As Whorf was to do later therefore, Sapir emphasized the value of multilingual awareness as a means of clarifying thinking. The idea that different languages embody different kinds of logic is implicit in Sapir's comment about philosophy. We are presented with the implication that processes of reasoning deployed by philosophers are rendered culturally relative through language patterning and are not inevitable manifestations of innate features of human

cognition, a view which some philosophers themselves had also considered (see Joseph 1996 for further discussion). Whorf gave particular attention, as Alexander (1936) had done several years earlier, to the possibility that a range of different order systems or logics is available to the species. As we saw in our discussion on cognitive universals in the previous chapter, this does not mean that there are no universal processes of reasoning. On the contrary, it would seem to be the case that the capacity for the full range of relational mental activity is constitutionally inherent in everyone, apart from pathology, otherwise it would not be possible to acquire additional ways of relating elements of experience to each other when one learns other languages. Just as elements of experience are selectively isolated and named in languages, so also are patterns of interconnection selectively discerned in experiential data and operationalized as linguistic processes in thinking and speaking.

6.4 *Language awareness as an augmentative function in cognition*

We may recall that Whorf (1941b[LTR]:249-250) thought the human mind/brain could be likened to a radio station or power plant, linguistic operations having the same kind of potential to repattern “states in the nervous system and glands — or rather, the subtle ‘electronic’ or ‘etheric’ forces in and around those physical bodies” — and “amplify and activate latent forces” as “mathematical formula language” has in bringing about “an unusual manifestation of force” in the station or plant. These remarkable ideas would seem to accord a very special place to the articulatory potential in linguistic thinking.

Throughout this book the verb ‘articulate’ has been required to carry a heavy semantic burden with respect to linguistic activity. Not only does it refer to verbal expression, but also to the connecting, jointing, or organizing of linguistic elements in thinking and speaking — their articulation in the structural sense. The so called ‘content’ words on their own are little more than indicators. As we point a finger at something which is present and to which we want to direct the attention of someone with whom we are communicating, so too are words used to alert interlocutors to the foci of our mental or perceptual attention, whether these be present or not. But the distinctive capacity of humans to communicate apperceptions of relationships in what is experienced (including what is thought about itself) can only be achieved by those linguistic processes which link and manipulate other elements of language in relationship to each other. It is patterns of relationships between elements of language, in other words, and not simply words themselves, which constitute that which is most distinctively different about human communication compared with that of other species or, indeed, with that of prelingual humans. The question here is the degree to which

relational activity may be an outcome of augmentational effects of incorporating language into cognition in the course of maturation.

What seems to be clear in Whorf's radio and power station analogies is that he believed that the incorporation of linguistic patterning into cognition is significantly involved in maximizing human cognitive potential. This is the reverse of the view more commonly held that what is unique about human cognition is merely expressed through language. What he seems to have been arguing is that although there are other kinds of thinking which we share with other species, the distinctively human relational activity expressed in mathematics, music and the various forms of language proper gives our cognition its species specific character. He emphasized that it is not the capacity to think itself, but the capacity to talk which makes us different from other animals and was specific in his opinion that "mathematics and music [...] are ultimately of the same kindred as language" (1941b[LTR]:248), that "(m)athematics is a special kind of language" (p.254) and not the expression of an entirely different cognitive capacity. Given that he also argued that these kinds of activities are culturally engendered rather than biologically specified, I think that we should assume that the 'latent forces' he referred to are the fundamental predilections for pattern extracting and processing which we have discussed previously.

It is this special augmentative power which he ascribed to language in cognition that Whorf was most interested in. If, as he argued, different languages provide different 'entrance' to whatever 'sublinguistic' or 'superlinguistic' existential matrix generates language, then his curiosity about the differential power of particular ways of speaking to activate and amplify latent forces which are constitutionally inherent is another aspect of his interest in linguistic relativity. He believed that awareness achieved by studying the way different languages embody different analyses of experience has the capacity, at least potentially, to free conceptual activity, including reasoning, from monolingual constraints. But an important aspect of his theorizing is that he also thought that linguistic processes in cognition determine or constrain thinking only insofar as the character of their functioning remains unavailable to conscious attention. His point about the relativity of one's 'picture of the universe' — the conceptual matrix from which our daily lives are generated as patterns of activity which make sense to us and to our associates — is that the linguistic constraints within which this conceptual activity is organized are compulsive or determinate only to the degree that they are unrecognized.

In fifty years of experimentation and discussion designed to investigate what have been understood to be Whorf's ideas about linguistic relativity, the role of awareness in the structure of his arguments has been highlighted by relatively few writers and has been completely ignored by many. There are several

remarks in Carroll's (1956) introduction (e.g., p.27) which suggest that he took the pivotal role of awareness in Whorf's theorizing for granted. Joseph A. Fishman (b.1926) later emphasized its importance in three influential articles (1960, 1980, 1982). More recently, Lucy (1992a), in developing his own theoretical treatment of Whorf's ideas, has paid considerable attention to the importance of the fact that linguistic categories in use are normally 'out-of-awareness', this factor being fundamental to their use in cognition as habitual and unconscious elements of thought. I have been making a similar point in terms of the incorporation or entrenchment of patterns of linguistic thinking in cognition, making no distinction, however, between cognitive and linguistic operations in the domain which falls into Whorf's category of thinking 'insofar as it is linguistic'. Lucy (1992a:36) also recognizes that: "Whorf explored the variation and hence the 'relativity' of linguistic categories in the service of overcoming their influence, and not as an end in itself."

That Whorf should have been interested in the way awareness of language patterning might have the potential to expand human cognitive potential, i.e. that he should have been interested in one of the roles of consciousness in cognition, is entirely congruent with his broad interest in human intellectual activity and his belief that the future for the species is intimately connected with our capacity or preparedness to improve thinking. He was appalled that attempts might be made to "restrict thinking to the patterns merely of English, and especially to those patterns which represent the acme of plainness in English", saying that to do so "is to lose a *power of thought* which once lost can never be regained" (my emphasis). He said: "We handle even our plain English with much greater effect if we direct it from the vantage point of a multilingual awareness" (1941a[LTR]:244). He considered that such awareness is vital to the as yet unreachable aim of achieving objectivity in science, saying that: "The person most nearly free" to "describe nature with absolute impartiality [...] would be a linguist familiar with very many different linguistic systems. As yet no linguist is in any such position" (1940a[LTR]:214).

The notion that each form of expression embodies a 'power of thought' unique to itself and representative of a selection only of what is available conceptually to humans is clearly an important component in the urgency Whorf felt regarding the task of investigating diverse languages before they were lost. His belief in the power of multilingual awareness to extend conceptual range and flexibility is probably as revolutionary in its implications for cognitive science as his identification of linguistic patterns with cognitive processes, although the impetus for research in this area also is still building up.

Some early work by Robert B. Kaplan (1966, 1972, 1987) in connection with the acquisition of writing skills in languages other than one's primary

language dealt directly with multilingual awareness. The argument in this and more recent research in that tradition is that cross lingual awareness can be used to improve students' control of language specific patterns of rhetoric. In 1972 at least, Kaplan acknowledged a link to Whorf, among others. Whorf's arguments may also form the generally unacknowledged backdrop to a research tradition which links early bilingualism with improved cognitive flexibility or performance. In a review of this literature Tunmer & Myhill (1984), for instance, argue (without mentioning Whorf) that metalinguistic awareness may be "the intervening variable mediating the positive effects of bilingualism on academic achievement" (p.169). This is because what is identified as enhanced cognitive ability is often demonstrated by children through a superior facility to manipulate elements of language as objects of attention. This skill is hypothesized to be an outcome of early acquisition of more than one language. Extensive work during the 1970s and 80s on the cognitive implications of child bilingualism attempted to achieve improved insight into the nature of advantages accruing from early bilingualism. Care needs to be taken, however, in assessing this literature, as some of the research was less than adequately conceptualized and executed for the, often admittedly attractive, results to be considered entirely robust. Further, in the context of our present discussion about language awareness, it is useful to notice that since the degree to which young children pay *conscious* attention to structural or even lexical differences in their languages is unclear, it is also uncertain to what degree this kind of metalinguistic ability should be called 'awareness'. Certainly Whorf mentioned specifically that he did not think that it was necessary for a person to be able to speak another language for beneficial effects of awareness of its structural character to be available. It is enough to say here that there is probably a difference between the metalinguistic ability (and whatever cognitive flexibility may accompany it) which is generated without conscious effort in situations of nonstressful bilingualism or multilingualism and the conscious meta-awareness of linguistic processes and their conceptual concomitants which he advocated. These matters require significantly more research.

There is another line of theory and investigation, also not acknowledged as having Whorfian roots, which has been explicit about the possibility that different modes of expression operationalize different kinds of cognition (or in Whorf's terms) represent different powers of thought. This work actively promotes the idea that metalinguistic awareness is an important means by which augmentation of cognitive power can be deliberately fostered in educational environments. For instance, David R. Olson (1977) argued in the context of an examination of oral and written language, that the "bias and structure" of different "modes of discourse define [different] types of knowledge and

competence" (p.222) and represent "alternative conceptions of reality" (p.223). Stating that "human intelligence is pluralistic" and that "different structures of knowledge [...] and ways of being intelligent" are embodied in different "languages of experience" (p.228) he added that these "permit us to interrogate nature in different ways". They can be thought of in Jack Goody's (1973) terms as different "technologies of the intellect" (p.240). The implication throughout is that acquiring facility in different modes of expression leads to greater intellectual flexibility. Whilst this earlier work may have promoted an ethnocentric (and socially biased) preference for a particular style of thinking (according superiority to written language in the tradition of European learning) this does not invalidate the general notion that styles of linguistic thinking can be thought of as intellectual tools with specific applications in specific social contexts. Olson (1991) has modified his earlier stance to correct the impression which might have been given that oral language is intrinsically inferior to written in any definitive general sense.

When he points out that in the "specialized use" of "formal written explicit prose [...] the language of science and philosophy and the language of formal schooling" provides a "specialized tool of analytic thinking and explicit argument that has been adopted as the predominant form of school instruction" (Olson 1977:232) he is correct with respect to Western traditions. He argues additionally that as: "Intentions" are "what sentences express in particular contexts", they are not only "important in understanding language" but are also "the basic concepts for the intentional management of our minds" (Olson 1986:150-151). He advocates that intentional terms like "'mean,' 'understand,' 'believe,' 'remember,' 'notice,' 'think,' 'perceive,' and 'forget'" (p.150) should be explicated for young children to assist them to develop increased competence to manage these activities proficiently (p.151) through greater awareness of their existence and use. Reflexive attention to thinking promoted by this awareness is held to bring it under greater control and make it more precise. The point is similar to that made by Bloomfield and Whorf with respect to scientific language.

Michael L. Herriman elaborates Olson's line of reasoning, developing it and linking it with empirical findings that metalinguistic awareness is associated with literacy development in middle childhood. Describing metalinguistic awareness as "an awareness of the form and function of language" (Herriman 1986:160) which is more than the ability to manipulate formal elements of a metalanguage in the philosophical sense, he hypothesizes that the crucial skills involved in being able to manipulate text may be metalinguistic. An earlier explanation clarified that metalinguistic awareness "refers to awareness of the *instantiations*" of metalanguage items like "*phoneme, word, phrase, etc*" rather than knowledge of the terminology as such (Tunmer & Herriman 1984:12; original emphases).

Investigations have determined that this ability “emerges at a definable stage in the child’s acquisition of language and appears to be causally implicated in learning to read and write” (Herriman 1994:2243).

There is an acknowledged link here to Courtney Cazden’s (1976:603) metaphor which defines metalinguistic awareness as “the ability to make language forms opaque and attend to them in and for themselves”, an ability which constitutes “a special kind of language performance, one which makes special cognitive demands, and seems to be less universally acquired than the language performances of speaking and listening”. Crucial to this kind of awareness and performance is “the ability to reflect upon and manipulate the structural features of spoken language, treating language itself as an object of thought, as opposed to simply using the language system to comprehend and produce utterances” (Tunmer & Herriman 1984:12).

If metalinguistic awareness is a vital element in the acquisition and development of literacy, and if literacy itself provides access to different ways of talking and thinking, continued attention to metalinguistic development throughout childhood and, one might add, throughout life, should have the potential to enhance or augment cognition by mediating increased control over the “formal power to codify reasoning” embodied in the “expressive power of text” (Herriman 1986:165-166). Explicit teaching of metalanguage in school (e.g. ‘word’, ‘letter’, ‘sentence’ and later ‘morpheme’, ‘phrase’, ‘paragraph’ etc) helps learners “analyze their metalinguistic knowledge” and “discuss syntactic and stylistic aspects of language as well as reflect on their own written work” (Herriman 1994:2245).

Herriman’s arguments that metalinguistic abilities may be “a by-product of the ability to attend to details of one’s own cognition, which includes language production” (1986:169) is important given current interest in the role of metacognition in learning. What he is claiming is that the application of conscious attention to linguistic processes may have a directly augmentational reflexive role in the development of one’s cognitive potential, specifically one’s reasoning abilities, insofar as these are mediated by particular patterns of language. As such, this claim is similar to Whorf’s claims about multilingual awareness but, like Olson’s, gives specific attention to the language of text and academic discourse within the monolingual situation and, to a significant degree, within the cultural tradition of Western educational practice.

Indeed, Herriman (1994:2244) reminds us that the form of English which continues to characterize scholarly writing, including that of many texts used in schools, is distinctively different from more generally used forms of the language. He argues that it is necessary to recognize

the historical development of English prose during the seventeenth and eighteenth centuries, particularly in natural philosophy. Writers of the time developed an argumentative prose style based not on the English vernacular, but rather on the model of Latin — the language more familiar to scientific, legal, and metaphysical writings throughout Europe — which subsequently formed the basis for the syntax and lexicon of formal prose.

Learners most proficient in manipulating this style have generally experienced greater success in formal learning environments. Deliberate explication of its rhetorical features (for both native and non-native speakers of English) can improve access to it through increased insights into its structure and organization, improving productive skill as well as comprehension in many cases.

What may be forgotten at times in discussions about the language of formal learning is that forms of language which give access to sophisticated knowledge in any well established domain or culture are invariably highly elaborated, their patterns of explanation and reasoning complex and generally difficult to learn to use with precision. Whilst it may be true that almost everyone acquires sufficient proficiency in their native language to meet basic survival needs, it is also the case that societies everywhere seem to recognize that highly proficient languaging, displayed for instance in expert performance in culture specific genres of language use, is achieved only with appropriate attention, effort, practice, and maturity, just like any other highly developed skill. It follows from Whorf's reasoning about the role of language in cognition that increased awareness of and proficiency in the skillful use of the more intricate features of any language, dialect, or register has the potential to refine whatever cognitive processes are intimately involved with that particular mode of linguistic operation and the oral or written performances associated with it.

It is the distinctive role for consciousness in the articulation and operation of cognitive behaviors which is perhaps most interesting in relation to the question of the nature and utility of metalinguistic awareness. What is advocated both in Whorf's writing and in this more recent work is that the products of language awareness — those metacognitive insights which are embodied in it — be turned consciously onto otherwise unexamined patterns of expression and conceptual patterns manifest in language use for the purpose of deliberately attempting to bring about changes in these patterns, including changes which constitute extension, enhancement, or augmentation of the 'power of thought'. The possibility of cognitive science as a discipline achieving the maturity and breadth of vision necessary for coming to terms with something like the full complexity of human cognitive operation requires that it incorporate into its research program this kind of thinking which allocates a central role to consciousness in the kind of cognitive activity which is definitively human. Exploring order systems and logics

developed within a range of cultures can provide us with glimpses of the range of possibilities available to the species in this regard.

6.5 *Different order systems, different logics, and the progress of science*

One of Whorf's final articles, written in late 1940 and published only a few months before his death, is entitled "Languages and Logic". In writing it he hoped once again to alert his general and scientific readership to what he regarded as the relativity of "the provisional analysis of reality" which "Western culture has made, through language" (1941a[LTR]:244). Using contrastive linguistic examples and illustrations he again demonstrated a variety of ways in which isolates of meaning are differentially extrapolated from situations, focusing this time on the way elements of experience are differently related or interconnected in accordance with combinatorial principles embodied in different languages. The objective was to show that although logic determines the way we make elements of experience cohere, different languages appear to operationalize such different ways of linking and interrelating perceptual and memorial data that we can only assume that a range of possible logics is available to the species.

Whorf emphasized this point by contrasting English with Nootka and Shawnee, two polysynthetic languages. He commented that

the way the constituents are put together in these sentences [...] suggests a chemical compound, whereas their combination in English is more like a mechanical mixture. A mixture, like the mountaineer's potlicker, can be assembled out of almost anything and does not make any sweeping transformation of the overt appearance of the material. A chemical compound, on the other hand, can be put together only out of mutually suited ingredients, and the result may be not merely soup but a crop of crystals or a cloud of smoke. Likewise the typical Shawnee or Nootka combinations appear to work with a vocabulary of terms chosen with a view not so much to the utility of their immediate references as to the ability of the terms to combine suggestively with each other in manifold ways to elicit novel and useful images. This principle of terminology and way of analyzing events would seem to be unknown in tongues with which we are familiar.

It is the analysis of nature down to a basic vocabulary capable of this sort of evocative recombination which is most distinctive of polysynthetic languages [...]. (Whorf 1941a[LTR]:236-237)

He went on to explain that such languages "do not use the chemical type of synthesis exclusively" and that:

Even our own Indo-European tongues are not wholly devoid of the chemical method, but they seldom make sentences by it, afford little inkling of its possibilities, and give structural priority to another method. It was quite natural, then, that Aristotle should found our traditional logic wholly on this other method. (Whorf 1940a[LTR]:237)

Perhaps some of Gerard Manley Hopkins' (1844–1889) poetry provides an example of the potential of English to operate in a quasi chemical instead of a wholly mechanical fashion. His poems suggest at times that he was able to hold constellations of experiential abstractions in mind all at once, their colors, sounds, and shapes rendered coherent in relation to one another by a logic different from the kind we normally use to understand events. Often these facets of experience seem to cohere not so much by virtue of their being identified as things, or features of known things, but almost kaleidoscopically, because they somehow all together represent his emotional response to the overwhelming ramifications of a situation rather than to the situation itself from a more objective orientation. For instance in "The Windhover" Hopkins (1953:23) writes

I caught this morning morning's minion, king-
 dom of daylight's dauphin, dapple-dawn-drawn Falcon, in
 his riding
 Of the rolling level underneath him steady air, and striding
 High there, how he rung upon the rein of a wimpling wing
 In his ecstasy! then off, off forth on swing,
 As a skate's heel sweeps smooth on a bow-bend: the hurl and
 gliding
 Rebuffed the big wind. My heart in hiding
 Stirred for a bird, — the achieve of, the mastery of the thing

The point I want to make is that we are not precluded from exploring modes of response to reality which are poorly provided for in our language. When we do so, however, the result may seem so out of the ordinary that we call it poetry.

Quoting from his contemporary in philosophy, Harold N. Lee, Whorf wrote:

"Those sciences whose data are subject to quantitative measurement have been most successfully developed because we know [so*] little about order systems other than those exemplified in mathematics. [...] We may look for advances in many lines in sciences at present well founded if the advance of logic furnishes adequate knowledge of other order types. We may also look for many subjects of inquiry whose methods are not strictly scientific at the present time to become so when new order systems are available" (Lee 1940:125 quoted in [LTR]:244-245). (*Added by Whorf).

“[T]he only correctives” for improving the “provisional analysis” made by Europeans “lie in all those other tongues, which by aeons of independent evolution have arrived at different, but equally logical provisional analyses” (p.244). Returning to his insistent theme, Whorf added to Lee’s remarks with the comment that

an important field for the working out of new order systems, akin to, yet not identical with, present mathematics, lies in the more penetrating investigation than has yet been made of languages remote in type from our own. (Whorf 1941a[LTR]:245)

Just as Whorf argued, therefore, that selective abstraction of isolates of experience from the range of data available for human processing is the basis for different cultural inventories of meanings, so he also argued that each grammar embodies a selection of relational conceptual processes which constitutes a particular extrapolation from what is possible in the way of logic. By implication in the first case, knowledge of as wide as possible a range of inventories improves our ability to imagine an expanded reality beyond constraints fostered by the naming range of a particular language. In this expansion of attention to naming we have a first basis for determining the parameters of human reality for the species as a whole. In the second case the implication is that knowing about a wide range of relational processes which are, or have been, deployed by the speakers of different languages to articulate connections between elements of experience, expands our ideas about the parameters of conceptual elaboration and flexibility available to the species as a whole. Such study, in other words, illuminates our understanding of the articulatory or combinatory possibilities available to us intellectually. Whorf had a passionate interest in furthering this kind of knowledge and it is in this area, rather than that of the naming function alone, that the most urgent research is required.

It should be clear that Whorf’s central preoccupation was not so much with language variation as such but with the possibility that studying the diversity of ways in which humans systematize experience can expand our knowledge of “what the human mind can do” (1940a[LTR]:215) and through such knowledge facilitate advances in conceptual functioning. He was quite explicit about this, saying with respect to the future that it is necessary:

to look at the subject of linguistics and its bearing upon thinking from the standpoint of the whole human species. In order to do this we must not be afraid to begin with a platitude. Man is distinguished from other animals by language, and by his great development in thinking. So far as we can envision his future, we must envision it in terms of mental growth. We

cannot but suppose that the future developments of thinking are of primary importance to the human species. They may even determine the duration of human existence on the planet earth or in the universe. The possibilities open to thinking are the possibilities of recognizing relationships and the discovery of techniques of operating with relationships on the mental or intellectual plane, such as will in turn lead to ever wider and more penetratingly significant systems of relationships. These possibilities are inescapably bound up with systems of linguistic expression. The story of their evolution in man is the story of man's linguistic development — of the long evolution of thousands of very different systems of discerning, selecting, organizing, and operating with relationships (1937c[LTR]:83-84).

Scientific study of languages, according to Whorf, “entails understanding many different beautiful systems of logical analysis” (1941b[LTR]:264) and understanding these has the potential to offer insights into the nature of scientific endeavor itself, not just make it more precise. For instance, he stated that:

Inasmuch as the analysis of reality is a matter of language, and the relativity of such analyses can only be appreciated through studies that show the immense range of possible diversity in linguistic expression it will be seen that there is a connection here with the attempts of science to understand the universe and man. (Whorf 1939e[LTR]:3:19)

A proper appreciation of the significance and subtlety of Whorf's theorizing is achievable only by contextualizing his investigation and analysis of individual languages in this broader, more fundamental concern with the way language is involved in human understanding of the universe and in our understanding of ourselves as a species.

To summarize, we have seen that it is the capacity to language which Whorf considered to characterize what is specifically human about our cognitive capacities and that, as a consequence, he thought that: “‘Talk’ OUGHT TO BE a more noble and dignified word than ‘think’” (Whorf 1940d[LTR]:220). What he was most interested in are the conceptual and experiential implications of the variety of actualizations of that capacity. In particular, believing such behavior to be crucial for the future of the species, he was interested in the opportunity humans have to augment their cognitive potential in a deliberate way. In such activity he accorded a special place to linguistic analysis which takes cognizance of the ‘power of thought’ implicit in different systems for making meaning. He focused on the enhanced flexibility and conceptual range which might accrue from awareness of the different logics of each system and the range of relational processes which constitute these logics.

While the present state of our knowledge of neurology and cognitive organization remains too tentative to allow us to decide on physiological or neurological grounds whether Whorf was warranted in talking about linguistic thinking in the way he did, there is no such impediment to rigorous empirical investigation of his allegations about multilingual awareness (and metalinguistic awareness in general). Definitions about what might constitute such awareness can be developed to the point where there is agreement about what they mean, hypotheses about relationships between metalinguistic (including multilingual) awareness and particular behaviors can be made, programs of language awareness training can be devised for a range of situations (not limited at all to those associated with formal learning) and experimental outcomes can be checked against hypotheses. In these ways theories about the reflexive power of conscious mental activity to enhance or even augment thinking can be explored and an estimate of the reasonableness or otherwise of Whorf's visionary hope that 'the possibilities open to thinking' can be expanded for the benefit of the species as a whole can be assessed quite pragmatically.

It may be that Whorf's most significant contribution to understandings we develop about language and thought and the nexus of these with reality will be seen eventually to lie in the augmentational role he gave to reflexive awareness in cognition. It is not difficult to imagine a range of very interesting practical implications for individual personal development, for educational programs (including language learning) and for intercultural work of all kinds. Most importantly, an understanding of what he had to say about language awareness is the key to whatever significance he himself accorded his discussions of the question of linguistic relativity. If the capacity to abstract linguistic patterns from the social environment and incorporate them into cognition is species specific, the reflexive capacity to turn conscious awareness of linguistic processes back onto cognitive activity itself constitutes an even more interesting species specific phenomenon.

How can we argue with Whorf when he reminds us that 'future developments of thinking are of primary importance to the species'? Not only the marvel of our advances in fields such as communication technology, medicine, and transport, but also the horror of the way we are able to translate our most fundamental insecurities and fears into sophisticated weaponry are surely the outcomes of developments in thinking. These developments have undoubtedly been based on advances in our ability to identify, track, and re-articulate relationships between elements and processes observed in nature.

These refinements in thinking which have characterized the recent technological era in our species' history are primarily elaborations of ways of talking and understanding which have their origins in European language and history. It

is not merely out of curiosity that we should accelerate our efforts to discover 'what the human mind can do' more generally in the way of linguistic thinking. Nor should it be a matter of sentiment only. Although powerful languages and peoples have overcome weaker ones since the dawn of human society, the rate at which this process is taking place today is tragic. Certainly, new ways of speaking and thinking evolve continuously to penetrate and subvert as well as to enhance and extend old ways and this is something which is too readily forgotten. The resilience of the species is something I believe we must have faith in; no, more than that, take joy in. Study of language, far from being a marginal pursuit in our endeavor to celebrate this resilience and further our understanding of ourselves and our world, needs to become central in the human sciences.

With his concern for the survival of the species on 'the planet earth or in the universe' Ben Whorf reaches into our age with his complex of emergent theories. These mesh now with more recent developments in linguistics and cognitive science in general. His 'fashions of speaking' embrace the whole gamut of linguistic activity — solitary or social, internalized or externalized, spoken, written, or signed. In his approach to linguistic analysis he modeled the importance of contextualizing the most finely detailed and precise studies of elusive linguistic processes within an overview of the cultural traditions through which they operate in communication and thinking. Today we would add to that contextualizing framework an awareness of the social dynamics of speech communities and the role of imagery in articulating meaning. Whorf offered a vision for the unity and centrality of linguistic science which has been obscured for much of this century. We have the opportunity, as we come into the new century, to install study of language into all levels of education and fields of science. As we improve our understanding of the intricate networks, patterns, and domains of agreement in which our ability to language is realized, we will come to know our individual selves, our science, and our species better.

APPENDIX¹

THE 'YALE REPORT'

REPORT ON LINGUISTIC RESEARCH IN THE DEPARTMENT OF
ANTHROPOLOGY OF YALE UNIVERSITY FOR THE TERM
SEPT. 1937 — JUNE 1938

By B. L. Whorf and G. L. Trager

PART 1 THE SYNCHRONIC OR NON-HISTORICAL ASPECT

SCHEMATIC OUTLINE OF PART 1

Division A Configurative Linguistics By B. L. Whorf and G. L. Trager

1. Preliminary linguistic outline
2. Phonemics
3. Morphophonemics
4. Configurations of grammar including grammatical classes

¹ This is the document referred to throughout the book as "the Yale Report" and dealt with in detail in chapter 3. The original 17 page handwritten draft document, together with nine finalized typed pages which comprise a little more than the first seven of the draft, is in the Yale University Library, Manuscripts and Archives and is available on microfilm as part of *Benjamin Lee Whorf Papers* (1979). The report is probably as important in theoretical and historical terms as the papers included in Carroll's 1956 collection of Whorf's writings entitled *Language, Thought, and Reality*. It is published here for the first time with permission of Yale University Manuscript and Archives.

In reproducing the report I have used the more final, typed version as far as it goes and, with the exception of a few of the more interesting variations from the handwritten draft to which I have drawn attention in footnotes, have not attempted to make a detailed comparison of the two versions. From page eight I have worked from the handwritten copy, keeping to the format established in the typed part. In order to remain true to the style of the original I have not added omitted articles or altered other features characteristic of a draft. Where arrows into the place of insertion in the text indicate Whorf's intentions regarding marginal or other additional comments I have included these as directed, noting the fact in footnotes where the passage consists of more than a word or phrase. These changes includes transposing the penultimate and final sections of the report as directed by a marginal note. I have also noted the more interesting deletions where legible, ignoring smaller ones which consist of repeated words etc.

5. Configurations of grammar as compared with experience interpreted non-linguistically

Division B Configurative Linguistics and Cultural World-Outlook —
 “Ethnolinguistics” By B. L. Whorf

1. The configuration of experience as seen in language
 - I. Segmentation of experience
 - a. Segmentation in terms of grammatical classes
 - b. Segmentation in terms of one language compared with another
 - II. Implicit metaphysics of a language, and, more or less, of a culture
 - III. So-called primitive mentality — the concept of cultural mentalities
2. Interpretation of coordination and parallelism between language and culture (the non-historical aspect, historical aspect to be treated in Part II² of Report)
 - a. General considerations
 - b. Illustrative detail
 - c. Simple versus complex terms
 - d. Cultural attitudes and backgrounds
 - e. Comparison of negativisms
3. Behavior-patterns as correlated with language
4. Study of the supra-linguistic and quasi-linguistic mentality³ (collective or social) through the linguistic approach
 - a. In general — spiritual emphases of a culture
 - b. Kinds of translations — official, literal, and interpretative
 - c. Understanding of symbolism

² This part seems not to have been attempted, even in draft form but see note 4 below.

³ End of original typed page 1.

- d. Ideas not independently lexated
 - The concepts of lexation and independent lexation
 - Application to the grasping of subtle turns of meaning in the language of exotic cultures
- e. Correct recognition of the immaterial values of a culture

 4

Trager's share in the present report is unavoidably very much curtailed by his absence in the European linguistic field. The compilation of the report was conceived and undertaken by the author, Whorf, not until the end of the second semester, long after Trager had sailed, and the author feels that it has not been possible for him to do justice by proxy to the large contributions made by his colleague. The important work in the subjects A2 and A3, the corner-stone of linguistics, is chiefly due to Trager. A1 and A5 represents mostly the work of Whorf; A4 represents mostly joint effort and collaboration. Division B represents the viewpoint of Whorf, who wishes to take full responsibility, but not full credit, for what is there expressed, for he acknowledges the contributions resulting from many discussions and consultations with Trager, particularly as relating to Trager's work with the Taos Indians. A number of suggestions and ideas have been contributed by Charles C. Hockett and Norman A. McQuown⁵, students at the Yale Graduate School in the classes of the authors, others have resulted from correspondence with Doctors⁶ Morris

⁴ In the handwritten draft there is a line across the page at this point and several additional sections are listed (see below) opposite the marginal note: "Part II The Historical Aspect":

- "5. Time-Perspective as seen in one language (including both vocabulary and grammatical patterning) in correlation with culture.
- 6. Adaptation of a language to New Conditions especially Cultural Influences
 - a. Inventive adaptation
 - b. Loan influences — loan words, loan translations, borrowed patterns
- C The Concept of Linguistic Taxonomy (This heading is circled and an arrow indicates that Whorf would have placed it after D).
- D Historical Comparative Linguistics
 - 1. Reconstructive Linguistics
 - Azteco (spelled Azeteco?)-Tanoan
 - 2. Linguistic Map of North America
 - 3. Notes on theories of belts, areas, and substrata"

Although materials relating to some of these sections may be found in the Whorf and Trager archival collections, the sections seem not to have been written, probably, I would hazard a guess, because of Trager's lack of involvement in what report writing was done and also the apparent abandonment of the report itself as an activity which might be fruitfully completed.

⁵ Names reversed in handwritten version.

⁶ "Doctors" added to typed version.

Swadesh, Mary Haas, and C. F. Voegelin. Five meetings for the reading of papers and discussion of linguistic work have been held jointly with Prof. Franz Boas and the group of linguistic workers associated with him at Columbia University, and we owe much to the stimulating points raised and ideas contributed by Prof. Boas and his co-workers, even where the fruits of those ideas may appear unrecognizable to them. We both acknowledge our great indebtedness to Prof. Sapir, especially for⁷ encouragement and for the stimulation given by his broad and penetrative outlook, at once scientific and sensitive, all of which he has given freely to us even while weighed down by illness. We unite in heartily wishing him a speedy return to health.

An expanded outline form has been used for the report, which follows. The nature of the research has been that of a work of systematization and of recognition of significances, and its conclusions are largely expressed in the arrangement and statements of the whole body of the report.

8

Division A Configurative Linguistics

By B. L. Whorf and G. L. Trager

(Abbreviations: lge – language, lges – languages, Eng – English)

1. Preliminary linguistic outline

As supplement to the extensive ethnographic outline prepared and published by the Dept. of Anthropology in 1937–1938, a tentative outline of the field of configurative linguistics as applied to any one language was made early in the term, and was entitled Language — Plan and Conception of Arrangement — as the name implies, a first and exploratory plan for the arrangement of linguistic information. It was not published in the ethnographic outline, but 5 or 6 typed carbon copies were distributed to persons interested, and a very condensed synopsis published in the ethnographic outline. It served somewhat as a basis for the further research, and work during the year has suggested much enlargement, some revision. The idea of such an outline is an important one for linguistic taxonomy, or the systematic view and classification of all known “linguistic

⁷ “his constant” omitted in typed version.

⁸ End of original typed page 2.

species", i.e. individual lgs, in order that science may obtain a comprehensive view of the human linguistic faculty as one large whole, much as zoology classifies and studies all animal species, not merely a few preferred ones. Long in advance of the ultimate possibility of such a linguistic world-picture it is desirable to compare many adequately comprehensive outlines and "trait-lists" of individual lgs to "see what we have got" world-wide and so make valid generalizations about the totality Language.

2. Phonemics.

a. Distinction of phoneme vs. allophone (positional variant). The allophonic constellations, or groups of sounds which actualize or represent each phoneme or sound-type under definite sets of conditions stateable as formulae, have been worked out for Taos, Picurís, Hopi, modern Aztec (2 dialects), 2 or 3 dialects of American Eng. A certain basic system of allophonic constellations, as well as of phonemes, is characteristic of each language, and certain variations upon this basic system characterize each dialect of a language.

b. Correlative phonemes, or correlative phonemic sets, e.g. (p, t, k), (p^c, t^c, k^c), (b, d, g). Features of correlation, e.g. voicing, aspiration, desonancy (the opposite of voicing, e.g. M, N, N), off-glides⁹, on-glides, nasalization, etc. have been studied. It is important, and often difficult, in a newly studied lge, to distinguish between a correlative feature, e.g. aspiration, i-glide, and a phoneme, e.g. h, y. A certain correlative feature and a certain phoneme may have exactly the same sound and be the same thing on the physical or mechanistic level. They are different purely and simply as elements of Gestalt-wholes; this makes them immensely different perceptively to the native hearer but indistinguishable to the ear of the student until he has become adjusted to the phonemic system of the language. They can be distinguished only by configurative phonemic analysis, which is¹⁰ obligatory and cannot be replaced by nicety of ear or acoustic instruments (not a new conclusion but worth reemphasizing). The denoting of affricates by such symbols as ¹¹ts, ta, tʃ offends against this principle because it denotes a feature of correlation by the symbol for a phoneme (t), and this soon leads to practical difficulties. Correlative features between allophonic constellations also exist (e.g. one particular positional variant of l may have a phonetic feature correlative with the

⁹ (e.g. off-glide i in ai, ei, oi as diphthongal unit phonemes)," in original omitted.

¹⁰ End of original typed page 3.

¹¹ With respect to Whorf's rendering of Hopi words I have tried to reproduce the originals as closely as possible.

corresponding or “homopositional” variant of *m*, although *l* and *m* as phonemes do not correlate). Of this type are cluster-glides, which sound like vowels, and are often lumped with certain vowels under the loose term “shwa”. Such glides appear in e.g. *pris^om*, *rhyth^om*, *litt^ole*, and are more widely distributed in colloquial dialects, e.g. *ath^oletic*, *el^om*; their irregularity of distribution in “standard” Eng may enable them to be considered as vowels (?), but Hopi *-k^on-*, *-k^ol-*, *-t^on-*, etc. are definitely allophonic correlatives (cluster-glides).

c. Distinction of segmental phonemes (consonants, vowels) and prosodic phonemes, i.e. units of length, stress, accent (pitch-stress, pitch), clipping. Clipping or prosodic staccato (Trubetzkoy’s “Silbenschnitt”) was discovered in and worked out for Hopi; it occurs in Eng and German.

3. Morphophonemics

Morphophonemics is a configurative analysis which distinguishes phonetic configurative elements (called usually morphophonemes) characterized by homologous position in linguistic elements of constant meaning — a type of configuration not used in pure phonemics. Thus if threads connected all the *c*’s, *l*’s, *i*’s, *f*’s, in *cliff*, *cliffs*, *cliffy*, the same morphophoneme would be found repeated along each thread. The same would be true of *leaf*, *leaves*, *leafy*, for this type of analysis considers the *v* in one word morphophonemically equivalent to the *f*’s in the other two, because it lies on the same thread with them. Morphophonemics relates to the underlying model of a set of forms — when lexical this model is that linguistic entity which has traditionally received the name of “root”. We recommend that this very convenient term be retained, but also that the understanding of it be less loose, and clarified by the morphophonemic concept. The symbol $\sqrt{}$ is suggested not only for roots but to indicate morpho-phonemic symbolism in general. The roots of the “cliff” and “leaf” forms above might be denoted $\sqrt{\text{kl}f_1}$, $\sqrt{\text{lif}_2}$. All phonologic variation in a given lge may be divided into allophonic (coming under phonemics) and morphophonemic. The latter includes ablaut, sandhi, lenition, hardening, zeroing, e.g. Eng *moisten* (*moisn*) : $\sqrt{\text{moist}}$, Latin *nox* : $\sqrt{\text{noct}}$, cf. *noctis*, and various other types of phonologic phenomena. It is very important not to confuse morphophonemics with historical reconstruction. The (morphophonemic) root $\sqrt{\text{kl}f}$ is purely a formula that correlates synchronic linguistic facts, and has nothing to do with the historical prototype (for which we use the customary marking * instead of $\sqrt{}$) of the set of forms in question. Trager has worked out the complicated and unusual consonantal changes (consonantal ablaut) in Taos verbs, Whorf the “vocal segments” of Hopi vowels treated as morphophonemes.

4. Configurations of grammar including grammatical classes

a. Overt and covert classes. Grammatical categories are¹² distinguished by grammatical markers, which may or may not appear with the form categorized. The test unit is the sentence, or sometimes small group of sentences (immediate field of discourse), not the word. For the marker to appear “with” the form means to appear in the same sentence (or sometimes, in the immediate field of discourse); e.g. in ‘he saw a small fish’, ‘a’ marks “fish” as of the category or class ‘singular number’, and appears “with” it. Grammatical classes which appear ordinarily “without” markers do have markers appearing with them under certain particular circumstances — such a class is “covert”, and its marker a “reactance”. Its grammatical meaning, if distinguishable, is a “cryptotype”. Grammatical classes are not to be set up in the absence of any markers at all; from a grammatical configurative standpoint an entirely unmarked class would be a fiction. Such fictitious categories have frequently been foisted upon exotic languages and modeled upon meanings of marked categories in the investigator’s or grammarian’s native European language. At the same time genuine categories of the exotic language have been ignored because they were marked only covertly. Covert marking is very definitely marking, and cannot be ignored. Markers include of course features of position and order in the sentence, and negative features — the significant absences of forms or patterns otherwise to be expected. Overt categories are accompanied by markers in all or nearly all sentences — e.g. verbs and nouns in Eng and French, gender in French. Their grammatical meanings are “phenotypes”. Covert categories have markers that ordinarily do not appear — they appear only in certain “test” types of sentence; e.g. Eng genders, where the markers (reactances) are the personal pronouns, but appear only when the sentence calls for such a pronoun. The pronouns mark linguistic classes, not “natural” orders of experience that could be discriminated by non-linguistic tests — this, in spite of the considerable degree of alignment with a sex distinction is true of Eng as well as French, Latin, Hebrew, or Taos gender. Eng verbs belong to different covert classes of “resolution” marked by absence of nouns or pronouns after the verb and other patterns (‘I heard it’) but not (‘I listened it’) and (‘it was heard’) but not (‘it was listened’) etc., but in many types of sentence (‘I will hear’, ‘I will listen’, etc.) no markers appear. Covert classes have failed of sufficient recognition both in European and in American Indian lgs; they are often of the greatest importance, and failure to recognize them may baffle or delude the investigator of a lge. The covert classes may have a far-reaching connection with the type of thinking, the

¹² End of original typed page 4.

“philosophy” or “implicit metaphysics” of a lge (cf. the important “round”, “long”, etc covert classes of objects, i.e. of nouns, in Navaho, reactance in form of certain verbs) and go to make up the number of those things that are responsible for the impression of a “primitive mentality” different from “civilized mentality” (see B1, III). The manifestations of these class-distinctions in thinking and the character of the sometimes rather deeply-hidden and seldom-appearing reactances suggest the phenomena associated with the unconscious, subconscious, or foreconscious in psychology, though on a more socialized and less purely personal plane, and may connect in a significant manner therewith.

b. Selective and modulus classes. Observing now a different order of configuration, classes may be divided into two types through the type of applicability of their markers, according as they apply only to a selected group of the vocabulary (selective class) or to the¹³ whole vocabulary or the whole of a certain larger class, which may be selective (modulus class). Typical of selective classes are the “parts of speech”, nouns, verbs, etc., of modulus classes or moduli are case, number (applicable e.g. to all nouns), voice, aspect, tense (applicable e.g. to all verbs). In some lgs and lge families, e.g. Semitic, Wakashan, moduli take the place of “parts of speech”; this has not been sufficiently recognized. Eng is moving in the same direction, has indeed gone a long way towards such a condition. has moved in the opposite direction; it was designed to have only modulus classes and roots, but selective classes of roots have appeared in actual usage, as Mr. McQuown has shown, modeled on similar classes in European lgs. Moduli are overt, selective classes either overt or covert. The markers of moduli are called by us “signatures”. One modulus (e.g. Eng noun-plural) may have more than one signature, e.g. for Eng noun-plural, -s, vowel change, -en, absence of articles, plural verb, suppletion (e.g. chicken : poultry signatures may be “bound” (a part of the word, including internally) or “free” (appearing separately in same sentence (including features of order and negativisms). “Inflection” is a term covering all bound markers, both signatures and selective markers. “Attached” is suggested as a broader variety of the type of “bound”, including markers attached to any word and not necessarily to the word categorized — e.g. in S. Paiute there are such markers that may be attached simply to any word that begins the sentence — these are usually not called “inflections” but “enclitics”.

¹³ End of original typed page 5.

5. Configurations of grammar as compared with experience interpreted non-linguistically

The task of formal grammar ends when the analysis of all linguistic configurations is completed, but the characteristics of a language are by no means fully accounted for then. It still remains to indicate the type of experience and kinds of referents referred to by different grammatical classes, for lgs may here differ widely. Our ordinary ways of classifying referents, as being “things”, “objects”, “actions”, “states”, etc. are quite unsuitable for this work, as they are themselves names for partitionings of experience resulting after it has been grammatically classed, and circular definitions or mere confusion will result from applying them as if they referred to the conformation of reality itself. Terms like “subject”, “predicate”, “actor”, “agent”, “function”, “cause”, “result”, are equally misleading or useless in any other than a strictly grammatical sense, defined for and by each particular lge and referring only to the patterns therein and not to external reality. It is, e.g. quite legitimate to talk about “the agent” in a given lge where the term has been defined or illustrated, but it is not to say that two different lgs of widely different type are alike in their treatment of the “agent”. In such a use it is not clear what “agent” means. It is impossible to break up the flow of events in a non-arbitrary manner into “subject”, “actor”, “predicate”, etc. as if there existed external realities of this sort. We, to be sure, may analyze a phenomenon as ‘boy runs’, but another lge is capable of analyzing it ‘run manifests as boy’. In describing differences between lgs in such respects we must have a way of describing phenomena by non-linguistic standards, and by terms that refer to experience as it must be to all human beings, irrespective of their languages or philosophies.¹⁴ This is possible, the way having been shown by Gestalt psychology. Visual perception is the standard, norm, and framework of all experience. The forms and laws of visual perceptions are the same for all individuals — even the most glaring abnormalities, like color-blindness, are relatively minor, and do not disturb the universal configurative principles of visual perception. We need not cite these laws here — see, e.g. Kurt Koffka, “Gestalt Psychology”. The basic principle is the contrast of figure and ground, involving the differing degrees of organization, stability, and fixity in figures or outlines of all sorts. A non-linguistic canon of describing the referents of linguistic forms, a canon which is understood in the same way by the speakers of any and all tongues, is provided by considering whether the referent has an outline or has not, and next, how much of an outline, a definite or a vague outline, a fluctuating or a stable outline,

¹⁴ End of original typed page 6.

a quality of ground or field as more important than outline, and similar criteria which can and should be worked out and expressed in suitable terminology. The difference between the referents of the words (a) dog, chair, house, tree, and (b) run, stand, fall, smooth, stiff, etc. is not to be phrased as that (a) are things, and (b) actions or states; but as (a) with marked outlines, or outline as of primary importance, and (b) with outline-quality subordinate or lacking. Going further, and comparing (c) stand, sit, lie, fall, with each other and with (d) white, smooth, large, useful, we see that the (c) words also refer to experience with a degree of outline, though a very low degree, while the (d) words refer to experiences in which the quality of outline is lacking. Certain covert shape-classes of nouns in Navaho and other lgs seem to have a class meaning referring to generalized outlines like the (c) words. The lge which says 'run manifests as boy' has the characteristic of commonly expressing "first degree outlines" (e.g. boy) as "verbatations". In Eng, an experience of "liquid H₂O" must have a certain minimum degree of outline-quality before it is in common parlance referred to by the noun 'water' — lacking this it is treated as ground or field, and referred to by adjectives — 'wet', 'damp', 'moist'. Hopi treats "liquid H₂O" rather differently — see B IIb below. Some lgs have highly figural (i.e. "outlinish") verbs, e.g. 'to be a hole in the ice' (Potawotami), 'to manifest as a fascicled bunch' (an outline like a bouquet of flowers) (Hopi). Hopi is indeed rich in highly figural verbs, with no counterpart in Eng. If the experience is also momentary or fluctuating it must be a verb reference, no matter how outlinish, unlike Eng; hence our nouns 'wave', 'flash', 'blow' (striking), 'splash', 'lightning', 'meteor' cannot be translated by nouns in Hopi, but the same experiences are there denoted by verbs. This pattern even prohibits the reifying or "nounizing" of such momentarily outlined experiences by roundabout linguistic devices such as participles: 'shooting star' is ruled out in favor of 'star moves', 'sunset' in favor of 'sun sets' (literally, 'sun interiorizes'), 'running dog'¹⁵ is permissible only when used like a dependent relative clause, and 'it is a running dog' is ruled out in favor of 'a dog runs'.

¹⁵ "(where 'running' is not long durative)" in margin of draft. P7 ends at end of this sentence..

Division B Configurative Linguistics and Cultural World-Outlook

By B. L. Whorf

The term “Ethnolinguistics” is suggested for this type of study

1. The configuration of experience as seen in language

I Segmentation of Experience The flux of experience may be classified and “chopped up” differently by different languages; this is most readily seen by going outside of Indo-European, American Indian lgs providing some of the greatest contrasts. These differences in “segmentation” — in what is treated as “one” aspect, phenomenon, substance, or quasi-whole, isolated out of the mass of presentation and fitted together with other such segmentation to make the mosaic representation of life which the language and culture takes for granted — these differences may apply not only in the large outlines of the cosmic picture (BI, II), where they are at their most subtle and hard to appreciate, but also in countless small matters of detail, where they are much more easily seen.

We say “a box of cigars”, Hopi says “cigars plurally put inside”, where ‘plurally put inside’ is a unitary term, unanalyseable [sic] except for inflectional endings. The two expressions refer to the same bit of experience but segment it into different constituents. Eng presents an outlined bit of the world, a ‘box’ — it carries the implication of contents, which the relater ‘of’ discloses to be cigars. In Hopi the cigars are the main idea, to which is referred a generalized configuration of interiorized multiplicity, but whether the enclosure that preserves this configuration be a box, barrel, bag, package, etc. does not require mention. We “unbutton” a coat, Hopi “causes inner-plural separation” of it (unit term ‘separate’ with inner-plural and causative inflections) without any allusion to such bits of experience as buttons. Where we have one term ‘snow’, another language has different words for snow everywhere on the ground, snow in patches, falling snow, etc. Words translated ‘war’, ‘clan’ etc. may carry a complex institutional meaning like our ‘the Church’, ‘the theater’, ‘the stage’, or again they may be rather on the plane of our ‘a church service’, ‘a play’, ‘a fight’.

a. Segmentation in terms of grammatical classes Study in this field springs naturally out of A4 and A5. For what sort of segmentations of experience does the lge use its various parts of speech, its cases, numbers, aspects, voices, etc.? See A5 for ways of allocating types of experience to verbs or to nouns, contrasting Eng and Hopi. Eng uses nouns for ‘summer’, ‘winter’,

‘morning’ etc.; in Hopi these segmentations of experience are neither nouns nor verbs, according to the formal configuration of the Hopi noun and verb classes, but a class by themselves, a type of adverb (= when it is summer, when it is morning). The ideas of ‘waiting’, ‘remembering’, ‘inferring’ may be expressed in Hopi by adverbs; in Eng they require verbs. In Hopi “referential motion” or motion described simply by reference points and directions is not denoted by formal verbs — i.e. there are no verbs ‘go’ and ‘come’. It is expressed by formally verbless sentences containing the necessary directional data as cases, postpositions, or adverbs. Then, in¹⁶ the absence of formal verbs, a special inflection at the end of the last word in the sentence adds “verbation”, or the characteristic of verbs which is necessary to complete sentences. Thus ‘he goes to the tree’ is ‘he to the tree (with verbaion)’ or ‘to the tree he (with verbaion)’. But ‘he runs¹⁷ to the tree’ requires a formal verb to express running. The adverb pay ‘now, then’ properly ‘in process of manifesting for the moment’, or ‘transition through a small segment of existence’¹⁸ when thus used with verbless verbaion means ‘go’ in the sense ‘leave, depart’, i.e. not go anywhere or in any direction in particular but simply go out of the immediate scene. The province of a certain grammatical class in one language may be a mere unexpressed nuance in another, in a third it may be a nuance expressed entirely by prosodic features, stress, loudness-emphasis, intonation, etc. In Hopi definite words express what special stresses and intonations express in Eng, e.g. kər qa` pəvɛ ʔltotiq ‘if they are not quieted’, kər qa` pas pəvɛ ʔltotiq ‘if they are not quieted’, where the adverb pas corresponds to the Eng nuance given by special stress on ‘not’. Some languages have no special type of intonations for questions, interrogation being expressed only by a morpheme, sometimes an independent word.

b. Segmentation in terms of one language compared with another

Most generally the two lgs so compared will be an exotic lge being investigated and the investigator’s native tongue, e.g. Eng, French, German, Spanish, etc. Modern European lgs are enough alike to constitute a “standard average European” (SAE) for comparison with e.g. an Am. Ind. lge. A very simple case of segmenting experience differently is treatment of the human body and its division into named parts. Even within SAE are distinct differences: ‘finger’ and ‘toe’ have the same name in most Romance lgs, Eng uses ‘toe’ for both ‘foot-digit’ and ‘point of foot’, Polish has one word for ‘hand-arm region’ and sim-

¹⁶ End of original typed page 8.

¹⁷ “runs” underlined in draft.

¹⁸ These two longer glosses of ‘pay’ are transposed in the draft. A marginal note not included in the typed version adds: “or in still different words ‘suddenly now and all over’ or ‘in process of being for the moment’”.

ilarly ‘foot-leg’. Hopi differs somewhat from SAE — a general hand-arm region, but foot and leg distinguished, no simple terms for hand, nipple, nostril, anus, vagina, buttock, cheek, which are expressed synthetically as the heads, holes, or mounds of certain regions,¹⁹ on the other hand simple terms for fold of groin, top of head, and lower back over buttocks, our ‘back’ being segmented as two regions instead of one. Verbs and words for general ideas may be related to the body-part analysis and vary accordingly. The Hopi verb ʔi·ta refers to motion of entire hand-arm region with an external object included, hence is the translation to lift, pass, hand over an object already in the hand, but is not used when the action must begin with a grasping or picking up of the object.

The world of natural phenomena and substance may be variously segmented — see instances above of ‘snow’ and Eng (and SAE) ‘water’. Hopi segments liquid aqueous manifestation into pa·hə ‘wild water’ and kə·yi ‘fixed water’ (water within a small fairly stable outline, as that of a container); it is the first that runs from taps and faucets and is in springs and rivers, the second which is in a glass or vessel or spilled therefrom on floor, etc. The second is the most general response to being asked the word for ‘water’, while the other is apt to be the reaction to ‘pond’ and is always so to ‘spring’. There is nothing quite corresponding to Eng ‘wet’ — while ‘be dry’ is a formal²⁰ verb (not a formal adjective as is e.g. ‘white’, ‘big’). There is neither adjective nor stative verb for wetness but only ‘to wet it’, a formal transitive verb, and ‘wet’ must be expressed as ‘wetted’ i.e. ‘having had water applied’ or by a compound or phrase involving pa·hə²¹ or kə·yi, whichever is the proper segmentation. This is no doubt in harmony with Hopi climatic conditions and cultural attitudes towards water.²² The phenomenon of light is segmented into ta·la ‘light diffused through space’ (also the word for ‘day’) and qö·hi ‘luminous essence within an outline’ (also the word for ‘fire’). The light within a neon tube is qö·hi but the illumination spread of it is ta·la and the tube is said to be ta·lɪk^{wi}ta ‘be carrying or conveying ta·la’. [The]²³ Hopi term ‘rain’ (yowyan) is a much broader segmentation than Eng or SAE ‘rain’ and might be called ‘the rain-

¹⁹ In the draft this reads: “as the head (qötö), hole (höci), or mound (como) of a region.

²⁰ End of original typed page 9. Whorf included a slash mark and noted “10” in the draft at this point which is several lines into handwritten page 8.

²¹ Whorf differentiated between examples and the rest of his text by printing them rather than writing them in cursive script. I will continue to underline these words as he did in the typed part of the report.

²² This sentence is encircled in the original.

²³ Written then deleted in original. An arrow through the text indicated that Whorf wanted to bring this sentence and the next three up to this point in the text from further down.

complex' or even 'the rain aspect of nature'; it includes all the powers and properties manifested in the rainstorm. In Hopi it is 'the rain' that 'strikes' (lit. 'shoots') the house or tree that with us is 'struck' by 'lightning'. 'Lightning' and 'thunder' are not the entities that they are in SAE but mere epiphenomena attending the power of rain, and in accordance with the principle mentioned in A5 are fleeting events to be referred to by verbs but not by nouns. Not only natural phenomena and body-parts but ordinary behavior and the most familiar human acts may be variously segmented for linguistic naming.²⁴ Segmentation of behavior in such a way that acts by individuals or dual pairs are given a different name from the performance of what is to us the same act by a group is common in the Great Basin and adjoining Mexico and is pronounced in Hopi; e.g. wari 'run (sing.)', yə'tə 'run (pl.)', wə'nə 'stand (sing.)', ho·ni 'stand (pl.)', pə'wi 'sleep (sing.)', to·ka 'sleep (pl.)'. This is akin to the fact of highly figural verbs, for the experiences are different in outline; e.g. wə'nə indicates a configuration ┐, ho·ni a configuration like ┐┐┐┐.

II Implicit Metaphysics Every complex of a culture and a lge (or every 'culture' in the broadest sense, as including lge) carries with it an implicit metaphysics; a model of the universe, composed of notions and assumptions organized into a harmonious system which is valid for framing statements about what goes on in the world as the carriers of the culture see it. There are certain words for large segmentations that sum up a great deal to the cultural metaphysics, e.g. in modern SAE 'time', 'space', 'cause', 'effect', 'progress', 'the past', 'the future', 'substance', 'matter', but the total picture is never given explicitly, not even in grammar, but is a complex semi-conscious thought-form which is taken for granted, and acted upon without being brought into the front of consciousness for scrutiny. The grammar is harmonious with it and reflects it somewhat, but only in scattering way. Thus the implicit metaphysics of SAE culture presupposes a uniformly flowing 1-dimensional time-order, a 3-dimensional space-order distinct from it, a universe consisting of a void or 'holes' b substance or matter which has 'properties' and forms island-like 'bodies',²⁵ an absolute unbridgeable difference between the matter and the 'holes', events 'caused' by 'preceding' events, things happening to matter, nothing happening in the void. Many experiences do not quite fit the picture; it is inevitable that they will be overlooked or find but faltering expression, because of the nature of the grammar and terminology available. The somewhat different cosmic model of modern physics involving relativity and microcosmic (quantum) analysis has been forced

²⁴ An arrow moves this sentence below the previous section.

²⁵ End of original handwritten page 8.

upon physics by research but no language, except mathematics, has been developed in its terms. But further, American Indian and other culture-language complexes have implicit metaphysical systems of their own, differing both from SAE and from “science”. The SAE view is not naive nor grounded in universal experience, (nor is any other) except as it corresponds with the universal figural properties of visual perception — SAE “time” and “space” e.g. are not intuitions. The implicit metaphysical systems of exotic culture-languages can be worked out and understood to some degree, by following same methods by which cultural anthropologist obtains an integrated description of a whole culture (in its broad outlines at least) — necessary however to take thoroughly analyzed configurative descriptions of grammar into consideration along with what natives say about their attitudes and outlook; and at last, possibly after many years’ work, an integrated picture emerges, perhaps startling in its differences from what was first imagined. Many things in lge and grammar receive full explanation only in terms of the metaphysics. The Hopian metaphysics has no time and space orders like ours has a contrast of two realms; a the causal, or unmanifested which includes the future and the mentalpsychic and is dynamic and in a process the end of which is manifestation, and b the manifested, which includes the present, past, and physical or apparent, and does not act causally per se, but contributes to causality by helping as it were to maintain a general well-being that aids the cycle of events. Within realm b there is a contrast of two modes of existence and/or extension; punctual (outlined around a point-center) and tensive (extending more or less indefinitely), which contrast takes over much of the work of the SAE matter-void contrast and is worked out throughout grammar and vocabulary in literally thousands of ways; it is seen e.g. in the contrasts between kə·yi, and pə·hə, qô·hi and ta·la, wə·nə and ho·ŋi, and in the use of different postpositions and demonstratives according as a location is specified punctually or tensively.

III So-called Primitive Mentality The concept of a primitive mentality, originated by Lévy-Bruhl, is a far-reaching generalization in a very important field of inquiry, otherwise little touched by either anthropologists, linguists, or psychologists, though seemingly of fundamental importance for all three. To believe that Lévy-Bruhl’s concept must be either uncritically embraced or flatly denied seems equally unjustified. To deny it and throw the burden of all the apparent divergences on the back of the obvious cultural and linguistic distinctions is to gloss over the facts. The decided impressions of a different way of thinking among “primitives” obtained by L-B and others are based upon something, but something as yet insufficiently analyzed. In the light of our research, esp. A4a, B1I, B1II above, it would seem that much of the difference

in²⁶ mentality may be understood through the differences of the kind there indicated — differences in grammatical categorization, especially of covert categories, in segmentation of experience and in the implicit metaphysics of the culture-language complex. To all these must be added a still more subtle mental atmosphere derived from a myriad inobvious but deep-rooted aspects and values of the culture outside the linguistic realm. All these factors, build up into a vast summation for which there seems to be no term as well suited as “mentality”. It is on one hand fused with each individual personality, and hence an individual factor, but also of a certain common type for all individuals, through its embodiment of a common basis in the culture, language, and metaphysics. Hence, for the concept of a “primitive mentality” we should substitute that of “cultural mentalities”. What has been mostly meant by the term “primitive mentality” is “any cultural mentality other than SAE cultural mentality”. The road to the understanding of any cultural mentality lies first through a good ethnographic understanding of the culture and thence proceeds through linguistic territory, and at length returns to the broad-cultural taking the following course from the grosser to the subtler: configurative linguistics in general — overt categories — covert categories — interpreted in non-linguistic Gestalt terms — segmentation of experience — implicit metaphysics — cultural mentality.

2. Interpretation of Coordination and Parallelism between Language and (Non-Linguistic) Culture. (The non-historical aspect).

a. General considerations [The]²⁷ way in which lge interlocks with the culture is a fit subject for linguistics in its broader sense, although it may be held by some to fall outside of “straight” linguistics (configurational linguistics). Hitherto neglected, except by Sapir, partly because “straight” linguists have not been interested in cultural anthropology and cultural anthropologists have been the same with respect to linguistics. Moreover, field admittedly holds a certain fascination for the more fantastic and romantic theorizers, with “Volkgeist” ideas, notions of inherent superiority of certain lgs, of a lge molding the culture, of stages of cultural “evolution” and what not. This feature should no longer repel properly qualified investigators. The very persistence of such notions as Volkgeist may indicate certain bases of reality, or certain partial glimpses of truth never properly worked out or thought through. It is necessary, then, first to

²⁶ End of original handwritten page 9.

²⁷ Article written then deleted in original. A marginal note at this point reads “above the term “ethnolinguistics” is suggested for this type of study.”

sound Sapir's note of caution: "We shall do well to hold the drifts of lge and culture to be non-comparable and unrelated processes - - - Attempts to connect linguistic morphology with certain states of cultural development are vain. Rightly understood, such correlations are rubbish." There is no causal connection, in either direction, between language and (non-linguistic) cultural features. The plea for more correlated study of a given language and study of the culture of its community does not rest on any such consideration, but on the fact that lge itself is culture, and that lge and the rest of culture (with language extracted from it) belong together as really inseparable parts of great whole — the culture in a broad sense.²⁸

b. Illustrative detail Kinship systems obvious instance — kinship terms must be understood in terms of the kinship system as it configures by itself, and also in terms of the language and its linguistic configurations. Moreover, the pattern of the kinship relation may serve as a model for conceiving other sorts of relations, and hence may be a factor in the "cultural mentality", (q.v. B1, III) and may be reflected in linguistic forms. Kinship terms in Hopi form a covert grammatical class, lacking certain grammatical forms shown by all other nouns. This grammatical class includes only two non-kinship terms: '(one's) hand-arm region' and '(one's) appointed helper or co-worker', a term of great importance in the social culture; on the²⁹ other hand 'husband' and 'wife' do not belong to this kin-term grammatical class. In Eng kin terms do not form any grammatical class either overt or covert — and yet the names of various kinds of animals, objects, and substances do form covert grammatical classes in Eng. Strong social or economic sub-groups within the whole community warp the lines of the language by the special jargons, "lingoes", technicalities, passwords etc. they build up among themselves; these warpings may be taken up by entire community and may even reach status of grammatical classes especially covert ones. In Eng the traditional "racy" talk of fishermen is doubtless source of division of fish-name nouns into 2 covert classes with markers (reactances) in the plural formation: 1. 'economic fish' (fish sought by fishermen), plural without -s (trout, bass, cod, mackerel etc.), 2. 'low-grade fish', plural with -s (sharks, skates, rays, bullheads, shiners etc.) including "queer" fish, (may be fished for but are not typical prized fish e.g. eels, flounders). Origin doubtless reference to fish of the catch in large quantities:³⁰ with technical or jargon use of the quant-

²⁸ End of handwritten page 10.

²⁹ Marginal note: "refer to in d" at this point.

³⁰ "and" deleted.

ized or mass-noun pattern³¹ instead of plural (like ‘grain’, ‘bush’ vs. ‘grains’, ‘bushes’), while low-graders intrusive in the catch are spoken of as individuals, not en mass). Incidentally, Hopi has no mass-noun patterns; the punctual-tensive the equivalent work. Names ending in -fish (goldfish, butterfish) are class 1 for a different reason. “Straight” configurative linguistics³² does not attempt these cultural interpretations, but simply maps the classes and their markers — e.g. -s, which “inflection” is a “reactance” as regards the (covert, selective) fish-class 2, and a “signature” as regards the (overt, modulus) class of noun-plural. ³³The native speaker of Eng will pluralize names of fish new to him in accordance with his sense of the cultural placement of the fish. Here appears the connection with the psychic unconscious mentioned in A1 4. The speaker is not aware that in his unthinking talk he classifies fish, still less that he does so on a cultural basis. Nevertheless he does so classify them!

c. Simple vs. complex terms Once the ability to analyze the language has been attained via configurative linguistics, it is possible to³⁴ observe whether a cultural pattern or feature is denoted by a simple, or primary term (e.g. plough, church, money) or a complex analyzable or secondary one (e.g. typewriter, post office, be engaged). In the historical aspect this may correlate with time-perspective (q.v.)³⁵; from non-historical standpoint of may correlate with observable degree of integration, pervasiveness, or deep-rootedness of the cultural feature — due usually to historical age, although it is the integration that is first directly observed and the historical age may not be clearly indicated without further research directed to this point. In most European lgs war is denoted by a simple term (war, guerre, Krieg, bellum), and the warfare-pattern shows the signs of being deeply ingrained — large armies, elaborate equipment, high efficiency, professionalism, military prestige,³⁶ war psychology, belief that war is an inborn human or masculine trait, etc., all of which might be observed without knowing the long history of warfare in Europe. A companion linguistic trait is the host of warlike and military words, even in ordinary civilian life.³⁷ In Aztec, however, the word for war, yaoyotl, is analyzable (sic), = ‘enmity, hostility’ from the simple term yaotl ‘enemy’; Aztec culture showed indeed strong warlike

³¹ “for” deleted.

³² “need not” deleted.

³³ The remainder of this section is written as a marginal note with an arrow to indicate point of insertion in the text.

³⁴ “tell” deleted.

³⁵ Space left in original.

³⁶ End of original handwritten page 11.

³⁷ This sentence was written as a marginal note.

traits, yet probably by no means so strong or deep-rooted as in Europe (Aztec warlike prowess would appear from historical indications to be a relatively late development). In Hopi the nearest thing to a term for 'war' is na'qöYta, analyzeable, = 'be plurally and reciprocally killing' from simple term qöya 'kill plurally', with reflexive and durative signatures. This correlates with the relative unimportance of war in Hopi culture. In Navaho the term for war is simple. Of course there may be lack of correlation; there may be a simple term for some culture element which is not deep-rooted, though it probably once was, unless term has been borrowed, or is itself obsolescent. Vogue and slang terms like *dude* are often coined simple terms for cultural emphases that are not deep-rooted, and with alteration of the emphases the term³⁸ and become obsolescent, or it may survive only in special uses ('dude-ranch').

d. Cultural attitudes and backgrounds — e.g. The Hopi linguistic segmentations of experience with respect to the phenomena of water and rain pointed out in B1 Ib., (distinction between and usages of 'wild water' and 'fixed water', lack of our segmentation 'wet', importance of the segmentation 'rain' or 'rain-aspect of nature') are in harmony with Hopi climatic conditions, economic importance of and cultural attitudes towards water and rain. Plant-names in Hopi form a covert grammatical class, a "botanical gender", with reactance a distinct way of forming plural; this correlates with deep-rooted agricultural and plant-utilizing nature of Hopi culture. Or we may observe negative correlation, or discrepancy with culture; e.g. SAE terminology and linguistic patterns, except for terminology in technological spheres, does not correlate well with the great importance of machinery and mechanical-electrical systems in modern life. Names refer too much to simple block-like outlines, machine-referents are segmented too much like "objects", terms do not refer enough to ramified, cobwebby configurations,³⁹ designations of functions are too narrow, meanings too limited,⁴⁰ misleading analogies too current.

e. Comparison of negativisms Where a lge is relatively negative to another, say to SAE, i.e. it appears to lack both term and concept for a certain SAE word, the concept may be a cultural one peculiar to one lge (e.g. to SAE). This pointed out before, and in terms of very obvious cultural reference occasions no difficulty, but we continually lose sight of the cultural basis of common familiar words and ideas. Hopi has a linguistic pattern for indicating age in years or other

³⁸ "[indecipherable word] "vogue" deleted. This sentence was added later.

³⁹ "and organizations [indecipherable word]" deleted.

⁴⁰ "internal processes with machines too much scamped (?) over" deleted.

units, of a person or anything else, but it has no word for 'birthday'. Of course 'birthday' is a cultural concept of SAE. The Hopi do not celebrate anniversaries of birth or attach special significance to one's natal day. It might be too hastily deduced that lack of a word 'birthday' indicated a lack of interest in age or as = haziness as to people's ages, but this does not follow, for the question of reckoning age is a separate one from that of the cultural importance of birthday anniversaries.

3. Behavior-Patterns as Correlated with Language

Not only collective, group behavior, but personal behavior of individuals is largely conditioned and channeled by the 'official' cultural meanings of the outlines (i.e. 'objects') in the environment wherein the behavior takes place. The 'official' cultural meanings are often deposited in language, sometimes in a simple term like 'altar', 'lamp', 'bridge', sometimes in grammatical forms which express the 'official' meaning or function, as in instrumentive terms, e.g. 'heater', 'conveyor', 'accelerator',⁴¹ 'sprinkler', 'defroster'. The coinage of terms by means of grammatical⁴² operations (moduli), e.g. the category of meanings indicated by the signature, suffixed -er, -or, actually determines much individual behavior by giving an ostensible cue to the meanings of situations and environments. Not only do such cues operate positively, but also negatively for often important properties of the environment are obscured by the usual way of speaking about it, and behavior which is deficient or misdirected as regards the actual needs of the situation results — including what is called "carelessness", or "oversight". Suppose the motive toward certain behavior is an interest in fire-prevention in a factory; then the usual linguistic forms will distribute this behavior in certain ways — the 'heaters' will all be safeguarded but the 'conveyors' will probably be overlooked, though they may convey hot cinders, start fires in bearings, etc. Whorf has drawn on his experience in fire underwriting for many instances of this kind. The same thinking occurs with individual "random" behavior (as well as patterned or group behavior) in exotic cultures, emphasizing the importance of understanding the culture-languages for insight into the forms of behavior. Grammatical configuration of terms or linguistic patterns referring to given situations may give information that could not be obtained from simple observation nor from questioning answered only in terms of the questioner's language (this ties in with B4). Information of the latter sort may tell investigator that a certain Hopi object is a 'prayer-pipe', that it is smoked during a prayer-

⁴¹ "or 'exhilarator' deleted.

⁴² End of original handwritten page 14.

ritual, especially when praying for a good harvest, etc. This information is important, but it should be coupled with the Hopi linguistic situation. Whereas a pipe, as such, is called a co-ño, this object is a na'twaNpi, lit. 'fixed outline for mutual trying, endeavoring' (on the pattern of e.g. pəvē'Wpi 'fixed outline for sleeping, bed', ʔəʔə'cpi 'fixed outline for closing, door' etc., < təwa'na 'try, endeavor, practise'). The informant's explanation obtained in the context of these linguistic patterns brings out that smoking the pipe is treated as an adjunct and aid to 'concentrating' in the mind or 'heart', on a desired result, usually the harvest — 'concentrating being a focusing of the causal power of the Hopian (metaphysical) causal realm and the basic germinal form of 'trying', — 'mutual' (na-) refers to the mutual or reflexive interaction between the tryer and the not-yet-manifested result being tried for, while na'twana 'mutual trying and being tried for', 'precipitation out of endeavor-power into actuality', means at the same time 'harvest, crops', as the goal and result par excellence of the collective Hopi will and endeavor.

4. Study of the Supra-Linguistic and Semi-Linguistic⁴³ Mentality (Collective or Social) through the Linguistic Approach

a. In general: This aspect may also be described as the necessity for linguistic approaches to culture to concern themselves at some time in their career with avoiding the pitfalls of a trite superficiality. One of the neglected phases of (linguistic) cultural anthropology is study of the finer shades of meaning, the deeper intellectual and spiritual life, the values which are recognized as ideals — often too readily assumed to be lacking (see Radin in this connection, *Primitive Man as Philosopher*). Whorf's conclusion from linguistics and cultural anthropology is that just as the traditional view that supposedly intuitively given intellectual concepts (of the type of space, time, causality etc.) are really cultural forms of SAE and some other cultures affiliated, in regard to spiritual values the traditional view is also reversed; it has proceeded as if spiritual values were a cultural product of SAE or "civilization", whereas they are common, in different forms, to all men, and may represent a real intuitive level of experience. This level is admittedly very hard to⁴⁴ get at, for it is not only linguistic (and therefore one step ahead of the non-linguistic anthropologist) but supra-linguistic (and therefore one step ahead of even the linguistic anthropologist). It is, in a sense, the most subtle aspect of the cultural mentality (q.v., supra) and the last realm reached by boring through the entire linguistic-

⁴³ "Quasi- " inserted above "Semi-".

⁴⁴ End of original handwritten page 13.

cultural world outlook. Religion in its inward aspect, not simply its forms and ceremonies but what it deeply means, both to the individual and in the collective life, comes in here, also the ethical and esthetic values of the culture. A culture, deeply understood, presents emphases on certain large totalities or integrations of very manifold experiences, which may be called the spiritual emphases of the culture. These emphases may be very little talked about, even in the native language, yet they may be the field of much unuttered brooding, wondering, and formulating which is not merely individual, for it comes out on rare occasions, or in esoteric initiations and kiva ceremonies, and there achieves a certain collective basis. Hence it is not non-linguistic, and the language is shot through with cues and hints toward it, though in too direct questioning on these points the informant, especially if he is a Pueblo Indian, may “shut up like a clam”. Cultures may differ widely on what is felt to be “private”, or “sacred”, or merely “nobody’s business”. One Hopi informant fuses the Eng. words “secret” and “sacred”, and there is perhaps no difference in Hopi thought. Any student would get the impression that Pueblo culture is intensely introspective for all its insistence on outward ceremonial. Hopi even has a pronoun⁴⁵ which is supposed to be merely thought, not spoken, except when quoting⁴⁶ thoughts. This is han ‘I as thinker’ with certain differences in accompanying verb form (cf. Eng. ‘thinks I’, ‘says I to myself’, 1st person used as 3rd person with 3rd pers. verb). The Eng. form is however often said, not the Hopi. The Hopi thinks to himself⁴⁷ han pə·wi ‘I’ll sleep’, but if he intends to communicate this thought he says aloud nəʔpəwni ‘I’ll sleep’, while if he is talking of another’s thoughts, then⁴⁸ he will pronounce the word han, and say “that fellow is thinking ‘han pə·wi’”. If asked the meaning of han he says “I” and may add “the same as nəʔ” and on questioning explains that it is used only in thinking or “talking to yourself”. There are very many ideas which (unlike han) are nowhere summed up in definite words (e.g. the ideas underlying Eng. gender or to take a simpler case of “cultural fish classes” are not), yet they exist as large wholes or massive configurations of linguistic-cultural organization. Here again, the road lies through the more overt patterns of language, thence through the more covert, but it need not stop there, it leads on to the deeper shades of meaning and the spiritual orientations of the culture and of personalities.

⁴⁵ Underlining of “pronoun” deleted.

⁴⁶ “another’s apparent” deleted.

⁴⁷ “only perhaps” deleted.

⁴⁸ “and only then” deleted.

b. Kinds of translations. In connection with the above, important to distinguish 3 kinds of translations of cultural terms and references; viz. “official” “literal” and “interpretative”. The first is what its name implies and is usually first given by the informant, the second is systematic and in terms of a knowledge of grammar and the analysis of the form, the third is psychological and cultural, and takes in the informant’s detailed explanations and the interpreter’s knowledge and insight into “ethnolinguistics” — native segmentations of experience, metaphysics, cultural mentality. For example Hopi paho off. ‘prayer-stick’, lit ‘wild-water arrow’, interp. cannot here be given as it would involve too much discussion of religious ideas, of the symbolic meaning of pa-hə ‘wild water’ or ‘aqueous element’⁴⁹ subtle or fluid essence contrasted with⁵⁰ solid form, and of the “subtle arrow” which goes into the super-terrestrial world. For kʷiniʹnaq monʷi informant gives off. tr. ‘north-wind great spirit’ and ⁵¹less spontaneously ‘north-wind chief’ (which he may realize is too literal, monʷi; is lit. ‘chief’). Grammatical analysis gives us lit. tr. ‘from-the-north chief’ which in this case tells us very little. There is no explicit reference to ‘wind’ (no wind or stem for wind) in the form, yet the form conveys a certain idea which the native renders (officially) as ‘wind’. The interp. tr. then is obtained from informant’s explanation, which brings out that the idea is not “a wind that blows” but the influence of a certain one of the (cosmic) 6 directions (these “directional influences” have the subtle nature⁵² of winds, but need not be manifested as ob-jective winds). A sentence with literal grammatically analyzed translation is e.g. na·v (by-himself) haqaʹwat (any-obj.) sinot (person-obj.) lamaʹʔənanʷaʔytaqat (good-intentions-who-has-obj.) ʔacviy (by-him) [as personal agent]⁵³ ʔima (these) na·nanʔivaq (all-directions-from) momʷit (chiefs, rulers) pəw (to-here) ʔitaʹməmi (to-us) yoʹkʷnayani (they-will-cause-rain). A somewhat interp. tr. is ‘the collective directional spirits may bring us rain through the agency of any person who has sincere (na·v) good intentions in the matter’.

c. Understanding of symbolism.⁵⁴ Symbolism, being a form of reference that plays upon subtle and supra-linguistic meanings, often eludes direct quest-

⁴⁹ End of handwritten page 14.

⁵⁰ “distinguished” deleted.

⁵¹ “somewhat” deleted.

⁵² “or inner form” deleted.

⁵³ Whorf’s square brackets.

⁵⁴ Marginal notes at this point:

“c. understanding of symbolism

d. correct recognition of immaterial values of a culture

e. ideas never independently lexified”

ioning. Yet it is so far linguistic that it influences profoundly the use of language and hence it may be studied through the language patterns it produces. In Aztec of the Conquest period there is very much symbolic allusion to flowers; study of the language patterns shows that the flower-symbolism is not that of SAE. Flowers do not symbolize delicacy and femininity so much as⁵⁵ all that is proud, fiery, aristocratic, and somewhat like flags, crests, or spearheads. The characterizing of flowers as sweet or fragrant need not alter this masculine symbology, and hence such ideas as fragrance and sweetness differ in connotation from with us. The idea of sweet flowerlike fragrance applied symbolically in the human sphere might suggest to us a gentle maiden, but to the Aztec a haughty cacique.⁵⁶ If this symbolism is not understood the frequent references to “beautiful, sweet flowers” in Aztec songs will have to us a delicate feminine ring which is foreign to the spirit of the original. So also with the symbolism of jewels or of birds among the Aztec or of corn and rain with the Hopi — it is never quite the same symbolism as with us, and to appreciate it we must not only know the culture but perform two operations of a linguistic nature: (1) disabuse ourselves of the effect of our own literary language in its allusions to e.g. corn and rain, (2) assimilate the native linguistic patterns, segmentations, and meanings that are tied in with the native employment of the symbolism.

d.⁵⁷ Ideas not independently lexated. “Lexation” and “lexated” (terms applying to the research in config. linguistics, grammar, A4 of report, not discussed therein) are terms used by the author for the status of a meaning or idea when it is connected with a lexeme (i.e. a work as item in the lexicon, not a word as element in a sentence). Thus the meaning of the words ‘feminine’ and ‘blueprint’ are lexations, the meaning of the Eng. feminine gender category is not a lexation but is linguistic, the meaning of a blueprint is neither a lexation nor linguistic. Many ideas, even though linguistic are never lexated, e.g. the meanings of grammatical categories are not (the idea lexated as “noun” is not the idea of the Eng. noun category itself, but rather a surrogate for it). Many ideas which are

⁵⁵ the original sentence includes a number of deletions (underlined) as follows: “[...] as they [indecipherable] all that is proud, fiery, and warlike (“aristocratic” inserted above), they are thought of somewhat as like battle flags, martial crests or spearheads [indecipherable].”

⁵⁶ Marginal sentence with arrow showing point of insertion in text.

⁵⁷ Following the marginal note: “interchange d. and e.” at this point I have transposed the content of the original sections d. and e. The original unnumbered page between 14 and 15 ends seven lines from this point with the words “inner realizations and inner” from what is now section e. below. The original page 15 starts with the words “states are not important” and ends with the words “never lexated independently” from original section e. which is now section d. The final page (numbered 16 although it is the 17th page) begins with “i.e. have no lexemic sign” and finishes with a place for the authors’ signatures.

akin to lexations are never lexated independently, i.e. have no lexemic sign which is not, in the very nature of the case, also a sign for some other and perhaps much more obvious idea, so that the former idea may easily elude observation. A stranger to our culture would not at first find in the word radio any meaning but that of the common household article 'box containing receiving set'. Such ideas as 'science of ether-wave transmission' and 'collectivity of performers in the public notice who broadcast' (cf. similar meanings attached to stage, pulpit, prize-ring, turf) would not appear to him until he had steeped himself in the language. Or consider the noun press and the different meanings which are not lexated independently therefrom! Moreover non-lexated linguistic ideas may be attached not to single words but to phrases, to word groups or classes, patterns, "turns of phrase", symbolisms and what not. Further, concepts which are basically not linguistic at all but derived from contemplation of visual symbols, (like a concept formed by pondering over a blueprint) may be secondarily attached to linguistic references.⁵⁸ Non-lexated meanings bulk especially large on the spiritual levels of a culture. They can be best approached by working through the more explicit linguistic element (sic) until the researcher not only knows ⁵⁹words but when the occasion calls for it can see through the disguise of words to meanings of a more subtle order. In Hopi kik^wsē is the word for 'breath', but in certain contexts a fairly sophisticated informant feels it should be rendered 'spirit of the breath' ; moñ^wi 'chief' when denoting the being of a cosmic direction he renders 'spirit' or 'great spirit'; these are cases somewhat like that of radio.⁶⁰ It follows that the lack of a certain type of idea cannot be argued from an apparent lack of a term for the idea. In Hopi the absence of a lexation corresponding either to our 'God' or '(a) god', does not mean that the Hopi do not have as part of their own culture the idea of a cosmic or universal being which is deeply and as it were religiously felt. Such an idea is definitely present; there is merely no lexation or no one lexation for it. It may be behind many different lexical allusions and circumlocutions, such as 'chief', 'person', 'persons', (cf. the effect in Eng. of writing these words with a capital letter), 'breath, 'from all the directions', the phrase ʔaʔnehimə 'Great Something' or 'Great What', etc. So too the absence of any one lexation for that erstwhile favorite of ethnologists, 'mana' does not mean that ideas of a subtle, indwelling, impersonal power are not present.

⁵⁸ This sentence inserted later.

⁵⁹ "all the" deleted.

⁶⁰ "with Hopian metaphysics also involved" deleted.

e. Correct recognition of the immaterial values of a culture. For example⁶¹ a non-linguistic approach to Hopi culture, or even a superficial type of linguistic approach could perhaps give the idea that the religion consists largely of external ceremonial and that inner realizations and inner states are not important. But Hopi religion learned about through the Hopi language gives a different picture.⁶² (It is believed that the testimony of Kennard on this point will be the same as Whorf's). Like the whole Hopi view of life, it is seen to stress inner mental activity to a high degree, outward ceremonies being almost in the status of "symptoms" of inner states, though symptoms regarded as important assurances that the inner work of the religious community is being properly done, and as essential to effective mobilization of individuals⁶³ into a powerful, co-operating mental group. The language is rich in terms for 'concentrating' the mind, for various modes of mental action and existence etc., these terms and ideas appearing frequently in ritual and in public speeches of chiefs, etc. The terminology and phraseology also indicate that the emphasis is not on inner experiences of a receptive and passive type (inner perceptions, feelings, religious emotion, visions, messages, revelations) although there are some words having such reference, but on those of a projective and dynamic type (directing of will, good intent, wielding of "power", concentrated thought as sufficient cause, thinking activity harnessed to the religious purpose, etc.). Through its emphasis on will and thought rather than receptivity, feeling, or sensation, the religion and in fact the whole immaterial culture might be called "thelistic" and intellectual — of course in its own intellectual terms, not ours. But this might be easily missed in a non-linguistic approach, and the abundance of ritual then contrasted with other religious cultures of a "vision-quest" character in such a way as to give the idea of a mere empty formalism. The "inner work" is not much talked about; it is thought in linguistic and quasi-linguistic thought forms, which come up readily in the innocent discussion of Hopi linguistic meanings when too pointed questions about what one thinks during ceremonies get nowhere. The investigator who uses only English often cannot get at what the native thinks without direct quizzing, and under quizzing the Hopi will-power can easily manifest in a form that about such things has been styled "won't-power".

End — Reference to Part II The Historical Aspect⁶⁴

⁶¹ "it might perhaps be supposed from" deleted.

⁶² "[indecipherable] extensively studied the language knows it [indecipherable] is almost the reverse that is true" deleted.

⁶³ "minds" deleted.

⁶⁴ Following a space, provision was made for signatures as follows:

"Date

Signatures"

PRELIMINARY PLAN OF THE YALE REPORT

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What appears to be a preliminary plan of the report, in Whorf's handwriting, is in the George L. Trager collection at University of California, Irvine. It consists of two large (roughly A3 size sheets of yellow paper. It is not known at this stage when these planning sheets came into Trager's possession but it seems likely that Whorf and Trager would have talked about the idea of writing a joint report for the Department of Anthropology in late 1937 while Trager was teaching the first half of the course they were taking for Sapir. Once Trager left for Europe in 1938 the job of writing the report who was evidently left to Whorf who, judging from the preponderance of material dealing with matters he was especially interested in, was probably always the more enthusiastic of the two about the report anyway. There are several Whorf manuscripts in the Trager collection and I have not been able to establish whether Whorf gave them to Trager in the late 1930s or whether they came into Trager's hands later, perhaps during the 1950s when he was independently involved in trying to get Whorf's work published and later also helped Carroll select items for the MIT collection according to an acknowledgment in Carroll's (1956:34) introduction to *Language, Thought, and Reality*. The planning sheets consist of neat, in some places rather cramped, notes. Rather than footnoting emendations in this document, I have tried to incorporate all the jottings into the text following arrows and other indications of Whorf's intentions. The text of the planning sheets is as follows:

- A Configurative Linguistics (CL)
- B Configurative Linguistics in the Study of the Cultural and Social Field (Ethnolinguistics)
- C Concept of Linguistic Taxonomy
- D Historical-Comparative Linguistics

- A 1 phonemics 2 morphophonemics.
 3 Configuration of Grammar and Grammatical Classes
 4 Configurations of (3) with respect to Experience interpreted non-linguistically

- B 1 CL and World-Outlook (including the implicit metaphysics of the language and, more or less, of the culture)

[I] segmentation of experience (simple ill body parts).

subdivisions: a. segm in terms of gramm. classes (springs out of 4) e.g. Hopi no nouns for mom. phen. wave, flash, lightning, meteor types of “ad-verbs” for duratives temporals, ‘to wait’ – lexations in 1 lg nuances e.g. word-stress another lg. b. segm. of the environment in terminology & ling. patterning of 1 lge comp. to another e.g. Am Ind. comp Eng. simple cases body parts [Marginal note: body parts no simple terms hand nipple nostril etc on other hand sivka and hovi] these contrasts may be seen between various Eur. lgs) natural phenom. snow – H rain (rain complex) light – fire gen. environment water – Eng. wet H. water terms. Eng. (Eur) inclusion of container with cts. (ties up with figural or visual outline).

II implicit metaphysics lg-culture outlines an implicit communic frame time, non-temp space, causation – contrast Hopi ties in with B1. Will tie up more or less with the fact under I [Marginal note: Every lg-culture has a system of metaphysics]

III so-called primitive mentality — substrate concept of cultural mentalities – L B’s concept of animism contr. Hopi Engl regards certain obj with animistic attitude.

2. correlations between lge & the culture — Sapir’s caution.

consideration & parallelism between lge & culture

subdivisions a. b. c. etc.

[Marginal note:

b illustrative detail – (simple)

c analyzeable terms

d cultural attitude and backgrounds – plant names – length with man

e relative negativisms]

kinship system obvious instance – esp. closely integ. in H.

unanalyzeable terms where cul. train deeply embedded. war peace (ties in with 5)

H cultural relig. attitude toward rain & water reflected in – (above)

On negative side – e.g. birthday in Eng closely integr with cultural patterns Hopi expr. not

These correlations (2) will tie up with 1 & the subject merges with 5 which is simply 2 considered under its historical implications

3 Behavior-patterns as correlated with lge

Behavior in certain environments [‘Much’ deleted] largely channeled by (a) cultural meanings of the objects and functions – there may be in turn expressed in

the grammatical forms & the gram. meaning (b) may tend to supersede all others & channel behavior accordingly. In case (a) we may have an unanalyzable term like 'altar' in b an an. gram. process expressing function as in heater, conveyor, accelerator (or 'exhilarator') sprinkler, defroster. Often important properties are obscured & behavior channeled accordingly. Through an interest in fire prevention the "heaters" may all be safeguarded (against starting a fire but the "conveyor" overlooked to some although may convey hot cinders, ashes, have fires in bearings etc. Instrumentive & other gram-patterned names may throw light on behavior not otherwise functions in the culture obvious natwaNpi

4 Study of the supra-linguistic mentality through the linguistic finer shades of meaning. Values. Emphases on certain totalities or integrations of manifold experiences which may be called the spiritual emphases of the culture. Ethical ideals & values as seen positively & negatively through the Ige (incl. as. subd important basic values which may be not much talked about)

e.g. knowledge of pueblo religion obtain ['otherwise' deleted] without using the native Ige could give idea that the religion consists largely of external ceremonial and that inner states are not important. This may tend toward a false contrast with other religious cultures of a "vision quest" character. But H religion as seen thru Hopi Ige give a rather ['entirely' deleted] different picture.

implicit [? implicates?] idea-configuration v. card
kinds of translations – official, literal, psychologist-cultural
Religious ideas may not be often not seen in ['the' deleted] either official or literal [rest of sentence lost in my photocopy: P.L.]

5 Time-Perspective as seen in vocabulary and linguistic structure. (to be employed largely in correlation with the historical glimpses obtained

a. Unanalyzability. [Marginal note: ref. Sapir Time Perspective)
[Two inch space]

negative correlation (contrasts) importance division of diverse roles between sexes in cultures & the superficial character of sex distinctions in the language, where strongly marked but superficial – (vocal only men's words and women's words) – no sex gender, pronouns referring to sex, not covert unanalyzable [rest of sentence too faint to decipher in my copy: P.L.]

C Concept of Linguistic Taxonomy
[Three inch space]

D Historical Comp. Ling.

Work on Azteco-Tanoan and especially VA has [several words indecipherable] the divarication concept & to indicate roughly the relatively chronology of minor branches in the stock

Reconstruction linguistics

[Four inch space]

Not suff appreciation that simply the ex post facto account of the large-scale phonetic changes that have occurred in cognate lgs as traceable through an existing harmonious system of rel. between the sounds of distinct lgs.

careless W Europe on other hand initial clusters

Notes on theories of belts, areas & substrata

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INDEX OF NAMES

- Abrahamsen, Adele, 53
 Alexander, Hubert Griggs, 193, 196, 208-211, 219, 223, 238
 Alford, Danny K. (Moonhawk), (b.1946), 24, 85, 88, 153n
 Allan, Keith (b.1943), 116
 Allerton, David J., 57n
 Allman, William F., 53
 Aristotle (384–322 B.C.), 127, 246
 Austin, John L. (1911–1960), 67
 Baker, Linda, 222
 Basilius, Harold A., 84
 Bechtel, William, 52-53, 64
 Benedict, Ruth F. (1887–1948), 34
 Bergson, Henri Louis (1859–1941), 40, 101, 117
 Bernstein, Basil (b.1924), 183
 Bertalanffy, Ludwig von (1901–1972), 117-121
 Berthoff, Ann E., 19, 163
 Bidney, David (b.1906), 207
 Black, Max (b.1909), 89, 91, 95, 110, 111, 115, 117, 121, 127
 Bloomfield, Leonard (1887–1949), 11, 15, 35, 56, 92, 99, 133-134, 161-163, 185, 188, 204, 280, 225, 229, 232-237, 242
 Boas, Franz (1858–1942), 2n, 4, 11, 15, 47n, 71, 78-79, 84-85, 93, 96, 129, 133, 160, 167, 182, 199, 201, 235, 254
 Bohm, David (1917–1992), xvii, 40, 52, 56, 61, 125, 153n, 174, 182
 Bopp, Franz (1791–1867), 3
 Bowerman, Melissa (b.1942), xiv, 28, 179-180, 188, 236
 Brown, Roger L., 84
 Brown, Roger W. (b.1925), 85, 222
 Burge, Tyler, 212, 214, 228
 Burns, Allan, 23
 Callaghan, Catherine A., 13
 Campbell, Lyle (b.1942), 12
 Capra, Fritjof, 40, 59
 Carroll, John B. (b.1916), xv, xvi, 1-3, 6, 8-9, 14, 16-18, 21, 26, 39n, 74-75, Carroll *continued*
 85, 128n, 130-131, 154, 163, 170, 197, 222-233, 240, 277
 Casagrande, Joseph B. (1915–1983), 124, 222
 Cazden, Courtney B., 243
 Chase, Stuart (1888–1975?), 16
 Chatterjee, Ranjit, 58
 Chomsky, Noam A. (b.1928), 9, 23, 50, 58, 62, 68, 78, 134, 176-177, 186-191, 212, 216, 223
 Churchland, Patricia S., 51-52
 Churchland, Paul M. (b.1942), 45, 53
 Clark, Eve, V., 221
 Clark, Herbert H., 221
 Coe, Michael D., 5
 Darnell, Regna (b.1943), 9-12, 39n, 43, 47n, 66, 128, 130-131, 164, 176-177, 199
 Dennis, Wayne (1905–1976), 11, 136
 Dirven, René, 143n
 Drechsel, Emanuel J., 84
 Eggan, Fred (1906–1991), 11, 136
 Einstein, Albert (1879–1955), xvi, 24, 43, 47, 88, 86
 Ellis, John M. (b.1936), 20, 111, 134, 136
 Emeneau, Murray (b.1904), 199
 Euclid (3rd century B.C.), 113
 Fabre d'Olivet, Antoine (1768–1825), 1, 164
 Fassett, Frederick G. Jr. (1901–1991), 16, 106
 Fearing, Franklin, 89, 94, 95, 109, 110
 Feuer, Lewis S. (b.1912), 89, 147
 Fillmore, Charles J. (b.1929), 160, 166, 176
 Firth, John R. (1890–1960), 183
 Fishman, Joshua A. (b.1926), 84, 240
 Fought John (b.1938), 35, 74, 128
 Furniss, Edgar S., 11
 Gabor, Dennis (1900–1979), 50
 Gatewood, J. B., 25n
 Gipper, Helmut, 139
 Goddard, Cliff (b.1953), 23

- Golding, William, (b.1911), 183
 Goodman, Paul, (1911–1972), 225
 Goody, Jack, 242
 Grace, George W., (b.1921), 86, 121, 182
 Greenberg, Joseph H. (b.1915), 179
 Haas, Mary R. (b.1910), 11, 132, 254
 Hall, Robert A. Jr., (b.1911), 25n, 133-134, 174, 233
 Halliday, Michael A. K. (b.1925), 71, 172-173, 181-183, 191
 Hamann, Johann G. (1730–1788), 65
 Harris, Zellig S. (1909–1992), 35, 40, 179
 Hartley, David (1705–1757), 51
 Hasan, Ruqaiya (b.1931), 71, 147
 Haugeland, John, 15, 64
 Haugen, Einar, (1906–1994), 19, 25n, 230
 Hefferline, Ralph F., 225
 Heisenberg, Werner K. (1901–1976), 59
 Heller, Louis G., 167
 Herriman, Michael L. (b.1942), 242-243
 Herzog, George (1901–1983), 133, 199-200
 Heynick, Frank, 88
 Hibben, Charles C., 60, 186
 Hill, Jane H., 25n, 84-85
 Hockett, Charles F. (b.1916), 11, 18, 25, 25n, 37, 42-43, 48-49, 50, 57-58, 62, 109-110, 117, 124-125, 132, 161, 174, 189, 191, 195-196, 199, 213, 229, 254
 Hoenigswald, Henry M., (b.1915) xvi
 Hoijer, Harry (1904–1976), 12, 17, 22, 74, 108-110, 136, 147, 152, 163, 207
 Hopkins, Gerard Manley (1844–1889), 246
 Hornstein, Norbert, 187
 Humboldt, Wilhelm von (1767–1835), 45, 84
 Hymes, Dell H. (b.1927), 17, 35, 18, 74, 85, 87, 128, 147
 Infeld, Leopold, 43
 Irvine, Judith T. (b.1944), 34
 Jakobson, Roman O. (1896–1982), 20, 134, 162
 Janda, Laura A., 178
 Johnson, Mark (b.1949), xiv, 27, 61, 72, 93, 141, 209, 212
 Joseph, John E. (b.1956), 16, 84
 Jung, Carl G. (1875–1961), 88
 Kant, Immanuel (1724–1804), 118
 Kaplan, Abraham (b.1918), 109
 Kaplan, Robert B., 241
 Karttunen, Frances, 12
 Kennard, Edward (b.1907), 11, 276
 Kincade, M. Dale, 219
 Kluckhohn, Clyde (1905–1960), 11-12, 35, 207
 Koerner, E. F. Konrad (b.1939), 9, 45, 84, 89, 90, 189, 229
 Köhler, Wolfgang (1887–1967), 104
 Korzybski, Alfred H. S. (1879–1950), 15
 Kozulin, Alex, 72
 Kristeva, Julia (b.1941), 20
 Kroeber, Alfred Louis (1876–1960), 11, 43
 Koffka, Kurt (1886–1941), 102, 104-107, 125, 260
 Lakatos, Imre (1927–1974), xvii, 82
 Lakoff, George (b.1941), 21, 27, 61, 72, 143n, 209, 212
 Landar, Herbert (b.1927), 18
 Langacker, Ronald W. (b.1942), 27, 37, 142-143n
 Lee, Harold N. (b.1899), 246
 Lee, Penny (b.1944), 22, 24, 49, 84, 140, 170, 221
 Lehmann, Winfred P. (b.1916), 3
 Lenneberg, Eric H. (1924–1975), 85, 115-116, 222
 Leshner, Robert A., 16, 128, 158
 Lévi-Strauss, Claude (b.1908), 18
 Lévy-Bruhl, Lucien (1857–1940), 147, 265
 Lightner, Theodore M. (1930–1980), 3
 Locke, John, (1632–1704), 28, 120, 204, 223
 Logan, Peter, 151
 Lorenz, Konrad Z. (1903–1989), 119
 Lucy, John A. (b.1949), 17, 22, 70-73, 77-94, 117, 128, 144, 147, 160-176, 184, 201, 218, 222, 240
 MacLeish, Denneth, 12
 Macris, James, 167
 Malinowski, Bronislaw K. (1884–1942), 143, 179, 190
 Malkiel, Yakov (b.1914), 104, 163
 Malotki, Ekkehart, 13, 139-140
 Manaster-Ramer, Alexis, 13
 Mandelbaum, David G. (1911–1987), 28n, 43, 53
 Mannheim, Bruce, 84-85

- Marchand, H., 180
 Martin, James R. (b.1950), 184
 Maturana, Humberto R., xivn, 76,
 McNeill, David (b.1933), 71
 McQuown, Norman A. (b.1914), 131,
 132, 161, 163, 254, 258
 McVittie, G. C., 61
 Metcalfe (Metcalf Eich), Janet, 51
 Miller, Nathan (b.1927?), 24
 Miller, Robert L. Miller, 45, 84, 90
 Miller, Wick R. (1932–1994), 222
 Morley, Sylvanus G. (1883–1948), 5
 Müller, F. Max (1823–1900), 21, 40
 Murdock, Bennett B. Jr., 51
 Murdock, George P. (1897–1985), 130–
 131, 51
 Myhill, Marion E., 241
 Newman, Stanley S. (1905–1984), 17, 35,
 131, 229, 288
 Newton, Isaac (1642–1727), 118
 Nichols, Johanna, 181
 Ogden, Charles K. (1889–1957), 237
 Ogle, Richard A., 160, 176, 185
 Olson, David R., 241, 242
 Ouspensky, Petr Dem'ianovich (1878–
 1947), 21, 22
 Parsons, Elsie Clews (1875–1941), 12
 Penn, Julia M., 84–85
 Perkowski, Jan Louis (b.1936), 181
 Perls, Frederick S., (b.1902), 225
 Piaget, Jean (1896–1980), xiv
 Pinker, Steven (b.1954), 19–20, 139, 154
 Popper, Karl R., (b.1902), 191, 205–206
 Radin, M., 271
 Reddy, Michael, 67, 77, 79
 Révész, Geza, 75
 Richards, Ivor A. (1893–1979), 20, 237
 Ridington, Robin, 17
 Roberts, John M., 115
 Robinet, (Voegelin) Florence M. (1927–
 1989), 99
 Robins, Robert H. (b.1921), 194
 Rollins, Peter C., 18, 20, 21, 40, 129
 Rorty, Richard, 223
 Rosch, Eleanor, 28, 175, 222
 Santa, John L., 222
 Sapir (1884–1939), xiii–xvi, 2, 8–12, 15,
 19, 24, 28n, 34–53, 56n, 58, 63–89,
 93, 104, 111–113, 125–132, 151–153,
 162–164, 175, 184–185, 188, 193–199,
 201–208, 215–222, 230, 235, 237,
 Sapir *continued*
 254, 267, 277–278
 Saussure, Ferdinand de (1857–1913), 35,
 71, 181, 227, 228
 Schiller, Andrew, 190
 Schultz, Emily A. (b.1949), 22
 Sejnowski, Terry, 52
 Shweder, Richard A., 94, 174, 222
 Siebert, Frank T. Jr. (b.1912), xviii, 11
 Silverstein, Michael (b.1945), 160, 173
 Slobin, Dan I. (b.1939), 180
 Smith, Henry (“Haxie”) Lee, Jr. (1913–
 1972), 18
 Spengler, Oswald (1880–1936), 119
 Spier, Leslie A. (1893–1961), 2, 153
 Stam, James H. (b.1937), 65, 84
 Steiner, George (b.1929), 20, 22
 Swadesh, Morris (1909–1967), 11, 132,
 162, 205, 207–208, 254
 Sweetser, Eve (b.1955), 61, 209, 143n
 Talmy, Leonard (b.1942), 27, 143n
 Tax, Sol, Loren, 17
 Tesnière, Lucien V. (1893–1954), 57n
 Thompson, J. Eric S., 163
 Thompson, Evan, 28,
 Torrey, Charles C. (1863–1956), 3
 Tozzer, Alfred M. (1877–1954), 10–11,
 162
 Trager, George L. (1909–1992), xviii, 11–
 18, 89–100, 128n, 130–135, 142, 143,
 144–146, 170, 199, 224, 229–236,
 253, 257, 277
 Trubetzkoy, Nikolaj S. (1890–1938), 12,
 162, 256
 Tunmer, William E., 241–243
 Turner, Mark (b.1954), 26, 60, 64, 213
 Uexküll, Jacob von, 118, 119, 120
 Van Heerden, P. J., 51
 Vandamme, Fernand J., 25n
 Varela, Francisco J., 28
 Voegelin, Charles (“Carl”) F. (1906–
 1986), xivn, 2n, 11, 13, 18, 99, 108,
 109, 132, 137, 161, 171, 179, 237,
 254
 Vrabie, Emil, 181
 Vygotsky, Lev S. (1896–1934), 29, 70,
 71–72, 82, 126, 165
 Watson, John B. (1878–1958), 69, 70, 95,
 165
 Weinreich, Uriel (1926–1967), 183
 Wertsch, James V. (b.1947), 70–71, 91–92

- Wheeler, Celia Whorf (b.1930), 21
Whitehead, Alfred North (1861–1947),
 xvi, 40, 153n, 196–197, 208, 221, 293
Whitney, William Dwight (1827–1894),
 89
Whorf, Benjamin Lee (1897–1941)
Whorf, Celia Peckham (b.1930), 136
Wilkins, David P. (b.1958), 184
Wimsatt, William C., 213
Wittgenstein, Ludwig J. (1889–1951), 58
Yevick, Miriam Lipschutz, 52

INDEX OF SUBJECTS

- Aboriginal Australia, 184
- abstract
 - entities, 44
 - thought, 200-201
- abstraction, 31, 63, 127, 193, 195, 208
 - and projection, 201-202
 - and synthetic integration, 210-211
 - as general cognitive principle, 198
 - basic level, 209-211
 - terms of, 199
- abstractional isolation, 208, 210-211
- abstractions
 - nominal, 210
 - status of, 194
- abstractive
 - activity, 194, 195, 201, 205, 207, 209
 - capacity, 196, 198
 - processes in cognition, 31, 193, 196, 199, 201, 204, 211, 249
 - innately endowed, 210
- acculturation, 63
- acquisition of language, 29, 213, 123, 185, 188-189, 243
- actual process of thought, 66-68, 75, 126
- actualities of experience, 163
- adjectives, 104, 142
- adverbs, 145
- affricates, 256
- ambivalents, 142
- affect, 198
- agreement, 29, 32, 150, 191, 226-228, 234, 236, 250
 - three senses of, 225
 - complete, 227
 - true, 225
- algorithm based perspective 50
- allophones, 47-46, 88, 255-256
- American
 - Anthropological Association, 11
 - Indian languages, 129, 144, 167, 258, 261-262, 265, 278
 - linguistics, 37, 158, 167
 - Structuralism, 35
- analogic transfer, 77-78
- anthropology, 34, 85, 128, 156, 207, 236
- anticipation, 66
- 'appropriation', use of term by Lucy, 77
- art, 119
- 'articulate', use of term, 114
- articulatory function of language, 95, 126, 152, 158, 238, 247
- artificial language, 8
- Arupa*, 38, 56, 169, 218
- Asian philosophies, xv, 51, 22
- aspectual (space-time) standpoint, 100-101, 124
- associations, 1
- associative memory and recall, 51
- Athabaskan, 2, 162, 164
- atoms, atomic particles, 48, 59
- attending, process of, 66, 74-75, 87, 199, 209
- attention, habitual patterns of, 145
- automatic phenomena associated with
 - formal patterns, 60
- axioms, 86, 114
- Aztec, xvii, 8, 149, 157, 199, 223, 274
- Aztec culture, 269
- Azteco-Tanoan, 280
- Babylonian cuneiform, 6
- Basic English, 26
- basic survival, 244
- behavior, 63, 74, 153, 196, 229
- behavior patterns, 155, 203, 237, 270, 279
 - correlated with language, 143, 152
 - ordinary, 264
- behavioral
 - data, 187
 - environment, 105
- Behaviorism, 23, 53, 235
- behaviors, compulsive, 33, 225
- bilingualism, child, 241
- bilinguals and multilinguals, 225
- biological invariances, 69, 76, 91
- biological tendencies, 45
- biology
 - and environment, 211-214
 - role of in language, 30, 82, 187, 195,

- biology, role of language in *continued*
 - 218, 224, 236
- body in the brain, mind, xiii, 213
- body parts, 145, 263-264
- borrowing new words, 152
- brain, *see also* mind/brain, 44, 189
- Buddhism, 21, 54
- calibration in communication, 29-32, 227
- canon of reference, nonlinguistic, *see also*
 - frame of reference, 110, 115, 116, 117, 141, 145, 260,
- Carnegie Institute, 5, 24
- categories of experience, 119-121
- categories
 - formal, 178
 - covert, 1, 147-149, 158-173, 180, 185, 192, 257, 266
 - overt, 149, 158, 161, 172, 178, 257, 266, 169-170
 - overt/covert distinction, 168
 - marking of, 167
 - relativity of, 117
 - semantically void, 178
- causality, causal relations, 59, 64, 132, 146, 156, 259, 264, 271, 214-215
- chemical synthesis in languages, 245
- chemistry, xvi, 4, 6, 7, 57n, 151
 - of speech, 3
 - of thought, xvi
- Chicago University, 117
 - Middle American collection, 157
- childhood, middle, 242
- Chinese
 - characters, 4
 - language, 5, 57, 216
 - thought, 59
- Chinook language, 200
- Chomsky era, 134
- circumlocutions, 124
- clarity norms, 43
- classification of data, 227
- classification of experience, 77, 79, 92-93
- 'classification', use of term, 127
- code, in Saussure's terms, 227
- codes, Whorf's interest in, 3, 6
- cogitation, 82
- cognition, *see also* language in cognition,
 - xix, 117, 176, 186, 192, 196, 207
 - augmentation of, 66, 239, 243, 241, 248-249
 - categories in, 78, 119
- cognition *continued*
 - connectionist, models of, 164
 - distinctively human, 65
 - embodiment of, 28, 141
 - information storage, 51-52
 - linguistic patterning in, 239
 - linkage and rapport in, 31, 34, 42, 82, 70, 169, 172, 174, 192
 - role of linguistics in study of, 81
 - theory of, 109
- cognitive 'state of linkage', *see* state of linkage
- cognitive
 - ability, 241
 - activity of a linguistic kind, 165
 - activity, behavior, 82, 125, 168
 - capacity/capacities, 27, 65, 239
 - fields, 104
 - flexibility, 241
 - grammar, 142n
 - growth, 224
 - linguistics, 28, 37, 143n, 214
 - operation, deeper layer, 174
 - operations, 25, 77, 204, 207
 - complex, 52
 - nonlinguistic, 81
 - organization, 37, 42, 249
 - potential, 81, 239, 240
 - power, 65, 66, 225
 - processes, 76, 87, 91, 193-194, 244
 - higher order, 195, 211
 - linguistically mediated, 136
 - out of awareness, during sleep, 126
 - science, scientists xviii, 19, 24, 28, 53, 64, 85, 186, 192, 193, 240, 244, 250
 - steady state, 49, 187, 188
 - storage, 56
 - strategies, 199
- coinage of terms by grammatical operations, 153
- Columbia University, 133, 254
 - meetings at, 199
- color, 106
 - perception and naming, 115
 - studies, 222
 - terms, 116
 - variation, apperception of, 222
- common sense understandings, 64
- communicability of ideas, 217
- communicable universe of ideas, 198

- communication, 66, 82, 158, 192, 225-226, 250
 - inter- and intrapersonal, 71
 - linguistic, 32, 42
 - non-linguistic, 25
 - phatic, 67, 79, 80
 - precise, xiii, 33, 231
- communicative
 - effects, 124
 - function, 72
- comparative linguistics, 128
 - historical, 280, 278
- complex terms, 268
- composite holographic associative recall model (CHARM), 51
- conceived situation, 143n
- concentration, process of, 66
- concept formation, xiv, 31, 208
- concepts, 25n, 60, 67, 76, 77, 79, 89, 113-114, 152, 200, 212, 219
 - and experience, 210
 - concrete, 202, 215
 - covert, 169-170, 177
 - exotic, 151
 - abstract, 195, 200, 210
 - innateness of, 213
 - nonlinguistic, 77
 - of a particular language, 111
 - Platonic view of, 77
 - psychological, 96
 - relational, 151, 215
 - relativity of, 88
 - universal, 222
 - verbal, 169, 178
- conceptions, fundamental, 110
- conceptual
 - 'content', 90
 - ability, 26
 - activity, 25, 30, 31, 64, 65, 66, 69, 74, 80, 81, 82, 92, 93, 209, 211, 223, 239
 - framework, 32
 - functioning, advances in, 247
 - level, 144
 - mode, 50, 203
 - organization, 22, 23
 - processes, relational, 247
 - processing, 76, 87
 - profiling, 142n
 - resources, 28, 89
 - structure, xviii, 45
- conceptual systems, xiv, 115
- conceptualism, 194
- conceptualization
 - culture bound, 119
 - process of, 210
- conditioning, 195
- conduit metaphor, 67, 79
- Conference of Anthropologists and Linguists, Indiana University, 134
- Conference on language in culture, Chicago, 99
- configuration, 31, 34, 35, 60, 74, 93, 116, 132, 156, 165, 167, 192, 204, 206, 214, 251
 - of experience, 143, 178
 - of grammar, 143, 257
 - of salience, 123, 126
- configurationism, 131
- configurative
 - approach to language analysis, 97, 129, 135, 142-148, 157
 - linguistics, xviii, 13, 128, 129, 130, 131, 133, 159, 171, 231
 - linguistics, 'straight', 148-149
- Congress of Americanists, 9
- connection weights, 53
- connectionism, xv, 9, 24, 37, 44, 50-54, 64, 192, 193, 196, 236
- conscious
 - attention, 209, 239, 243
 - awareness, 32
 - behavior, 127
 - mental activity, xiii, 249
 - thinking, 64, 125, 198
- consciousness, 26, 44, 54-55, 108, 146
 - collective, 155
 - content of, 80
 - field of, 102, 104
 - individual, changes of, 224
 - reflexive, 29
 - in cognition, role of, 240
 - role in cognitive science, 244
- content and process dichotomy, 72-74
- content metaphor, 75, 76
- contiguity and sequence, 214
- convolution and correlation, 51
- Cornell University, 17
- cosmic
 - concepts, 101
 - picture, 144
- cosmologies, relativity of, 113

- 'covert', Whorf's pronunciation, 170
- covert categories, *see* categories, covert
- creative linguistic behavior, 62, 176
- creoles, 189
- cross lingual awareness, 241
- cryptic category, Trager's, 170
- cryptogrammar, Halliday's, 181-182
- cryptotype, productive potential of, 176
- cryptotypes, 1, 127, 158-185
- 'cryptotypic', use of term, 182
- cultural
 - and personal identity, 237
 - anthropology, 148, 266, 271
 - attitudes, 269
 - change, 152
 - construction of reality, 92
 - differences, 67
 - factors, 117
 - fish classes, 272
 - input, 196
 - knowledge, 185
 - mentalities, 143, 147, 156, 266, 278
 - metaphysics, 146
 - organization, 69, 82
 - patterning, 34, 136, 212, 268
 - relativism, 119
 - systems, 229-231
 - traditions, 250
 - treatments, different, 140
 - values, nonlinguistic, 147
- culturally
 - entrenched assumptions, 133
 - patterned behavior, acquisition of, 204
- culture, 2, 64, 128, 140, 146, 148, 156, 203, 207, 266
 - analysts, 202, 207
 - and personality theories, 167
 - defined, 151
 - immaterial values of, 143, 157, 276
 - of consciousness, 22
 - study of, 63, 130, 203
- culture-language complexes, 146, 271, 266
- cyclicality, 141
- discourse, universe of, 105
- doer, notion of, 76, 215
- data
 - deficiencies in, 187
 - empirical, 126
 - linguistic, 189
 - nonlinguistic organization of, 102
- data *continued*
 - of biochemistry, 189
 - of communicative interaction, 62
 - of experience, 120, 125, 181
 - of neurology, 189
 - of ordinary speech and thought, 192
 - of primary experience, 102
 - of utterances, 186, 187, 188, 189
- description and explanation, 190
- determinism, 85
- dialect, 244
- dichotomized conception of language and thought, xiv, 72, 85
- differences in language, subtlety of, 148
- different essentials, *see also* isolates of experience and meaning, 90, 122, 123, 217
- different languages, 88, 95, 104, 110-111, 115-116, 126, 132, 144-147, 217-218, 221, 234, 237, 239, 245-247
- different perspectives, 209
- disagreeing, 67
- discourse environment, field of discourse, 166, 172, 190
- discourse, 126, 229
- dominance relations, 221
- dreams, 40
- Dresden Codex, 5
- duration, 101, 138, 140, *see also* time
- E-language (externalized language), 189
- earth's gravity field, 221
- Eastern philosophy, xv, 37-40, 56
- ecological knowledge, 184
- education, xiii, 85, 249-250
 - Western, 243
- ego, 216
- egocentric speech, 72
- egoic field of experience, 99, 107, 108, 115, 140, 142
- egoic fields (internal), 28
- Egyptian language, 46
- Einstein's principle of relativity, 86
- electrical and magnetic fields, 55, 105
- electricity, 41
- electronic or 'etheric' forces, 55
- emergence, 37-38, 53, 56, 59
- emotion, linguistic patterning of, 55
- emotions, emotional response, 67, 69, 107, 113, 138
- empirical investigation, theoretical preconditions for, 78

- enculturation, 90, 115, 207
- endocrinal system, 55
- energy fields, 30, 41
- enfolded or implicate knowledge, 52, 61, 63, 125, 174, *see also* implicate order
- English, 3, 38, 48, 72-73, 97, 100, 122-127, 135, 138-139, 140-145, 151, 154, 155, 256, 258, 166, 170, 179, 183-184, 215, 220, 222, 229-230, 235, 240-246, 260-272, 278
 - American, 255
 - conceptual perspective of speakers, 145
 - feminine gender category, 275
 - gender 166, 169, 257, 272
 - idioms, 78
 - kin terms, 267
 - monosyllable, 39n
 - native speaker of, 149
 - noun category, 82, 178, 185, 210, 275
 - noun-plural, 258
 - prose, historical development of, 244
 - verbs, 167
- entities, 61
 - apparent, 56
- environing world, 112-114
- environment of ticks, 118
- environmental
 - contingencies, 212
 - field, 105
- environmentally influenced factors of
 - lifestyle, 155
- epistemology, 211
- ethical and esthetic values, 272
- ethnographic outline, 131, 254, 255
- ethnographic work, 148
- ethnolinguistics, 20, 132, 143, 155-156, 231, 261, 278
- ethnology, ethnologists, 167, 236
- European
 - culture, 206
 - language and history, 249
 - languages, 72, 141, 146, 149, 167, 258, 268, 200
 - languages, societies dominated by, 141
- events, 59, 93, 100, 105, 194, 197
 - flow of, 133
 - understanding, 63, 196
- evolution, 120
- existence, 72
 - conceptual structuring of, 40
- existence *continued*
 - grades or sub-planes of, 39
 - sub atomic order of, 218
 - universal laws of, 41
- expectation, patterns of, 199
- experience, 82, 87, 94-95, 100, 106-107, 112, 121, 125, 128, 135-136, 146, 152, 187, 195, 197, 259
 - accumulated, 196
 - analyses of, 163, 239
 - and understanding, 92, 128
 - bits of, 31-32, 191, 194, 226
 - contents of, 112
 - interpreted non-linguistically, 143
 - intuitive science of, 76
 - isolates of, *see* isolates of experience lived, 28
 - non-visual, 107
 - nonlinguistic organization of, 91
 - partitionings of, 132
 - perceptual, 208, 213
 - primary, 140, 143n
 - raw, 89, 92, 94, 198
 - semantic configuration of, 127, 183
 - structuring of, 179
 - subjective, 101, 117, 164
 - types of, 132
 - universal configurations of, 96, 147, 218, 223
 - unvisual, 107
 - with language, 180
 - world of, 144
 - worlds of objective, 144
- experiential data, 81, 87, 89, 93, 101, 105, 125, 126, 134, 190, 219, 228
 - organization of, 68, 102
- experiential
 - essentials, 93
 - flux, 125
 - invariancies, 126
 - relation to conceptual activity, 87
 - relation to reality, 40, 114, 136
 - world, 27, 91
- experientialism, 27, 210
- experientialist explanations, 191
- explanation, patterns of xvii, 207
- explanatory
 - modeling, 64
 - principles, 188, 191
- explicate order of manifest existence, 52, 56, 125

- external and egoic fields of experience, 28, 109, 120, 124
- external senses, 120
- fashions of speaking, 145-152, 184, 250
- feature analysis, 62
- features of situations, 79, 123, 235
- feeling for form, form-feeling, 45, 176, 203, 206, 215
- feeling of getting later, 141
- feeling, 81
- fellow feeling, 226
- field
 - of causes, 53, 56
 - of force, 102, 104
 - theory, 23, 41-44, 56, 70, 162, 168, 193
- figure and ground, 28, 95-110, 116, 124, 134, 140, 260
- Filipino society, 184
- fire insurance, 19
- fire-prevention, 153-154, 270
- fish-names, 149, 267-268
- flower symbolism, 157, 274
- flux of experience/impressions, 89-95, 101, 136, 144, 226, 261
- Foreign Service Institute (FSI), 16
- form and substance, 73
- form classes, 137
- form, 4
- formal completeness, 112
- formal structure, 134, 152, 181
- Four articles on meta-linguistics*, 229
- frames of reference, nonlinguistic, 88-89, 97-126, 137, 234
- French language, 8, 166, 257, 258, 262
- fundamental insecurities and fears, 249
- fundamental root ideas, 223
- future of the species, 240, 248
- General Semanticists, 15
- generative entrenchment, degree of, 213
- genetic inheritance, 213
- geographical environment, 105
- geometries, 110-220
 - relativity of, 112-113
- German language, 8, 131, 256, 262
- gestalt psychology/theory, xviii, 27, 70, 83, 90-117, 122, 131-135, 142, 150, 158, 193-195, 201-206, 219, 259, 266
 - degrees of organization, 134
 - Langacker's use of, 143n
- gestures, 45, 63, 71
- glands, 55, 104
- grammar, 127, 146, 191
 - deep, 58, 173
 - knowledge of, 156
 - modulus classes, 161, 258
 - scientific, 173
 - surface, 58
 - task of formal, 132
 - traditional, 133, 141, 160-161
 - transformational generative, 62, 175, 177
- grammatical
 - activity, 160
 - analysis, 111
 - categories as abstractions from
 - experience, 202
 - categories, 82, 96, 100-101, 137, 145, 149, 163, 167, 169, 172, 181, 185, 202, 240, 257, 262, 266, 278
 - empty, 178
 - meanings of, 133, 162, 168-172, 178-179, 183-185, 275
 - categorization, differences in, 147, 217
 - category labels/names, 132, 161, 259
 - category of alienability, 181
 - class, unmarked, 165-166, 257
 - command forms, 142
 - field, 42
 - form, 96
 - gender, 82
 - markers, 166, 172, 257
 - masculinity, 181
 - operations, processes, 58, 68, 73, 147,
 - organization, patterning, 133, 192, 235-236
 - structures, 111
 - theory, 161
- grammatics, Halliday's term, 191
- gravitational field, 220
- gravity, 118
- Great Basin, 146
- Greek language, 8
- Greek thought, classical, 195
- grooves of language and thought, 58, 68-69, 80, 237
- Guarijio language, 222
- habits, 191
 - linguistic, 111, 151, 237
 - of attention, 122
 - of selection, 90

- habitual
 - language use, 18, 33, 40, 78-79
 - thought world, 77
- Hallidayan approach to linguistic analysis, 184
- Hartford Fire Insurance Company, 8
- head marked possession, 181
- hearing, 107-108
- Hebrew language, xvii, 1, 3, 8, 164, 166, 216, 223, 258
- hieroglyphic writing, 5
- higher mind, 33, 40, 216, 217, 218
- Hindu philosophy, 21, 37, 54, 169
- historicity in Western society, 151
- history and psychology, 71
- holism of Sapir's and Whorf's conceptions of language, 74
- holism, 63
- holograms, associative properties of, 52
- holographic
 - organization of the universe, 52
 - processes, 52
 - reasoning, thinking, 61, 196
- holography, 37, 50
- Hopi
 - architecture, 13
 - assertions, 142
 - causal realm (metaphysical), 271
 - classification of events, 100
 - climatic conditions and cultural attitudes, 263
 - culture and behavior, 127
 - experience, language, and metaphysics, 139
 - expression of intensities, 139-140
 - fused space-time world view, 140-141
 - grammar, 136, 170
 - grammatical sketch, 163
 - inceptive cryptotypes, 170
 - kinship terms, 267
 - kiva ceremonies, 272
 - language and culture, xvii, 2, 72, 97, 100, 106, 127, 135-157, 222, 230, 255-278
 - linguistic segmentation of experience, 150
 - metaphysical dichotomy, 155
 - metaphysics, 139, 265, 276
 - noun and verb classes, 145
 - nouns, 135
 - parts of speech, 135, 141, 137, 168
 - Hopi *continued*
 - phonemes, 12, 162
 - 'picture of the universe', 113, 127, 139, 276
 - plant names, 269
 - prayer pipe, 155, 271
 - religious beliefs, 157
 - stems, 134, 136, 137, 141
 - 'tense' system, 140
 - tensors, 221
 - time, 139, 145, 210
 - use of calendrical devices, 140
 - validity of Whorf's analysis, 136
 - verbal categories, 142, 173
 - will and endeavor, 155, 271
- human
 - abstractive capacity, 196
 - behavior, complex, 63
 - biology, 194
 - body, organization of, 118
 - brotherhood, 33
 - cognition, 31, 65, 205
 - communication, distinctive nature of, 238
 - conceptual capacity, 33
 - existence, 140
 - experience, two levels of, 91
 - forms of experience, 120
 - intellectual development, xvix
 - intelligence (pluralistic), 242
 - knowledge, 119, 121
 - linguistic development, 248
 - linguistic faculty, 131
 - mentation compared with other species, 65
 - mind/brain, 82, 189
 - person as patterns in brain, 64
 - reality, 115, 224, 247
 - relations, 224
 - society, 236
 - species, 26
 - survival of, xvix, 33, 248, 250
- humanities, 232
- Humboldtian tradition, 16, 89
- Hungarian language, 8
- hyperspace, 40, 61
- hypothetico-deductive language, 85
- I Ching or Book of Changes, 59
- I-Language (internalized language), 188
- ideal speaker hearer, 192, 188
- ideas, 1, 4, 60, 65, 67, 97, 127

- ideas *continued*
 - fields of, 8
 - not independently lexated, 143, 157, 274
- idiolect, 192, 212-214
- idiolectal divergence, 227
- idioms, 49
- illusions about nature of reality, 33, 40
- image schematas, 93, 212
- imagery, xiv, 80-81, 102, 125-126
 - in articulation of meaning, 250
 - patterns of, 61, 79
 - pre-rational plane of, 69
- imagination, xv
- implicate order, *see also* enfolded order, 38, 52, 56, 125, 182,
- implicit metaphysics of language, 143, 146-147, 175, 264-266, 278
- impressions, *see also* flux, 94, 117, 127
- indeterminacy, 37, 42, 48, 56, 63, 125, 177
- Indiana University, 18
- Indo-European languages, 111, 142, 144, 261, 246
- induction, 205
- infant's state of speechless response, 234
- influence, notion of in relations between language and thought, 36, 68, 74
- innate
 - endowment, 68, 82, 187, 206, 213, 216, 223, 238
 - ideas, 223
 - principles of grammar, 187-188
 - striving for form, 204
- inner
 - meaning, 80
 - mental function, 72
 - or 'ideal' system/form, 45, 89-90
 - speech, 70, 72, 165
- input, patterned, 187
- instant, for different species, 118
- intellect, technologies of, 242
- intellectual
 - and spiritual life, 156
 - climate, importance of taking into account, xviii, 23
 - flexibility, 242
 - functioning, higher, 29, 71
 - operations, fundamental, 27
 - tools, 101
- intensities, Gatewood's discussion of, 25n
- intentional terms, 242
- intercalibration, 227-228, 236
- intercultural relations, xiii, 33, 166, 225, 249
- intercultural training, 16
- interdisciplinary boundaries, 75
- interlanguage contrast, 47
- 'internalized', use of term, 188
- internalized linguistic system, 31, 25, 37, 41-50, 58, 70, 75, 82, 168, 187-190, 202, 211, 214, 228
 - generative power of, 62, 172, 188
 - projective capacity of, 62, 211
- International Journal of American Indian Languages*, 10
- International Journal of American Linguistics*, 137
- international language, 26
- interpretive
 - activity, 63
 - processes, 125
- intertongue study, 217
- intra-atomic linguistics, 7-8, 23
- intra-linguistic comparisons, 115
- introspection, 115, 126
- intuition, 82, 118, 147, 176, 203-204
- intuitive
 - level of experience, 156
 - science of experience, 67-68, 102, 217
- investigative methodology based on Whorf's claims, 110
- isolate
 - terminology, significance of, 117
 - theory, 197, 210, 211, 221, 234
- isolates
 - egoic, 120
 - invisibles, 139
 - of/from experience, xvi, 28-31, 83, 90-96, 106-124-126, 140-145, 173, 190, 198, 202, 208-225, 236, 247
 - of meaning, xvi, 28-31, 91, 94, 122-126, 190, 198, 202, 214, 217, 223, 245
 - relational, 210
- isolation, act of, 208, 210
- key images, 208, 209, 210
- kinship systems, 148, 184, 267, 279
- kinship, land, and totemism, links between, 184
- kin possessive pronominal suffixes, 184

- knowing the world, nature of activity, 158
 knowledge, 120, 195
 absolute, 119
 of language, mature steady state, 189
 of world beyond senses, 121
 organized, 204
 building through language, 66
 sophisticated, 244
 'language', term used as verb, xiv
Language (the journal), 12-13,
Language, Bloomfield's, 35
 Language in Culture conference, 22, 108
 "Languages and logic", 245
 Language — Plan and conception of
 "arrangement", 254
 language
 ability to, 250
 abstract character of, 204
 acquisition, 49, 66, 68, 70, 78,
 92-93, 186, 188, 190, 198, 202,
 206, 216, 236
 research questions, 187
 second, 49, 180
 child, 70-71, 120, 179, 221
 influence of language data on, 179
 reorganizing processes, 188
 theory compatible with Whorf's
 ideas, 205, 236
 analysts, 124, 126, 148, 267
 and culture, 143, 148, 151
 drifts of, 148, 152, 267
 and ethnology, 12
 and experience, 95, 132, 201
 and mind, 29
 and non-linguistic cultural features,
 and other behaviors, 151
 and thought, xiv, 65, 69, 72, 73, 77,
 80, 86, 200, 249
 and thought grooves, 67
 and thought, correlation between, 65
 and thought, separation of, 27, 78
 and thought, technology of, 129
 as a garment, 80
 as cognitive activity, 29
 as how of thought, 151
 as intellectual tool, 24
 as mold of thought, 68
 awareness, xiii, 33, 40, 128, 225, 228,
 232, 237, 240-244, 249
 power of, 224
 capacity to, 50, 65-69, 239, 224, 248
 language *continued*
 change, 189
 data, chaotic, 187, 190
 deficit, 189
 defining, 43
 differences, psychological correlates,
 112
 different conceptions of, 62
 diversity, 33
 environments, 187
 every-day, ordinary, 119, 235
 evolution of, 204
 extension, 150
 faculty, 190
 function of, 71
 in cognition, xiii-xviii, 9, 22-42, 55,
 64-66, 71-75, 81-87, 112-114,
 239,
 244
 radio and power station analogies,
 55, 239
 augmentational function of, 82,
 238-245, 250
 in science, 225
 in use, 194, 244
 knowledge of, 55, 182
 learning, 31, 66, 90, 122, 180, 193-
 195, 203-205, 211, 232, 249
 loss, 240, 250
 mapping view of, 86, 121
 materialist view of, 54
 mature knowledge of, 187, 202
 mental nature of, 186
 of experience, 115
 of explanation, 77
 of formal learning, 242-244
 psychology, 164
 role overemphasized, 153
 skillful use of, 244
 social nature, 9, 68, 228
 structure, 74, 93
 study of, xix, 250
 teaching, 89
 three crystal aspects of, 173
 use of, 85, 157
 variation, 247
 yogic use of, 55
 Language, the totality, 131, 255
 Language, Thought, and Reality (LTR),
 xivn, xv, xviii, 20, 116, 120,
 128n, 131, 157, 277

- languages
 - particular, 111
 - psychological relativity of, 113
- linguaging
 - activity, xiv, 76, 80, 91
 - highly proficient, 244
- langue and parole*, 227
- latent content of language and thought, 67-68, 76, 81, 125, 217
- latent forces activated by language, 55, 239
- Latin language, 8, 166, 244, 258
 - gender, 169
- learning, role of metacognition in, 243
- levels
 - notions of in language and thought, 37-40, 49, 53, 80, 125, 174
 - of existence, 38
- lexicogrammatical activity, 182
- lexicon, lexations, 37, 82, 143, 177, 184
- light, 107, 263
- linguistic thinking paper — “A linguistic consideration of thinking”, 2n, 24, 169
- linguist’s fallacy, 127
- Linguistic Society of America, 11, 230
- “Linguistic aspects of science”, 233
- linguistic
 - abstraction, *see also* abstractive processes, 199
 - actions, McNeill’s theory of, 71
 - analogies, 77
 - analysis and description, 129-132, 142, 231, 250,
 - anthropology 85, 272
 - aspect of thinking, 69
 - classification of experience, 77, 219
 - competence, 25, 38, 66, 88
 - systems of, 227
 - conditioning of behavior, 154
 - construction of reality, 183
 - description
 - gestaltic, 137, 141
 - in terms of distribution, 134
 - isosemantic criteria, 137
 - process approach, 73- 74
 - determinism, 180
 - enculturation, xiv, 3, 28-30, 82, 101
 - entities, 37, 56
 - evidence, 140
 - experience, 62, 180
 - expression, xix, systems of 248
- linguistic *continued*
 - form, 68, 126, 163
 - historiography, 229
 - history, 163
 - inquiry, 1, 191
 - isolates, *see also* isolates of experience and meaning, 100
 - meaning, 54, 82, 101, 134
 - morphology, 50, 67
 - pattern, *see also* patternment, 88-89, 64, 102, 116-117, 198, 206, 235
 - patterning operations, 54, 70, 104
 - phenomena treated as forces, 168
 - processes, 53, 65, 76, 91-92, 123-127, 171, 181, 190, 229, 237, 238, 250
 - reasoning, 26
 - relativity empirical research tradition, 17, 27, 115
 - relativity and relativity principle, xiii-xv, xviii, 14, 17, 22-26, 32, 73, 77, 83-87, 92-127, 116-117, 122, 126-130, 139, 142n, 145-159, 179, 211, 239, 249
 - schemes of classification, 96
 - science, 22, 50, 62, 158, 176, 179, 186, 190, 217, 250
 - signatures, 258
 - species, 131
 - structure, 35, 47, 54, 71, 85
 - system, *see also* internalized system, 35-36, 63, 78, 90, 178-180, 187, 196, 216, 227, 232, 236
 - system, as background, 127
 - taxonomy, 129, 131, 255, 278, 280
 - thinking and nonverbal behavioral patterns, 71
 - thinking
 - capacity for, 41- 42
 - relativity of different kinds, 112
 - styles of, 242
 - systems of, 236
- linguistics, 23, 64, 85, 97, 247
 - as fundamental to cognitive theory, 81
 - contrastive, 245
 - descriptive, 15, 128, 132, 229
 - historical, 143
 - modern, 167
 - scientific, 15, 134, 230-231
 - Trager’s schematization of, 132
 - history of, 128
- linguists, xvi, 126, 189, 265

- linguists *continued*
 - personal needs of, 192
 - work of, 194
- linkage and rapport, *see* cognition
- linkage, 25, 54, 82, 169, 177
 - factors, 54
 - processes, 202
 - potentials of, 56n, 57, 178
 - covert, 176
 - non-motor, 165, 177
- literacy development, 242
- literary language, 157, 189
- logic, 52, 200, 209, 231-232, 245, 247
 - advance of, 246
 - different kinds of, 33, 237, 248
 - linear and algorithm based, 37
 - planetary, 129
 - systems of, 32, 248
 - possible, 245
- macrolinguistics, Trager's, 229
- Manas*, 37-38
- manifest
 - entities, 59
 - existence, 60
 - linguistic form, 38, 68
- manifold of existence, 52, 56, 37, 61, 94
- manifolds of fluxions, 39
- Mantric Yoga, 54-55
- Massachusetts Institute of Technology (MIT), xvii, 8, 86
- mathematical formulas, power of, 38
- mathematics, 25n, 40-41, 48, 113-114, 119, 136, 146, 201, 220, 225, 232, 239, 246, 247, 265
 - pure, 234
- 'matrix', use of term, 63
- matrix of connections, 31, 59, 62, 178
- matrix relations, 54, 58, 63, 165
- matter, 41, 101, 117, 196, 264
- Maya*, xvii, 5-12, 60, 163
 - web of, 40
- meaning, 54, 81, 90, 97, 124, 156, 171, 177, 178, 179, 228-229
 - and science, 233
 - and thought, 4
 - making, 31, 66, 92, 95, 101, 109, 122, 126, 155, 236, 248
 - of a blueprint, 82, 157
 - of a linguistic form, 56, 235
 - analysis of, 132, 134
 - configurations of, 155
- meaning *continued*
 - congruencies of, 228
 - limited by form, 181
 - linguistically communicable, 122
 - operationalization of, 186
 - place in linguistics, 128, 133
- meanings
 - cryptotypic, 179
 - limited, misleading, 150
- memory, 87, 181, 204
 - trace theory of, 104
- mental
 - 'objects' or 'entities', 177
 - abstractions, 122
 - activity, 30, 127, 235
 - filing cabinets, 177
 - growth, 247
 - processes, 64, 66, 203
 - rapport systems, xviii
 - stock in trade, 127
- mentalism, xvi, 9, 60, 235
- mentation, 66
- metacognition, 29, 182, 215, 232, 244
- 'metalanguage', use of term, 116, 229
- metalanguage, 115, 116, 231, 242, 243
- metalinguistic
 - abilities, 243
 - analysis, 182, 209
 - awareness, 29, 33, 126, 173, 181, 225, 230, 231, 241-244, 249
- metalinguistic knowledge, analysis of, 243
- metalinguistics, 18, 224, 228-232, 237
- metaphor, xiv, 51, 62, 69, 76-77, 86, 140, 209, 212, 237
 - of container/contents, 72
- metaphysics, 19-20, 117, 127, 147, 156, 175
- methodological framework, 132, 157
- Mexico, 8, 146
- microlinguistics, Trager's, 229
- Middle American languages, 5
- mind, xvi, 38, 41, 64, 78, 218
 - sciences, 31
 - field theory of, 9
 - lower, 40
 - metaphors of, 165
 - personal, 39
 - science of the, xv
- mind/brain, xv, xvii, 62, 64, 66, 193, 194, 196, 238
- minimal end-concept, 209

- Möbius strip, 114
- Modern European languages, 262
- modes of expression, 237, 241, 242
- molar and molecular approaches, 104-105
- monolingual constraints, 239
- morphemes, 49, 54, 56, 107, 134, 177, 180
- morphophonemics, 132, 143, 163, 256, 218, 278
- Mparntwe Arrernte language, 184
- multilanguage database, 235
- multilingual awareness, 26, 32, 33, 225, 237, 240, 243, 249
- multilingualism, 88, 241
- music, 40, 47, 113, 136, 239
- n-dimensional realm, 61
- Nahuatl language, xvii, 1, 3, 7, 8, 10, 12, 162
- Nama*, 37-38
- Nama-Rupa*, 56
- naming function, operations, 152, 182-183, 221-222
- national temperament, 67
- Native American languages,
 - genetic relationships, 12
- native speakers, 43, 156
- natural
 - phenomena, 264
 - philosophy, 244
- nature, 197
 - monistic view of, 100
- Navaho, 149, 169, 208, 222, 258, 269
- nouns, 260
- Neanderthal experiential reality, 183
- need for regularity, 205-206
- negativisms, comparison of, 270
- neon signs, 102, 104
- nervous system, 55, 104, 118, 120, 189
 - and glands, 238
- network concept and models, 44, 49, 52, 57-58, 75, 86
- neural
 - nets, 24
 - processes, 54
- neurolinguistic organization, 24, 44, 53, 62, 150, 162, 177, 181, 187
- neurolinguistics, 40, 54, 168, 174
- neurological
 - operations, 52
 - structures, 64
- neurology, 249
- New Haven, 133
- Nitinat language, 219
- nominalism, 194
- nonsense words, 39n
- Nootka language, 43, 100, 216, 245
- norm shape of linguistic forms, 43
- noumenal pattern world, 55
- noun meaning, 97
- nounizing, 135, 260
- nouns, 102, 142
 - and verbs, 96, 99, 167, 100, 137, 145, 219, 261
 - mass, 73
- numeratives, 142
- objectification, 175
- objective experience, 163
- objects, 105
- observation
 - process, 205
 - acts of, 87
 - field of, 142
- observational criteria, 142
- observations, 88, 123, 191
- observers, 108, 127, 112, 119
- official cultural meanings, 152, 155, 270
- oligosynthesis, xviii, 3, 4, 5
- ontogeny, 29
- order systems and logics, 244-247
- organism and environment, interface of, 126
- organization, forces of, 105
- outlines, 140-142, 107, 116, 135, 138, 150, 260
 - degree of, 135, 260
 - lacking, 260
 - quality, 135
 - marked, 260
- outward form, 80
- overt and covert categories, distinctions
 - between, 182
- overt categories, *see* categories, overt
- parallel distributed processing, *see also* connectionism, 24, 52, 175
- parallel modeling of brain function, 51
- parasemantic distinctions, 137
- part contains whole notion, 50
- pattern, patterment, 29, 31, 34, 36, 38, 41-42, 45, 56, 65, 82, 97, 156, 174-178, 190, 193, 195, 203, 204, 214, 216, 218, 243
 - and process, 207

- pattern *continued*
 - cosmic background of, 59, 216
 - recognition, 64
 - seeking approach to linguistics, 131
 - systems, unconscious, 39n
- patterning
 - of stimuli, 125
 - ethno-semantic regularity of, 184
 - unconscious, 64
 - elemental, 136
 - exact, 48
 - human predilection to, 216, 239
 - productive power of, 60
- patterns
 - observable in distribution, 134
 - of activation, 75
 - of occurrence, 190
 - of reaction, 228
 - of reference, 111
- Peabody Museum at Harvard, 10
- perception, 91, 95, 116, 119, 120, 125, 209, 211, 219
 - and language, 115
 - of motion, 117
 - primary 211, 219
 - tactics, children's first, 221
 - field of, 136
 - lower level processes of, 117
 - principle of configurated, 218
 - visual, 101, 107, 116, 147, 259
 - and tactile 118
- percepts, 219
 - auditory, 89
- perceptual
 - capacities, 214
 - data, 87, 121, 122, 126, 245
 - environment, 106
 - experiments, 126
 - field, 106
 - illusions, 104
 - interface with the environment, 124
 - invariances, 222
 - operations, 195
 - processing, 28, 136, 198, 206, 214, 215, 221, 222
- personal
 - development, 249
 - psyche, 38
- personalities, spiritual orientation of, 156
- phenotypes, 158, 168-184
 - meaning of, 173
- philology, 163
- philosophy, xiii, xv, 27, 41, 52, 85, 116, 147, 158, 177, 195, 200, 208, 229, 231-232, 237, 242
- phonemes, 47, 50, 56, 97, 134, 205, 218, 255
 - segmental, 256
- phonemic
 - analysis, configurative, 255
 - organization, 44
 - patterning, 39, 132
 - principle, relativity of, 46, 88
 - system, internalized, xviii, 88-89
 - theory, 45-47
- phonemics, 128, 132, 134, 143, 163, 255, 278
- phonetic
 - distinctions, 43
 - law, 128
 - system, 45, 112
- photographs, 102-105, 125
- phylogeny, 29
- physical
 - properties of stimuli, 116
 - sciences, 41, 46, 168
 - world, 56
- physics, 7, 46, 56, 87, 88, 141, 147, 151
 - classical, 9, 42, 150, 218
 - modern, xvi, 6, 37, 40, 42, 59, 70, 113, 146, 265
 - relativity, 104, 265
 - relativity theory, 59, 61
 - teaching in Papua New Guinea, 151
 - world of, 136
- physiology, 106, 114, 118, 124
- pictures of the universe, *see also* views of the world, 32-33, 87, 101, 121, 147, 128, 135, 141, 222, 239
- Picurís language, 255
- planetary approach to language, 129
- poetry, 246
- point of maximum significance, 210
- points in the pattern model of cognitive organization, 24-48, 61-62, 185, 187, 195, 199
- points of potential resonance, 48
- points, world of, 112
- Polish language, 229, 263
- political science, 232
- popular culture, 21
- positional variant, *see also* allophones, 47

- Potawatami language, 135, 260
 poverty of the stimulus, *see also* language acquisition, 186
 practical intelligence, xv, 70, 74
 Prague School, 12, 35, 162
 predication, 142
 prediction, 192
 prelinguistic
 child, 66, 95, 239
 plane, 102
 prelinguistics, Trager's 229
 primary experiential data, xiv, 32, 194-196, 214
 'primitive' mentality, 258, 265, 266, 278
 process and content, 76
 processes
 non-motor, 54
 nonlinguistic, 67, 75
 processing heard speech, 59
 projective aspect of language, 63, 177, 198, 202, 215
 projective effect of 'unconscious thinking'
 on experience, 198
 pronominals, 142, 166, 216, 272
 pronunciation of sounds, 63
 prosodic
 features, 145
 phonemes, 256
 proto-phonemic theory, 43
 psychiatry, 164
 psychic experiences, 117
 psycho-physical organization, 118
 psychoanalytic theories, 63
 psycholinguistic
 patterning, xviii, 1, 175, 160, 164
 research, 115
 psycholinguistics, Whorfian, xv, 2, 27, 160, 164, 170, 192
 psychological
 spacing, 45
 forms, 96
 ground, 218
 and metaphysical terms, 75, 127
 psychology, xiii, xvi, 2, 4, 64, 85, 97, 116, 164, 175, 195, 207, 232, 236, 258, 265
 psychophysical
 field, 105, 106, 125
 principles, 95
 Pueblo culture, 272, 279
 quality of intensity, 140
 quantum phenomena, 48
 radioactive elements, 7
 rapport, *see also* linkage, state of, 34
 rate, speed or intensity of motion, 139
 rational activity, 206
 raw experience, organization of, *see also* isolates of experience, 198
 reactances, 149, 165-177, 188, 258, 267, 268
 realism, 194, 212
 realities, constructed, 121
 reality, 64, 121, 192
 analysis of, 245, 248
 categorizations of, 91
 conceptions of, 242
 construction view, 86, 121
 nature of, 33
 shared, 111, 113
 ultimate nature of, 121-122
 we can say we know, *see also* experience, 87
 reasoning, xiv-xv, 64-65, 69, 71, 75, 80-81, 120, 206, 211, 239
 universal processes of, 238
 recall and recognition, 52
 recognition, 197, 221
 record keeping, 151
 reference, 61, 91, 96, 123, 142, 156
 frame, *see* frame of reference
 of words, 177
 system of, 112
 referents, 107, 134, 134, 259
 of seeing, 107
 kinds of, 132
 ways of classifying, 132
 reflection, 71, 120, 203, 204, 243
 register, 244
 relational
 feeling, 176
 mental activity, 31, 151-152, 182, 202, 221, 239, 238
 terminology, 151
 relations between language
 and behavior, 155
 and culture, 27, 148
 and experience, 143, 148, 201-202
 and experiential invariants, 24
 and thought, 19, 27, 66, 75
 and world view, 184
 thought, and experience, 30
 culture and world view, 84, 143, 151

- relations
 - of pure patternment, 56
 - of concepts to experience, 219
- relationships,
 - apperceptions of, 238
 - recognizing, 66
 - techniques of operating with, 248
- relativism, flexibility of, 223
- relativity
 - biological and cultural, 119
 - conceptual, 88
 - Einsteinian use of term, xviii
 - physical theory of, 47, 88
 - psychological, 88
- remembering, 66, 69, 74, 75, 145
- resonance theory, 25, 25n, 37, 48-50, 58, 62, 174 187, 195, 236
- response to the environment, 195
- reversative meaning, 180
- rhetoric, patterns of, 241, 244
- rhythms, 97
- Roman Catholic Church missionary centers, 129
- Romance languages, 262
- Romanian language, 180-181
- rule-based reasoning processes, 64
- rules and rule following, 62, 64, 76, 106, 121, 192, 195, 205, 206
- Rupa*, 38
- S matrix theory, 59
- Southern Paiute language, 259
- SAE (Standard Average European)
 - cultural mentality, 266
 - culture, implicit metaphysics of, 146
 - cultures, 147, 264
 - discrepancy with culture, 150
 - languages, 72-73, 146-147, 156, 264-265, 270-271
 - terminology, 269
 - time and space, 147, 265
- salience
 - abstraction of, 204, 206, 219
 - patterns of, 144, 106, 195, 204
- Salishan languages, 219
- Sanskrit language, 37
- Sapir memorial paper — “The relation of habitual thought and behavior to language”, xiii, 13, 15, 14, 77, 108, 122, 130, 145-152,
- Sapir school of linguistics, 133
- Sapir’s
 - absence on sabbatical leave, 96
 - affinity for Newman, 131
 - death, 13
 - illness, 11, 129-130, 132
 - influence on Whorf, xviii, 23
 - interest in the unconscious, 176
 - Language*, 9, 35
 - Yale classes, 39n
- Sapir-Whorf Hypothesis, *see also*
 - linguistic relativity principle, xiii, 17, 84, 230
- schema theory, 204
- schemata, 214
- science, xvii, 40, 102, 129, 131, 158, 224, 232, 236, 248, 250, 265
 - advance of, 26, 235
 - and technology, 24
 - defined, 68
 - language of, 242
 - progress of, 32, 129, 192
 - biological, 118, 232
 - Western, 37
- “Science and linguistics”, 100
- sciences
 - history of, 128
 - human, xvix, 250
- scientific
 - agreements, 234
 - description, 232
 - discourse, 234, 235
 - inquiry, 92, 167, 188, 248, 195
 - jargons, 115-116
 - knowledge, 234
 - language, 237
 - changes in, 224
 - use of language, 232
- segmentation
 - of experience, 31, 32, 91, 145-156, 109, 230, 261, 266, 278
 - of reality, biological, 118
- selective classes, 161, 258
- self
 - consciousness, capacity for, 224
 - reflection, 224
 - talk, 126
- semantic
 - categories, 180, 182
 - connection, xviii
 - contrast, 145
 - differentiation, 4

- semantic *continued*
 - function, 74, 162, 178
 - investigation, 236
 - patterns, 143
 - primitives, 136
 - processes, 109
 - system, 180
- semanticity, interactive, 173
- semantico-referential domain, 184
- semantics, 58, 68, 97, 126, 134, 137, 168, 172, 182, 231, 233
 - configurative, 237
 - contrastive, 111
 - linguistic, conceptualist account, 142n
- semiotic mediation, 71
- Semitic
 - languages, 46, 258
 - Semitic roots, 3, 7, 10
- sensation, 82, 115, 117, 120, 203, 204
- sense
 - awareness, 197
 - data, 94, 106, 121, 204
 - of smell, 107-108
 - of taste, 107-108
 - of touch, 107
 - organs, 119
- sensory
 - experience, 94, 119
 - modes, 114
- sentences, 142
 - as test units, 166
 - schemes of, 38
 - well formed, 62, 192
- sequence, 141
- sex distinctions, 280
- shape
 - and form, 38, 218
 - segmentation, 38
- Shawnee
 - language, 13, 99, 107, 109, 122, 123, 124, 245
 - paper — "Gestalt technique of stem composition in Shawnee", 108, 109, 110, 116, 145, 158
- Sigma XI, 12
- singularities, 59
- situational foci, 123
- situations, 90, 122, 124, 154, 185, 204, 207, 245, 271
 - macrofeatures in common, 124
 - meanings of, 270
- Social Sciences Research Council, 8, 10
- social
 - agreements, 233
 - and cognitive factors, 180
 - behavior, nonlinguistic patterns of, 184
 - innovations, 151
 - interaction, 62, 203, 223, 236
 - processes, 72, 203
 - psychology, 71
 - realities, 28, 121, 184, 186
 - sciences, 193, 232-233
 - system, 151
 - theory, 167
 - thought forms of language, 3
- socialization, xiv, xviii, 68, 89, 212
 - linguistic 29, 198, 224
- socially established patterns of behavior, 36, 45
- Society of American Linguistics, 11
- sociolinguistics, 231
- sociology, 236
- Sonoran language, 13
- sound system of language, *see also*
 - phonemic system, 31, 185
- sounds
 - alternating, 47n,
 - psychological definition of, 44
 - objective system of, 45
- space, 107, 113, 114, 121, 141, 156, 196, 220, 264, 271
 - absolute, 118
 - abstraction of, 197
 - and time, 38, 117, 218
 - apperception of, 101, 114
 - concept of, 101
 - different conceptions of, 113
 - dimensions in, 139
 - Euclidean, 61
 - experience of, 141
 - knowledge of, 110
 - Newtonian and Euclidean, 101
 - point of, 112
 - three dimensional, 38
- space-time of physics, 100
- Spanish language, 262
- speech, 66, 69, 81, 126, 172
 - and thought, 79
 - behavior, 4
 - communities, 33, 96, 172, 180, 188, 190, 192, 214, 227-228

- speech *continued*
 data, 189
 environment, 57
 events, 116
 faculty, 3
 habits, 227
 linearity of, 59
 phenomena, 181
 situations, 42
 social and egocentric functions of, 70
 social dynamics of, 250
 sounds, *see also* phonemes, 47
 theorizing about, 191
 spiritual values, emphases of a culture,
 143, 156, 271
 spoken language, 243
 state of linkage, *see also* rapport and
 cognition, 25, 31, 36, 55, 63, 71,
 104, 158, 174, 182, 187, 192, 203
 state of potentiality, 41
 statements, 124, 230, 231
 about cultural patterns, 230
 stems, 7, 138, 139
 stimuli, selection of, 120
 stimulus response model, 15, 70
 stock of concepts, 1, 211, 216
 'store house of impressions', 89, 90
 structuralism, 74
 structure-in-depth, 58
 subject and predicate, 96, 132
 substance, 73
 and form, 72
 and matter, 146
 super-terrestrial world, 273
 supra-linguistic
 mentality, 143, 156, 271, 279
 meanings, 156, 274
 syllables, 46
 symbolic organization, 201
 symbolism, 37, 79, 143, 156, 202, 225,
 274
 synaptic
 potentials, 189
 weight space, 53
 syntax, 166, 183
 systems theory, thinking, xviii, 30, 117
 Tagalog language, 184
 grammatical conspiracies in, 184
 talking, xiii, xvix, 31, 239
 Taos language, 166, 253, 255, 257, 258
 teaching and learning, problems of, 195
Technology Review, 13, 16, 66, 86, 106,
 122, 128, 150, 217, 220
 technology, 150, 194, 224, 249
 tendencies, 140
 tenses and moods, 142
 tensors, 140
 terminology
 in technological spheres, 269
 specialist, 114, 148, 150, 233, 236,
 267
 terms, simple unanalyzable, 149, 268
 text, formal power to codify reasoning,
 243
The Theosophist, xviii, 13
 theories
 ability to conceive, 225
 of belts, areas and substrata, 280
 theory formulation in linguistics, 191
 Theosophical Society, 21
 theosophical paper — "Language, mind,
 and reality", 122
 theosophy, 40, 54
 thing vs. action, 100
 thinking, 54, 77, 107, 120, 126, 206,
 221, 250
 advances in, 66
 and speaking, 71
 apparatus, necessity to use, 153
 clarifying, 237
 future developments in, 129, 248-249
 linear, 64, 175, 195
 linguistic, 54, 112
 nonlinguistic, xiv, 25, 78, 81
 organismic, 63
 preparedness to improve, 240
 reasonable, 59
 refinements in, 249
 reflexive attention to, 242
 silent, 69
 unconscious, 198
 without language, 81
 thought, 64, 75, 81, 90, 164
 abstract, 199
 and feelings, 78
 and language, 71-72
 and speech, 70, 165
 as pattern in the brain, 60
 associative, 52
 centers of, 5, 8
 content, 74-75
 development, 71

- thought *continued*
 fields of, 4
 forms of, 90
 full power of, 79
 fundamental conformation of, 67-68
 general laws of, 220, 223, 226
 linguistic tools of, 71
 linguistically organized, 152
 power of, 240-241, 244, 248
 process of, 65, 75
 processes, xiii, 74
 structure of, 111
 universals of, 223
 verbal, 70, 165
 without speech, 79
 thoughts, 67, 124
 time, 140, 156, 196, 197, 210, 264, 271
 and cyclicity, awareness of, 101
 and space, 101, 113, 146, 197, 208
 and space segmentation, 96, 100
 absolute theory of, 197
 apperceptions of, 146
 concept of, 73
 experienced, 118
 human view of, 151
 linear, 141
 mathematical, 101
 measurements of, 139
 pieces of, 141
 psychological, 101
 time-perspective, 268, 280
 timelessness, sense of, 141
 tones, 97
 Trager archival material, 130, 137
 Trager's view of analysts of style and art
 trends, 232
 transducer fallacy, 49
 transformations, 173
 transitivity, 170, 183
 translation, 95, 122
 pragmatic, 124
 three kinds, 156
 Trobriand language, 179
 typological work, 181
Umwelt, 119
 un- particle, 127, 176-179
 unconscious processes, 36, 63, 126
 understanding, xv, 81, 128, 193, 195,
 196, 205, 208, 226
 and communication, 236
 the world, universe, 150, 191
 universal
 being, notion of, 157, 275
 grammar, 216
 principles of, 187
 language, different entrance to, 1, 217
 universals, 23, 68, 102, 108-110, 193,
 214
 biological, 94
 cognitive, 220
 conceptual, 212, 214, 215
 conceptual and linguistic, 166, 218
 experiential, 110, 211-212, 218, 221
 linguistic, 29, 214, 221
 linguistic and cultural, 110
 search for, 223
 universe, descriptions of, 113
 University of California, Irvine, 130
 University of Chicago Library, 130
 'upwards' and 'downwards' terminology ,
 174
 use of language upon data, 232
 utterances, 172, 188, 243
 valences, 57
 valency grammar, 57n
 verbal expression, 238
 verbatum, 260-262
 verbs, 97, 142, 190, 260, 264
 figural, 135
 of naming, 184
 performative, 67
 transitive, 57, 127
 view of the world, nonlinguistic, 180
 views of the world, *see also* pictures of the
 universe, 185, 166
 behavioristic, mechanistic, 235
 visible forms, 138, 142
 visibles and invisibles, 138
 vision, laws of, 107
 visual
 environment, 105
 experience, 102, 105, 107, 138
 field, 107
 vocabulary, 38, 152
 vogue and slang terms, 269
Volksgeist, 266, 267
 Wakashan languages, 219, 258
 war, 149, 268, 269
 war psychology, 268
 warlike words in civilian life, 149
 water, 69, 135, 150, 260, 263, 273, 278
 Watkinson Library, Hartford, 8

- wave field systems, 39-41
- ways of
 - behaving, 207
 - being intelligent, 242
 - living, abstracted, 207
 - talking, 4, 89, 91, 95, 115, 125, 186, 192, 206, 211, 232, 234, 239, 249
 - thinking, 147, 250
- weight space, 54
- Weltanschauung*, *see also* picture of the universe, 17, 84
- Wenner-Gren Foundation for Anthropological Research, 17-18
- Western
 - culture, 245
 - traditions, 242
- Whorf
 - access to his unpublished writings, 116
 - as 'transcendental linguist', 20
 - hypothesis, thesis, *see also* linguistic relativity principle, xiv, 20, 119
 - theory complex, xiv-xv, 2, 18, 23, 29-30, 82, 95, 158-159, 192, 218, 223, 250
- Whorf's
 - analytical capabilities, 139
 - approach to linguistics, 6, 158
 - articles for nonlinguists, 130
 - business activities, 15
 - childhood, 1, 6
 - conception of mind, 164
 - death, 13
 - dialect of English, 13
 - early interest in linguistics, 6, 11
 - empiricist approach, xvi, 109, 111, 115, 194
 - experientialist stance, xvi
 - field approach to language, 43
 - field trip to the Hopi, 130
 - final years, 9
 - gestaltic approach to linguistic analysis, 96
 - ideas about linguistic roots, 3-10
 - ideas in the secondary literature, 139
 - illness, xvii, 13, 128-134, 137, 171
 - instruction in linguistics, 8
 - interest in fundamental problems of meaning, 27
 - interest in secret codes, 1
 - letter on semantics, 163
 - memorial to Sapir, *see* Sapir memorial
 - novel — *The Ruler of the Universe*, 21
 - obituary, 13
 - original contribution, nature of, 111, 128
 - personal circumstances, xvii
 - personal relationship with Sapir, 131
 - physicalism, 22, 70
 - planned text book, 135, 168
 - religious beliefs, 14, 21-22, 27
 - research fellowship, 10
 - research program, xvii, 9
 - Sterling Fellowship, 11
 - technical competence, 8
 - theosophy, xvii
 - training as chemical engineer, xiv, 8, 13-14, 19
 - unmanifest/manifest terminology, 174
 - unpublished letters, xvi, 18, 116
 - view of his own place in history, 128
 - work in fire insurance prevention, 8
 - Yale lectures, 197
- word
 - categories with subtle meaning, 169
 - classes, 161
 - functioning similarly in discourse, 178
- words, 54, 56, 177
 - reasoning in, 59
- world
 - of a speaker, 93
 - of manifest substance and activity, 218
 - of microphysics, 136
 - outlook, linguistic-cultural, 156, 272
 - view, 17, 84, 90, 117, 175
- world-picture, linguistic, 131, 255
- writing, 32, 43, 60, 65, 151, 242
- Yale University, xvi, 3, 10, 11, 96, 117, 199, 218
 - archival material, xvi, 18, 130, 136,
 - Department of Anthropology, 91, 128, 131, 254, 277, 157
 - Graduate School, 11, 254
 - linguistic circle, 23, 133, 201
- Yale report, ch. 3, appendix
- Yucatec Maya language and culture, 22, 145, 184, 222
- zoology, 131