

Signs, Mind, and Reality

Sebastian Shaumyan

Advances in Consciousness Research 59



John Benjamins Publishing Company

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Advances in Consciousness Research

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Volume 65

Signs, Mind, and Reality: A theory of language as the folk model of the world
by Sebastian Shaumyan

Signs, Mind, and Reality

A theory of language

as the folk model of the world

Sebastian Shaumyan

Yale University, USA

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

Sebastian Shaumyan

Signs, Mind, and Reality : A theory of language as the folk model of the world / Sebastian Shaumyan.

p. cm. (Advances in Consciousness Research, ISSN 1381-589X ; v.

65)

Includes bibliographical references and indexes.

1. Semiotics. 2. Language and languages--Philosophy. 3. Structural linguistics. 4. Linguistic analysis (Linguistics). I. Title. II. Series.

P99.S462 2006

401'.43--dc22

2006042713

ISBN 90 272 5201 7 (Hb; alk. paper)

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John Benjamins Publishing Co. · P.O. Box 36224 · 1020 ME Amsterdam · The Netherlands
John Benjamins North America · P.O. Box 27519 · Philadelphia PA 19118-0519 · USA

Table of contents

Preface	xi
CHAPTER 1 The Science of Semiotic Linguistics	1
1.1 The confusion of language and logic in modern linguistics	1
1.2 The place of Semiotic Linguistics among other semiotic disciplines	8
1.3 Language defined	11
1.4 Grammar and semantics	12
1.5 Transfer Principle	13
1.6 Genotype grammar and phenotype grammar	15
1.7 The organization of Semiotic Linguistics	17
1.8 Research Program for Semiotic Linguistics	17
1.9 Anomalies, antinomies, and concepts of Semiotic Linguistics	18
CHAPTER 2 Language as a Phenomenon of the Social Mind	21
2.1 Facts of the social mind	21
2.2 Independence of language from psychology	22
2.3 Independence of language from biology	24
2.4 Methodological fallacy of reductionism	25
2.5 Language versus knowledge of language	26
2.6 Language-thought and the method of the distinction of language from thought	27
2.7 Semiotic versus objectivist view of language	28
2.8 Language as a theoretical construct and language universals	32
2.9 Semiotic universals as genetic factors	36
2.9.1 Communicative function of language	36
2.9.2 Subjectivity	36
2.9.3 Polarity of persons	37
2.9.4 Complementary duality of society-individual	37
2.9.5 Arbitrariness and conventionality of the sign	38
2.9.6 Ego-coordinates	39
2.9.7 Fundamental linguistic classes	40
2.9.8 Distributive and integrative relations	42

CHAPTER 3 The Linguistic Sign	45
3.1 Sign and meaning defined	46
3.1.1 Sign	47
3.1.2 Meaning	48
3.1.3 Field	48
3.1.4 Assignment of attributes to sign and meaning	49
3.1.5 Conventionality of the sign-meaning relation	50
3.1.6 Meaning and referent	51
3.1.7 Meaning and information	52
3.2 Critique of Saussure's concept of the linguistic sign	53
3.3 Critique of Peirce's conception of semiotics	56
CHAPTER 4 The Anomalies of Categorization and the Principle of Differences	58
4.1 Anomalies of categorization	58
4.2 Arbitrariness and conventionality of the linguistic sign	61
4.3 Principle of Differences and the Concept of Value	63
4.4 Explaining the anomaly of meaning by the Principle of Differences	65
4.4.1 Anomalies of meaning	65
4.4.2 Semiotic identities and semiotic differences	66
4.4.3 Semiotic identities and semiotic differences in phonology	67
4.5 Principle of Duality of Categorization, and value and worth classes of signs and meanings	68
4.6 Critique of Saussure's conception of the arbitrariness of the sign	70
4.7 Homonymy	71
4.8 Principle of Phonological Differences and Principle of Phonological Duality of Categorization	73
4.9 The significance of the Principle of Differences	74
4.9.1 Principle of Differences as the cornerstone of linguistic analysis	74
4.9.2 Philosophical implications of the Principle of Differences	76
4.9.3 Principle of Differences and cognition	77
4.10 Disassociation of the sign-meaning bond in modern linguistics	79
4.10.1 Generative semantics	79
4.10.2 Generative phonology	80
4.10.3 The confusion of the functional and physical aspects of the concept of phoneme in violation of the Principle of the Duality of Categorization	81
CHAPTER 5 Linguistic Structure	86
5.1 Principle of the Contrast of Structural and Lexical Signs	86
5.2 Syntactic and paradigmatic meanings	91
5.3 Antinomies between lexical and structural meanings	92
5.4 Grammatical structure	95
5.4.1 Contensive autonomous words and their structures	95
5.4.2 The structure of the word combination	98
5.4.3 The structure of the syllable	99
5.5 The concept of the structural class	100

5.5.1	Fusion of meanings and structural series	100
5.5.2	Meaning of structural classes	102
5.5.3	Structural class defined	103
5.5.4	Structural classes and the Proportionality Law	105
5.6	Extending the Principle of Differences to cover the structural sign series	106
5.6.1	Generalized Principle of Differences	106
5.6.2	Extension of the diagnostic cases for homonymy	107
5.7	The lexicon	107
5.8	Grammar	108
5.9	Law of Autonomy of Grammar from the Lexicon	110
5.10	Semiotic Typology of Languages	112
5.10.1	Typology of signs	112
5.10.2	Sign-based typology of languages	115
5.10.3	Law of the Syntactic Field as the foundation of linguistic typology	115
5.11	Confusion of structural and lexical meanings in modern linguistics	117
5.11.1	Agentivity	117
5.11.2	Agentivity in ergative languages	119
CHAPTER 6 The Theory of Superposition		121
6.1	Meaning and information	121
6.2	Worth- and value-changing contexts	123
6.3	Primary and secondary functions of a sign and the notion of the field	125
6.3.1	Synonymy and polysemy	126
6.3.2	Spurious polysemy	127
6.3.3	Syntactic superposition	128
6.3.4	Syntactic and non-syntactic contexts	129
6.3.5	Superposition in phonology	129
6.3.6	Variants and alternants	130
6.3.7	The notion of the field of a sign	131
6.4	Principle of Superposition	131
6.5	Stability and flexibility of language	133
6.6	Law of Sign-Function Correspondence	133
6.7	Hierarchy of sign functions and the Range-Content Law	134
6.8	Basic and derived words as primary and secondary forms of the word	135
6.9	Antinomies of structural and logical meaning explained by superposition	137
6.9.1	Antinomies of word classification	137
6.9.2	Antinomy of transitivity	138
6.10	Confusion of linguistic and logical analysis of meaning	142
6.11	Superposition in diachrony: Principle of Diachronic Differentiation	144
6.11.1	Structural meaning shift	146
6.11.2	Lexical meaning shift	147
6.11.3	Phonological shift	147
6.12	The theory of synonymy as part of the theory of superposition	148
6.13	A historical note	151

CHAPTER 7 Methodological Interlude	152
7.1 Dimensions of a theory	152
7.1.1 Research program	153
7.1.2 Principles and laws	154
7.1.3 Conceptual framework	157
7.1.4 Analogical modeling	158
7.1.5 Mathematical modeling	160
7.2 The nature of abstraction	162
7.3 Examples of semiotic abstraction	164
7.3.1 Communicative and informational dimensions of language	164
7.3.2 Abstraction from sound to phoneme	165
7.3.3 The concept of phoneme	169
7.3.4 Are segmental phonemes a fiction?	171
7.4 Dialectics and Complementarity Principle	175
7.5 Empirical and conceptual problems in linguistics	176
7.6 What must count as discovery in theoretical linguistics	182
7.7 The pitfalls of formal models of language	184
7.8 Critique of Hjelmslev's notion of linguistic reality	189
CHAPTER 8 The Word and Word Classes	192
8.1 Difficulties with defining the word	192
8.2 Defining the word	194
8.2.1 Word defined	194
8.2.2 Lexeme	194
8.2.3 Autonomous and non-autonomous words	195
8.2.4 Independent and dependent contensive autonomous words	196
8.2.5 Modifiers and relators	197
8.2.6 Functional definition of the word	197
8.3 Word and morpheme	197
8.4 Theory of word classes	198
8.4.1 Difficulties with the word classification	198
8.4.2 Law of Contensive Autonomous Word Classes	200
8.4.3 Principal phoneme classes	202
8.5 Word and its syntactic field	204
8.6 Principle of Maximal Distinction	205
8.7 Opposition of independent and dependent words as basis for language typology	206
8.8 Problems with the notion of word classes in contemporary linguistics	207
CHAPTER 9 Syntax as the Theory of Word Combinations	209
9.1 Word combination as a linguistic gestalt	209
9.2 The structure of the word combination	210
9.2.1 Complete and incomplete word combinations	210
9.2.2 Representing word combinations	211
9.2.3 Applicative Principle	212
9.2.4 Word Combination Law	213

9.3	Constituency as a relational concept	213
9.4	Dependency relations as invariants under changes of constituency	214
9.5	The Nucleus Law	217
9.6	The Nucleus Law and the Principle of Superposition	218
9.7	The Generalized Nucleus Law	220
9.8	Isomorphism between sentence and syllable structure	223
9.9	The strange properties of the Nucleus Law	224
CHAPTER 10	The Theory of the Sentence	226
10.1	Predicative and attributive articulation of the sentence	226
10.2	Sentence articulation laws	228
10.3	Obligatory Subject Law and Term Uniqueness Law	229
10.4	Law of Binary Structuration of the Sentence	230
10.5	Word-based syntactic phenomena	232
10.6	Transformation-based syntactic phenomena: the theory of diatheses	234
10.7	Passive	237
10.7.1	Bipartite passive as a paradigmatic phenomenon	238
10.7.2	Passive proper	239
10.7.3	Relation between bipartite and tripartite passive	241
10.7.4	Reciprocal subordination between a syntactic unit and its nucleus	241
10.7.5	Middle voice	244
10.8	Critique of the generativist notion of transformation	244
10.8.1	Nominal constructions	244
10.8.2	Apposition	246
10.8.3	Genitive case	246
10.8.4	Concrete and abstract nouns	247
10.8.5	Confusion of lexical and structural signs	248
10.8.6	Use of transformations in linguistics	249
CHAPTER 11	Genotype Categorial Calculus	250
11.1	The theoretical apparatus of Semiotic Linguistics	250
11.2	The choice of the mathematical framework	252
11.3	An outline of genotype calculus	254
CHAPTER 12	Semiotic Linguistics and Cognitive Grammar	257
	Epilogue	263
	References	269
	List of Definitions	278
	Index of languages	280
	Index of names	281
	Index of terms	283

Preface

This book is about a great intellectual adventure — the search for instruments that can free linguistics from dependence on the preconceived logical categories of the sentence and can make it to become a truly autonomous branch of knowledge, independent of logic and any notions alien to the nature of language. Only by becoming a truly autonomous branch of knowledge will linguistics be assigned its deserved place in the system of sciences.

As the culmination of many years of research, I have developed *Semiotic Linguistics*, a new linguistic discipline, which I present in this book. The domain of Semiotic Linguistics is radically distinct from all of the other domains of linguistics. The domain of Semiotic Linguistics is human language conceived of as a *folk model of the world*. By a folk model of the world we mean that every language is a particular conventionalized form of the representation of the world imposed on all the members of a language community by the social need to have a common instrument of communication. The folk model of the world is in fact a collective philosophy unique to each language. It is called the folk model because in many essential features it differs from a scientific model of the world.

The term ‘conventionalized’ as opposed to ‘conventional’ means that by its origin any representation of an element of the world could have been non-conventional, close to reality, but under the pressure of the laws of sign operations all natural representations have become conventionalized, regardless of changes in man’s perception of the world. For example, speaking of sunrises and sunsets, we do not need to mean that that the sun rises in the east and sets in the west; these words are merely conventionalized forms of the representation of the world that reflect man’s perception of the world before Copernicus. As the folk model of the world, language is a phenomenon of the social mind independent of individual psychology.

The idea of language as the folk model of the world can be traced back to Humboldt's conception of the internal form of language. Various versions of this conception can be found in works of many linguists, from Saussure's notion of value, Sapir's and Whorf's hypotheses of linguistic relativity, to the more recent 'ethno-syntax' of Anna Wierzbicka (1979, 1988).

We find insightful counterparts of the conception of the internal form of language in the modern theory of literature. The modern theory of literature does not confine itself to treating a literary work merely as a product of the artistic imagination of its author. Between the two objects — the artistic imagination of the author and his literary product — a third object is distinguished by the modern theory of literature: the conventional 'poetic world' through which the author perceives reality and which bears on the formation of the text of the author. We may mention Roman Jakobson's study on the role of the statue in the mythological world of Pushkin, Vladimir Propp's morphology of the fairy tale, Mikhail Bakhtin's reconstruction of Rabelais's poetic world, and many works on structuralist poetics.

Similarly, the modern theory of art does not regard creations of painters and sculptors merely as products of their imagination. Between the two objects — the painting and the imagination of its painter or the sculpture and the imagination of its sculptor — the third object is distinguished by the modern theory of art: the conventional 'poetic world' of the artist's perspective, through which the painter or the sculptor perceive reality and which bears on the formation of the painting or the sculpture.

The ideas underlying Semiotic Linguistics have a long history. These ideas can be traced back to the trend called *European Structuralism* in Europe and Russia. This trend must not be confused with *descriptive linguistics school* in America, also known as structuralism, which was sharply distinct from European Structuralism. While European Structuralism was concerned with *intrinsic* relations between sign and meaning, American descriptive linguistics concentrated exclusively on the *extrinsic* relations between morphemes separated from their meanings, so that the morpheme lost all its sign properties and became a mere vocal form — a physical event rather than a semiotic phenomenon. But in spite of all their significant achievements, European and Russian structural linguists have never succeeded in presenting structural linguistics as a coherent system of principles, laws and concepts, distinct from other linguistic disciplines. This is what the reader will find in this book. The rehabilitation of European and Russian structural linguistics in the form of Semiotic Linguistics is not a return to structuralist linguistics but an advance to a new stage of the development of the semiotic trend based on the discovery of a coherent sys-

tem of semiotic principles, laws, and concepts. The insights and discoveries of Semiotic Linguistics give a new significance, a new power to the old concepts of European and Russian structural linguistics.

Semiotic Linguistics recognizes three distinct objects: 1) man's thought, 2) the world, 3) language as the folk model of the world mediating between man's thought and the world.

Language as the folk model of the world is a bond of thought and sound that serves as an interpretation of the world imposed on the all members of a speech community. As the folk model of the world, language is a variable positioned between two constants — man's thought and the world. Man's thought does not get knowledge of the world directly but through the intermediacy of various folk models of the world, each model refracting the world in its own particular way.

Since Humboldt, the relation of language to thought and reality has been a time-honored topic of the philosophy of language, which has also attracted the attention of many linguists beginning with Saussure and Hjelmslev. Among the more recent significant contributions are the two books of Sydney M. Lamb (1998 and 2004; also important 1966).

Semiotic Linguistics is neither a philosophy of language nor a new series of general discussions of the relation of language to thought. Semiotic Linguistics is a technical inquiry into the intrinsic mechanism of language as opposed to thought. The technical question central to Semiotic Linguistics is this: What are the laws of the intrinsic mechanism of language as an intermediary between man's thought and the world?

This problem is difficult because language is an intermediary between man's thought and the world. It does not exist separately from thought but forms with it *the language-thought continuum*. *Mutatis mutandis*, we trace an analogy between the language-thought continuum and the energy-matter continuum, postulated in contemporary physics. Just as energy is a form of matter, so is language a *communicative form of thought*.

The difficulty of the problem is that we need to use the power of abstraction to distinguish language from thought, to distinguish the laws of language from the laws of thought. The analysis of the bond between language and thought is not like the analysis of a chemical bond; no chemical reagents are of assistance here, they must be replaced by the power of abstraction. Only by distinguishing language from thought — and the laws of language from the laws of thought — can we understand the interaction of language and thought, understand how language affects man's perception and cognition of the world. In pursuing this problem Semiotic Linguistics recognizes two distinct levels of the language-

thought continuum: 1) the level of linguistic value and 2) the logical level. As a result of this approach, Semiotic Linguistics differs radically from all trends of contemporary linguistics, which do not conceive of language as an intermediary between man's thought and the world and confound linguistics with logic and linguistic analysis with logical analysis.

Speaking about the distinction of the linguistic and the logical levels of language and about the distinction between the linguistic analysis of language and the logical analysis of language, I must make important terminological remarks. I distinguish between logic as the name of the science of logic and logic as a name for the processes or content of thought distinct from properly linguistic phenomena. I mean logic in this second sense when I oppose the linguistic level of language to the logical level of language and the linguistic analysis of language to the logical analysis of language.

A clear understanding of linguistics and logic as different sciences is also important. Logic as science is an essential part of the methodology of science and in this role is useful for linguistics as well as for other science. So, in my research I get much benefit from the concepts of combinatory logic. On the other hand, it is important to understand the special relation between the theories of syntax in the present-day linguistics and the science of logic due to the history of linguistics. Linguistics as an independent science owes its origin to the principles presented in Saussure's work, as published by his students. Before that time linguistics was considered a part of logic rather than an independent science. Due to the dependence of linguistics on logic, the concepts of logic were introduced into the study of language without the exploration of the specific aspects of language requiring the development of new properly linguistic concepts. The dependence of linguistics on logic was reflected in the first place in the choice of the basic unit of language. As the basic unit of language was chosen the sentence because the sentence was a linguistic expression of the logical statement, the direct concern of logic. The basic concepts in the analysis of the sentence came from logic. An important part of the analysis of the sentence was the concept of hierarchy understood from a logical point of view: the sentence was meant to reflect the logical statement and everything in the sentence which corresponds to the parts of the logical statement was considered the main parts of the sentence, while all the rest was considered secondary. This understanding of hierarchy is implicitly or explicitly accepted in contemporary linguistics and it reflects the historically inherited dependence of contemporary linguistics on logic and the logical analysis of language in terms of logical concepts alien to language.

Semiotic Linguistics brings a new concept of hierarchy totally independent of logic. We start with the introduction of the new concept of the basic unit of language leading to the understanding of language as an entity closely connected with thought and independent of thought at the same time. Taking the word as a basic unit of language, we treat syntax as the process of the combination of words and regard the sentence as a particular case of the combination of words. We discover the *molecular structure* of the syntactic design of language. The basic unit of the combination of words I call the *molecule*. The molecule is a binary combination of words connected by the relation of dependency. Every molecule consists of two words of which one is independent and the other depends on it. The hierarchy of the syntactic design of language is reflected in the dependencies between words inside a molecule and in the chains of dependencies between molecules.

As intermediaries between man's thought and the world, languages function as different forms of the perception of the world by man's thought. And since every language is a particular conventionalized form of the representation of the world imposed on all members of a language community by the social need to have a common instrument of communication, every language is both a communicative and cognitive form of thought.

In investigating the laws of languages the linguist is overwhelmed, on the one hand, by the tremendous diversity of the means of expression in the languages of the world and, on the other, by the lack of clarity of the theoretical conceptions that would tell the linguist what to look for, thereby enabling him to discover facts that would otherwise have escaped notice or to see connections between facts that would otherwise have remained unrelated. Indeed, without the necessary right conceptions supporting his observations, the linguist will have no basis for his claims that he has discovered anything at all.

The most important, but at the same time the most opaque concepts of linguistics are the concepts of *difference*, *identity*, and *class*. One cannot overstate the significance of these concepts: the whole mechanism of language turns on classes of meanings and signs formed by differences and identities, between meanings and between signs. The opacity of the concepts of difference, identity, and class for linguistics stems from the confusion of these concepts in linguistics with those in other sciences. In fact, the notion of difference in linguistics is radically distinct from the notion of difference in other sciences. At first sight, differences and identities between words correspond roughly to differences and identities between things words refer to. But here's the rub. It is true that words refer to things of man's external or internal world. But what are those things? Do they exist independently of language? No, they do not. The

world is independent of language, but the analysis of reality into classes of things depends on language. Hence, we come up with a distinct concept of difference and identity for linguistics as opposed to the concept of difference and identity in other sciences: while other sciences investigate differences between the things of the world, linguistics is concerned with differences not between things but between words. Differences and identities between words are totally distinct by their nature from differences and identities between the things of the world. These differences determine the arbitrariness and conventionality of connection between the vocal form and the meaning of the word.

The investigation of the concepts of difference, identity, and class in linguistics is the key to understanding the nature of linguistics as opposed to other sciences.

What is the nature of differences and identities between words in contrast to differences and identities between the things of the world? How do different languages impose on thought different analyses of reality into classes of things?

The law I have advanced to define the nature of the differences between the words of a language is totally independent of physical and any other laws defining the nature of the differences between the things of the world. This law I call the *Principle of Differences*.

Due to the crucial disparity between the nature of linguistic differences and the nature of the differences of the elements of the external reality, sound is analyzed into correlated but totally independent classes of the communicative form of sound and correlated but totally independent classes of the physical content of sound; similarly, thought is analyzed into correlated but totally independent classes of the communicative form of thought and classes of the logical content of thought. The goal of Semiotic Linguistics is to investigate the stratification of sound into classes of forms of sound and classes of sounds proper and the stratification of thought into classes of linguistic meanings and classes of concepts.

The essence of the language-thought continuum is a great mystery story that is still unsolved. The whole mechanism of language as bond between sound and thought turns on identities and differences. The whole mechanism of language is a mechanism for forming classes of signs as opposed to classes of sounds, and forming classes of meanings as opposed to classes of concepts, or information. To reveal the secret of the working of the mechanism of language is to understand why languages such as Chinese, Hopi, Latin, or English are so different and how they serve as instruments of communication and thought. The variety of languages we observe in the world is explained by and is re-

ducible to the universal principles and laws of the formation of classes of signs as opposed to classes of sounds and the formation of classes of meanings as opposed to classes of information.

Do we understand the mechanism of language? Do we understand how language operates to form classes of sounds and classes of meanings? Linguistics has not found a clear answer to these questions. The problem of the formation of classes of sounds and classes of meanings is seen either as a technical problem of minor importance or no problem at all. But to solve the problem of how language operates to form classes of sounds and classes of meanings, one must first see this problem and understand its importance. Yet most linguists are not ready to deal with this problem, because they either do not see it or do not understand its importance. This is the reason why the situation for linguistics is so difficult. The formation of classes of sounds and classes of meanings is a problem that is as important for linguistics as the problem of motion is for mechanics. Just as mechanics could not exist without the laws of motion discovered by Galileo and Newton, so the science of language cannot exist without the laws of the formation of classes of sounds and classes of meanings in language. Unable to see or understand the problem of the formation of classes of sounds and meanings, unable to even look for the clues to the workings of the mechanism of language, linguistics is going through a crisis of its foundations.

The main danger for a scientist involved in the study of social and linguistic phenomena is that of taking anything for granted — *problem-blindness*. The distinction between *appearance* and *essence*, which is part and parcel of the dialectical method of investigation, is nothing but a constant attempt to probe further and further through successive layers of phenomena, towards laws that *explain* why these phenomena evolve in a certain direction and in certain ways.

Semiotic Linguistics, a discipline presented in this book, is the beginnings of a new science of language. The cardinal tenet of Semiotic Linguistics is *the dialectics of language* — the heterogeneous dual nature of the sounds and meanings of language: sound has two mutually independent, but complementary facets — a value facet and a physical facet; likewise, meaning has two mutually independent, but complementary facets — a value facet and a logical facet. The concept of value is not new. Value was discovered by Saussure. But the concept of value has not caught the imagination of linguists. Value was never understood properly and has been all but forgotten. What is new in this book is the rediscovery of value as the clue to understanding the intrinsic, the deepest aspects of the workings of the mechanism of language, to the mysteries of the workings of language and ultimately to the workings of the human mind.

Like Ariadne's thread in the labyrinth of language, I advance the Principle of Differences. Under the Principle of Differences, the value of meaning and the value of sound are defined by the conditions of the interdependence of sound and meaning. Under the Principle of Differences, meanings belong to one and the same class not because they are semantically or logically related to one another (although they may be and often are), but because they differ from all other classes of meanings by being represented by one and the same vocal form, by one and the same sign. Likewise, sounds belong to one and the same class not because they are physically related to one another (although they may be and often are), but because they differ from all other classes of sounds by being correlated with one and same meaning or with one and the same distinctive function. Semiotic Linguistics is a science of language that follows from the consequences of the Principle of Differences, which does for linguistics what the laws of Galileo and Newton have done for mechanics.

Semiotic Linguistics views the sign as the ruling concept of language research that brings a novel method of drawing linguistic inference.

Semiotic Linguistics is not merely part of semiotics but the central semiotic discipline to which other semiotic disciplines must be subordinated. Natural language is a universal semiotic matrix from which all other semiotic devices derive their basic structural and functional properties. Hence, the privileged place of Semiotic Linguistics among the semiotic disciplines.

The subject matter of Semiotic Linguistics is the study of the linguistic sign, the formulation of semiotic principles and laws characterizing the linguistic sign and drawing consequences from these principles and laws.

The fundamental consequence of the semiotic principles and laws is the diversity of languages. Grammars are language-specific; but while grammatical constructions may differ from language to language, their functioning must always respect a fixed set of universal principles. I redefine the goal of universal grammar. Since the fundamental fact about natural languages is their diversity, I contend as against all existing versions of universal grammar, which seek to identify putative universal constructions across languages, that there is no basis for pursuing this goal. The proper goal of universal grammar must be *the explanation of the diversity of natural languages*. Sign-based universal grammar is concerned with the discovery of universal principles and laws of semiotics explaining the diversity of natural languages. Why are the languages of the world diverse? This is the question sign-based universal grammar seeks to answer through the discovery of universal semiotic principles and laws.

Sign-based universal grammar is universal, not in the sense of the theory of language universals, not in the sense of the theory of universal constructions,

but in the sense of the theory of universal semiotic principles and laws explaining the diversity of natural languages.

Present-day linguistics is a babel of theories using mutually incomprehensible technical idioms that generate terminological confusion and conceptual chaos. What is the source of the crisis of our science? There is a catastrophically growing tendency among linguists to imagine that one could theorize about language by applying to it mathematics, logic, psychology, biology, and other disciplines, while remaining blissfully ignorant of the internal semiotic mechanism of language. True, mutual contacts are important for sciences. But linguistics can benefit from contacts with other sciences only on the condition that it first grapples with the semiotic nature of language. The source of the crisis of linguistics is the confusion of sign concepts with concepts concerned with different domains of reality.

The proper subject matter of linguistics must be the sign mechanism of language. Although this idea is not at all new and can be traced back to Saussure, the study of the sign mechanism of language is not an easy task. The trouble is that the sign mechanism of language is not something that can be observed directly. Language is a complex object that hides its inherent sign mechanism under physical, physiological, logical, psychological, neurological, and other phenomena. The sign mechanism of language is a covert system. Therefore, the primary task of linguistics is, as Saussure put it, “to delimit and define itself” (1972: 20), that is, to define the conditions under which it can isolate the covert sign mechanism as its subject matter from other phenomena of language. The significance of this task cannot be overstated: the sign mechanism constitutes the essence of language.

In the *Cours de linguistique générale*, compiled from the notes of his students and published posthumously in 1916, Saussure defined the sign mechanism as the proper subject matter of linguistics, showing the right direction towards developing linguistic theory as an independent branch of knowledge. Unfortunately, linguistics pays at best lip service to Saussure’s revolutionary ideas. Why has Semiotic Linguistics been neglected by linguists? This can in part be explained by the fact that Saussure’s *Cours* is abstruse. Saussure did not formulate the notion of *language-thought duality* explicitly, his definition of the linguistic sign is far from satisfactory, and his distinction between language (*langue*) and speech (*parole*) is elusive. Yet without the explicit formulation of the language-thought duality and its implications, and without a satisfactory definition of the concept of the linguistic sign, it is difficult to see why the linguistic sign must be the central concept of linguistics. The revolutionary con-

tent of Saussure's theory got buried underneath its abstruse presentation, the vagueness of its basic concepts, and resulting inconsistencies.

As a result, linguistic theory today is still in its diapers. The contemporary linguistic scene teems with competing linguistic theories, but all of them fail to acknowledge the primacy of the linguistic sign in linguistics.

My goal is to develop linguistic theory based on Saussure's profound ideas revealing the true nature of human language. To this end, I search for *semiotic hierarchy*. Under semiotic hierarchy, some sign properties or laws of language are more fundamental, and to them other less fundamental properties and laws are reducible. The ultimate explanation of all laws of language must be founded on — that is, must reduce to — the properties of the linguistic sign. Semiotic hierarchy provides a useful filter that saves linguists from wasting their time on ideas not worth pursuing.

An important innovation in this book is the strict distinction of the relevant and irrelevant contexts of the operations of signs. The totality of the relevant contexts that change the function or the meaning of a sign I call the *field of the sign*. The field of a sign defines the hierarchy of its meanings and functions and the hierarchy of the vocal forms of the sign.

Doubtless, the faculty of language is implemented in human biology. True, the phonological design of language is supported by our innate articulatory and perceptual systems; but are these capacities specialized for acquiring grammatical systems as advocated by Chomsky and his followers? This is an unrealistic claim unsupported by linguistic facts. A truly realistic notion of the faculty of language is to consider it as the innate capacity of humans to produce, combine and use signs; but which language a child acquires depends on its social environment, not on its innate capacities. The innate capacities of a child just make it possible for the child to acquire any language. But language is a social phenomenon with its own laws that do not depend on the psychological processes involved in its acquisition and its use. All languages must be explained in terms of inferences from the principles and laws of the linguistic sign.

Starting from Saussure's vantage point, I revise his theory completely. I redefine his central notion of the linguistic sign and flesh it out by introducing an array of principles based on the new definition. The proposed principles and laws of the linguistic sign define a basis for a uniform explanation of such heterogeneous phenomena as phonology, syntax and semantics, grammar and the lexicon, synchrony and diachrony. The success of this uniform explanation gives especially strong support for the validity of these principles and laws. Furthermore, I replace the elusive opposition between *langue* and *parole* (roughly corresponding to 'language as idealized system of signs' and 'lan-

guage in use'), central to Saussure's linguistics, with the opposition of language and thought as two aspects of the dialectical unity *language-thought*. This last notion merits closer attention.

Thought cannot be observed directly, but only as represented by language, tied to thought as the representation of thought. Thought and language are tied to each other. As an empirical basis, the linguist faces a corpus of texts, by which I mean both written and oral discourse. Texts are entities where language and thought are tied together, constituting the language-thought continuum. Language is the form and thought is the content of the language-thought continuum. Taking a language corpus of texts as his empirical object, the linguist has to use abstraction in order to separate the facts of language from the facts of thought and focus on the facts of language as his theoretical object. Unless the linguist separates linguistic facts from all other (logical, psychological etc.) facts, he cannot properly understand either language or thought. Linguistics as the theory of language stands or falls depending on whether this task is carried out consistently and correctly.

Unfortunately, linguistics has failed to consistently separate the facts of language from logical and psychological facts since the 1916 publication of the *Cours de linguistique générale*, where this task was set. The most recent period of linguistic research is even more confused than any other period. Present-day linguistics is dominated by works that rather than focus on linguistic facts proper, encourage their confusion with facts of logic and psychology.

Language as opposed to thought is a bond of thought and sound that articulates thought and sound into signs whose meanings impose on thought a particular mode of the analysis of reality which is obligatory for all members of a particular language community. Each of us thinks his own thoughts; our signs we share with our fellow men. What we think is the *content of our thoughts*; how we think is the *form of our thoughts*. Every language is a form of thought in the sense of *how* the content of thought is expressed. Language as a bond between thought and sound that articulates them into distinct signs and meanings I call *the sound-thought articulator*.

Human language has a dual character. On the one hand, the existence of language is determined by the language faculty of man, which is understood to be a particular component of the human mind; this is a fact of psychology and is rooted in the biological properties of the brain. But on the other hand, language is a system of signs that existed before the birth of an individual who employs it and so is outside of the thought of the individual. This is a semiotic fact, which is a particular instance of social facts — of the facts of the social mind. The remarkable property of social facts is that they are not only external

to the individual, but are endowed with a compelling and coercive power to impose themselves upon him, regardless of whether he wishes it or not.

In accordance with the dual character of language, the common, fundamental structural properties of languages — universal grammar — are both genetically encoded in the minds of individuals and at the same time independent of individuals. The essential fact about language is that it is a social institution independent of individuals. Hence, we must distinguish two different concepts: language and *knowledge of language* by individuals. While language, as a semiotic phenomenon and social institution is the subject matter of linguistics, the knowledge or mastery of language is a psychological phenomenon and is the subject matter of the *psychology of language*.

The creation of Semiotic Linguistics has been prepared and preceded by many years of the semiotic research of language. The results of this research were first systematized as Applicative Universal Grammar (AUG). AUG was first presented in 1963 (Shaumyan and Soboleva 1963) and developed in further publications (Shaumyan and Soboleva 1968; Shaumyan 1974, 1977, 1987). The mathematical formalism of the earlier version of AUG was presented in (Shaumyan 1987 and its computer implementation (in Jones 1995, Jia 1996, Shaumyan and Hudak 1997).

We must distinguish sharply two aspects of the investigation of language: the genetic aspect and the functional one. In my book *Applicative Grammar as a Semantic Theory of Language* (1977) I have analyzed how the fundamental classes of language are directly based on the speech situation (EGO or HIC, NUNC). This is clear, for example, in the nominal declension, where so-called grammatical cases are anchored in the underlying system of spatial cases. But this genetic point of view must be sharply distinguished from the functional one, presented in my book *A Semiotic Theory of Language* (1987). The two books are based on different conceptual and mathematical machineries that complement each other insofar as they represent the complementary approaches to the investigation of language: the genetic approach and the functional one. The genetic point of view must be sharply distinguished both from the functional and the diachronic points of view. The genetic point of view is a panchronic point of view that is concerned with constant genetic forces acting in the languages of the world.

Similarly, we must distinguish between a linguistic theory and the mathematical formalism of a linguistic theory. A linguistic theory is complete in itself, regardless of whether it is represented by a mathematical formalism. I contend that no grammatical theory can be considered adequate unless its concepts and laws can be explained in terms of the properties of the linguistic sign.

This is a fundamental condition of theoretical adequacy for a grammatical theory, and existing theories of universal grammar have to demonstrate that they satisfy this condition.

The present book contains only the conceptual system of Semiotic Linguistics. As for the mathematical model of Semiotic Linguistics and its further computer implementations, they will be the topics of separate publications. Here I will present only the main ideas of the mathematical model of Semiotic Linguistics.

The mathematical model of Semiotic Linguistics is a version of categorial grammar I call *genotype calculus*. This calculus owes much to the version of the categorial grammar of Haskell B. Curry (1961; Curry and Feys 1958). I had the good fortune to discuss ideas with Curry. One of Curry's ideas is the *ob-system*. This concept is of capital importance both for Semiotic Linguistics and for the interpretation of the formalism of categorial grammar in terms of Semiotic Linguistics. In this connection I introduce two new concepts: *categorial ob-system* and *categorial ob-diagram*. Curry was skeptical about including combinators into his system, but I have done this with good results. The genotype calculus is described in Shaumyan 1987, Shaumyan and Hudak 1997, and Desclés 1990.

What is called categorial grammar is used widely in modern linguistics. But categorial grammar is not a theory of grammar; it is only a calculus used as a mathematical formalism for representing various theories of grammar. Present-day theories of grammar using various versions of the categorial grammar formalism are totally different from the genotype calculus and are incompatible with it.

Abstraction lies at the heart of linguistic analysis, and the history of modern linguistics turns on the history of linguistic analysis. The history of modern linguistics is not a history of new discoveries of previously unknown languages of the world. It is a history of conflicting views about ways to analyze language. Changes in ways of abstraction result in new ways of regarding old phenomena. And this is what the history of linguistics is all about. In this respect, it has little in common with the history of geography, the history of physiology, or the history of any natural science.

Semiotic Linguistics transforms classical linguistics into a truly autonomous science on a par with other sciences. The glaring defect of classical linguistics is its lack of independence characteristic of an autonomous science. Rather than seek to discover the genuine intrinsic laws of language, classical linguistics seeks support in the laws of biology, psychology, sociology, mathematics, and what not.

The concerns of classical linguistics to explain the phenomena of language not by the laws of language but by the laws of biology, psychology, sociology, or mathematics is called *methodological reductionism*: the laws of a science are reduced to laws of other sciences. In the past, methodological reductionism was fashionable in natural sciences. For example, chemists were concerned with explaining the phenomena of chemistry not by the laws of chemistry, but by the laws of physics; physicists were concerned with explaining the physical phenomena not by the laws of physics but by the laws of quantum mechanics; biologists were concerned with explaining the biological phenomena not by the laws of biology but by the laws of chemistry or by the laws of physics. Nowadays reductionism in natural sciences is rejected as a ‘bad thing.’ Reductionism has been abandoned in natural sciences because scientists have come to understand that the world is stratified. The world is not a homogeneous entity whose complex phenomena can be reduced to simplest phenomena. Rather, the world is stratified into independent levels, each level having its specific laws, which are not reducible to the laws of some underlying level. It is true that the physical level of the world underlies the chemical level and the quantum-mechanical level underlies the physical level, but it is also true that each level has its own independent laws. Thus the laws of the chemical level cannot be reduced to the laws of the physical level and the laws of physical level cannot be reduced to the laws of the quantum-mechanical level. The fact that classical linguistics loves reductionism while natural sciences have abandoned it testifies to the deep provincialism of classical linguistics.

A few words about the presentation of the book. Any presentation that aims to give a complete account of a new theory of an object whose research has a long history must necessarily include a considerable amount of well-known facts, descriptions of well-known approaches and ideas of previous theories. Generally, historical notes would be desirable. But in the present case the history of research is so extensive that it must constitute the topic of a separate investigation whose presentation would greatly exceed the volume of this book. Such an investigation has not been the aim of this book.

I may be rebuked for criticizing the views expressed in older publications — views their authors may have abandoned. To these possible rebukes I answer that I am interested in criticizing wrong ideas from the perspective of the theoretical foundations of linguistics, regardless of whether their authors have abandoned them. By contrasting what I consider correct ideas with what I consider wrong ones I both clarify my own theory and help to prevent resurrection of wrong ideas in the works of future authors.

I may also be rebuked for omitting the discussion of certain modern theories of language. To this I answer that since my book is foundational in nature, I do not see any need to analyze theories of language that despite their contributions to linguistic research have not had any influence on the theoretical foundations of linguistics.

Who are the imaginary readers of this book? It is meant for those who are interested in theoretical and philosophical ideas about language — for linguists, philosophers, psychologists, logicians, mathematicians, computer scientists, etc. I expect my readers to have some knowledge of linguistics — within an introductory course. I have been at pains to make my presentation accessible to everyone in my prospective wide audience, and therefore must ask the readers who are well acquainted with certain concepts I explain to bear in mind that what need not be explained to some must be explained to others.

For reasons of space, time and priority, I had to forego an analysis of the work done by my precursors. That is an important task in its own right, which could be the topic of a separate publication. Besides Saussure, the founder of the semiotic paradigm, my most significant precursors are (in alphabetical order) Bühler (1934), Hjelmslev (1943/1961, 1954), Jakobson (1966, 1971), Karcevskij (1929), Kuryłowicz (1964, 1973, 1975), Martinet (1960, 1962, 1965, 1985), Peshkovskij (1931), Sapir (1921), and Trubetskoy (1969). In addition, I must mention works of a few important authors who view language in the spirit of modern semiotics. These authors are (in alphabetical order): Jurij Apresjan (1995), Michael A. K. Halliday (1978), Roy Harris (1988), Sydney M. Lamb (1966, 1998, 2004), Jurij Lekomcev (1983), Alexej Losev (1983), Adam Makkai (1992, 1986, 2000), P.H. Matthews (1981), Igor Mel'čuk (1988, 1993-94), Kenneth Lee Pike (1982), Vadim Solncev (1995), Jurij Stepanov (1998), Boris Uspenskij (1965), Anna Wierzbicka (1988), Leon Zawadowski (1966, 1975).

In the course of my research I have had the good fortune to collaborate with Pauline Soboleva (Shaumyan & Soboleva 1963, 1968), Zlatka Guentchéva and Jean-Pierre Desclés (Desclés et al. 1985, 1986), Frédérique Segond (Shaumyan & Segond 1992, 1993, 1994), Bernard Sypniewski (Shaumyan and Sypniewski 1996), Paul Hudak (Shaumyan & Hudak 1997), whose ideas have stimulated my work.

In the domain of the methodology of science I am indebted in the first place to Stephen E. Toulmin (1953, 1961, 1972, 2001), Larry Laudan (1977, 1986), and Ludwig Wittgenstein (1922, 1953, 1969).

I am grateful to those who with their important comments contributed to the presentation of this book. They are (in an alphabetical order): Claude Boisson,

Catherine Chvany, Arkadij Lipkin, Adam Makkai. I must mention separately William Sullivan and Bernard Sypniewski for their especially detailed suggestions and corrections.

I am grateful to Maxim Stamenov, Editor of *Advances in Consciousness Research*, for his significant contributions to the improvement of the text of the book. My deepest thanks go to the Anonymous Referee of the Publisher for his insightful notes and suggestions.

This book could not have completed without the invaluable research assistance of my daughter Olga Shaumyan in editing the book. She contributed her insights, criticisms, suggestions, and computer skills.

The present book is concerned only with presenting an outline of the new linguistic discipline — Semiotic Linguistics — and deals with the problems of the theoretical foundations of linguistics, in the first place. Therefore, I have omitted topics of significant theoretical interests and importance but of no direct relation to the topics of the present book. Some of the omitted topics have been presented adequately in my book *A Semiotic Theory of Language* (1987). Among these are a technical presentation of the mathematical machinery of Semiotic Linguistics, important topics in linguistic typology such as research in ergative and active constructions, a detailed analysis of dominant linguistic theories such as Generative Transformational Grammar, Montague Grammar, Relational Grammar of Perlmutter and Postal, and the Lexical Functional Grammar of Bresnan. I refer the interested reader to that work.

Today's linguistics has an acute need for unity of theoretical views. We must strive to make linguistics acquire what other sciences — mathematics, and later physics, chemistry, and biology — have already acquired: a kernel of truths recognized by everybody.

As in politics, so in science, unity cannot be brought about without conflict. However, an intellectual struggle must be put up not for the sake of the victory of the views of this or that scientist, but for the sake of the victory of truth. The driving force behind scientific battles must not be the urge for domination, but the longing for everybody's submission to truth, which is one and indivisible. For this reason, just as I forsake restraint to refute and discard the views of others whenever they seem to be erroneous, so I will readily and gratefully welcome any critique of my own. I assail quite frequently and with great tenacity even the most outstanding investigators. This is a sign that I recognize that their views are influential and therefore deserve candid and careful discussion. Like many others, I felt their influence and benefited from their views not only when I accepted them, but also when I had to challenge them. I hope therefore

that others will benefit from a discussion of their theories as much as I have done myself.

For a long time the linguistic scene has been dominated by various theories of formal linguistics which, oblivious to the true nature of language, applied to the grammars of natural languages a network of extralinguistic concepts. Formal linguistics, which succeeded for a while in presenting itself as the final embodiment of the science of language, has no room left for improvement. Any doctrine that lacks potential for further development must be surpassed.

The germs of the true science of language do exist. Barely conspicuous, these germs are sure signs of the possibility of fuller developments which will some day bear abundant fruit, if only for future generations.

Chapter 1

The Science of Semiotic Linguistics

1.1 The confusion of language and logic in modern linguistics

With the posthumous publication of Saussure's *Cours de linguistique générale* in 1916 the science of linguistics entered a new stage of development. It was principally Saussure's ideas that laid the foundations for linguistics as an autonomous and independent branch of knowledge.

Before Saussure, linguistics was not an independent branch of knowledge: the investigation of language was viewed by everybody as part of investigation in logic. In search of the fundamentals characterizing language as an aspect of the human mind radically distinct from all other aspects of the human mind Saussure discovered that language and thought relate to each other as the communicative form and its content. Language and thought constitute an integral whole — what we may now call *the language-thought continuum*. By complementing each other as part of a single continuum, language and thought at the same time drastically oppose each other as both independent and conflicting entities. This is a paradox that we may now call *the paradox of the language-thought continuum*. Saussure solved this paradox by the discovery of the semiotic fundamentals that underlie language as an aspect of the human mind radically distinct from all other aspects of the human mind. Saussure's discovery was a revolution in linguistics. The discovery was revolutionary because Saussure established that although linguistics and logic were closely related, they were nevertheless independent branches of the investigation of the human mind; which meant that linguistics was no longer a servant of logic.

Saussure's revolutionary ideas were followed and applied by prominent representatives of the science of language. Among them were the Pole Jerzy Kury-

łowicz; the Russians Alexander Peshkovskij, Sergej Karcevskij, Roman Jakobson, Nicholas Trubetskoy, and Alexander Xolodovich; the German Karl Bühler; the French Lucien Tesnière, Émile Benveniste, Charles Bally, and André Martinet; the Dane Louis Hjelmslev; and the American Edward Sapir. The significant contributions of these and other outstanding linguists were promising great future for the new independent branch of knowledge. But Saussure's revolution of transforming linguistics from being a handmaiden of logic into an independent branch of knowledge was drastically interrupted by new influences in linguistics in the 1940's and the following years. The imagination of linguists was caught by the idea that no science could exist without mathematics and therefore linguistics was in need of mathematics. The idea seemed bright and irresistible, and so wide-scale experiments in the application of mathematics to linguistics started. This trend distracted linguistics from Saussure's semiotic program — from the program of the semiotic investigation of language as a distinct aspect of the human mind.

Two programs of the application of mathematics to linguistics have been significant: 1) *categorial grammar* and 2) *generative transformational grammar*.

We must recognize that the experiments in the application of mathematics to linguistics had their own significant positive results. I wish especially to emphasize categorial grammar. Significant results were achieved by the application to the study of language of various mathematical calculi of categorial grammar, whose origin can be traced back to the mathematical system of logic invented by the Polish logician Stanisław Leśniewski (1929, 1992). In this respect, the names of Kazimierz Ajdukiewicz (1935), Yehoshua Bar-Hillel (1935; 1960 with C. Gaifman and E. Shamir), Joachim Lambek (1958, 1961, 1999, 2001), Haskell B. Curry (1961), Jean-Pierre Desclés (1990) stand out.

In spite of its significant results, the mathematical trend in linguistics had also its dark side. Great damage to linguistics was caused by the confusion of the concept of linguistic form with various mathematical concepts of logical form, notably on the part of generative syntactic theory. Due to this confusion, the semiotic concept of the linguistic form, discovered by Saussure, was ousted from linguistics by various and totally distinct versions of the concept of logical form.

Linguistic form is determined by principles characterizing the bond between the sign and the meaning. The confusion of the linguistic form with the logical form was the result of the blindness of generative grammar to the bond between sign and meaning. Language is a system of signs, and neither is a sign without a meaning, nor is a meaning without a sign. Linguistic form is in the

bond between sign and meaning. What generative linguistics has done was to break the bond of sign and meaning by a total disassociation of sign and meaning from each other. The bond between sign and meaning laid important constraints on the study of language. These constraints brought necessary insights into the understanding of the synchronic operations of language as opposed to diachronic processes. All the synchronic operations of language turn on identities and differences. But identities and differences are determined by the bond between sign and meaning, by linguistic form. All synchronic studies of language lose sense after the bond between sign and meaning is abolished. Equally, all diachronic studies lose sense, because no reasonable diachronic study is possible without understanding synchrony. The adepts of generative linguistics wrote much about the relation of language to the human mind, about the relation of linguistics to psychology, biology, and so on. But all this work is of no interest and cannot be useful because none of these topics can be pursued without understanding the semiotic mechanism of language, without understanding linguistic form.

How was the semiotic concept of linguistic form ousted from linguistics by the totally distinct concept of logical form? In order to see this, let us compare some syntactic concepts of generative transformational grammar with syntactic concepts of the semiotic theory of language.

One of the myths of contemporary linguistics holds that generative grammar was revolutionary, in that it changed the orientation of linguistics from morphology to syntax — from the preoccupation with the word to the preoccupation with the sentence as the central unit of language. This myth arose as a result of the confusion of the linguistic concept of syntax with the logical concept of syntax. Chomsky viewed language as an infinite set of sentences and grammar as a device for generating all possible sentences of a language. The identification of language with a set of sentences reflects the logical view of language as a set of propositions. From the vantage of language as the communicative form of thought, language is a two-tiered word-sentence sign system. Words are signs that combine to form sentences. Under the semiotic theory of language, syntax is concerned not merely with sentences to the exclusion of the notion of the word but, in contrast, with the investigation of the laws of how words combine to form sentences. Language is a word-sentence sign system, so that one cannot understand the sentence without understanding how words combine into sentences, any more than one can understand the word without understanding how words operate as parts of sentences.

The same confusion of linguistics and logic underlies central constructs of the generativist paradigm. For example, let us compare the concept of the hier-

archy of deep and surface structure in generative transformational grammar with the hierarchy of the primary and secondary syntactic functions of words in the semiotic theory of language. In spite of the terminological differences, there is a striking correspondence between the two hierarchies. Yet, there are also serious divergences in view of the fact that the generativist structure hierarchy is founded on the confusion of linguistics with logic, while the functional hierarchy is postulated as a result of the consistent semiotic approach to the study of language. Thus, generative grammar assigns syntactic combinations with predicative articulation — that is, sentences — to the class of deep structures, and nominalizations of sentences, to the class of corresponding surface structures. In many cases this classification of syntactic combinations into deep and surface structures is valid and agrees with the classification of syntactic combinations into primary and secondary syntactic functions established by semiotic grammar. When, however, the two grammars differ in construction analysis, this divergence arises from their different conception of syntax: semiotic grammar is founded on the semiotic conception of syntax, while generative transformational grammar is implicitly founded on the logical conception of syntax. The difference in the two conceptions of syntax is reflected, in the first place, in the choice of syntactic primitives. For generative grammar the syntactic primitive is the sentence. For semiotic grammar the syntactic primitive is the central sign of language, which is the word. The different choice of syntactic primitives leads to different programs of syntax. Generative syntax views sentence structures as deep structures of language and nominalization structures as transformations of deep structures into surface structures of language. Semiotic syntax, on the other hand, is the theory of word combinations, which considers sentences only as a particular subclass of the general semiotic class of word combinations. The concept of the sentence taken without qualifications is an ambiguous concept that can be interpreted either from the logical or the semiotic perspective. From the latter perspective, the properties of the sentence are not taken as primitive (as is done in logic), but are regarded as derived from the syntactic properties of words as central signs of language.

To illustrate the foregoing, consider the following nominalizations: *the singing bird* and *the red table*. As noted above, generative grammar views all types of nominalization as derived from predicative structures. This analysis can be motivated from a logical point of view, but it does not follow from the sign properties of word combinations. Semiotic grammar, on the other hand, bases its analysis solely on the degree of structural complexity of word combinations. For generative transformational grammar nominal structures are always derived from predicative structures; for semiotic grammar, depending on relative

structural complexity, in some cases nominal structures derive from predicative structures, while in others predicative structures derive from nominal structures. Thus, in the above examples, semiotic grammar considers *the singing bird* as derived from *the bird sings* but *the table is red* as derived from *the red table*. The reasoning behind this analysis is that the primary syntactic function of a verb is the function of predicate and the secondary function of a verb is the function of the attribute, while the reverse is true of an adjective: the primary syntactic function of an adjective is to serve as an attribute, while its secondary syntactic function is to serve as a predicate. Since word combinations with words functioning in their secondary capacity are considered structurally more complex, this provides a structural motivation for the semiotic analysis of nominalizations and other syntactic structures.

The fundamental error of generative transformational grammar is that it takes the sentence — rather than the word — as the syntactic primitive. Given this assumption, generative transformational grammar views all nominal word combinations as derived from predicative word combinations. But, in fact, both sentences and nominal word combinations are two particular classes of fundamental word combinations of language. We can only gain insight into the most intimate properties of sentences and nominal combinations by a careful investigation of the syntactic laws of word combination.

Parts of speech are classes of words that differ from one another by their syntactic function, defined by syntactic oppositions as follows: the noun has the syntactic function of subject and the verb has the syntactic function of predicate, where both functions are defined by the opposition of NOUN:VERB; the adjective has the syntactic function of attribute defined by the opposition of ADJECTIVE:NOUN. We see that each part of speech correlates and is defined by its own specific syntactic function.

An important concept characterizing the syntactic functions of parts of speech is *syntactic derivation* and the distinction between primary and secondary syntactic functions of words based on it. With respect to their syntactic functions, we divide words into basic ones, having inherent syntactic functions we call their primary syntactic functions, and words derived from the basic ones. Derived words with their syntactic functions are regarded as secondary syntactic functions of basic words. To illustrate, the verb *rotate* is a basic word whose syntactic function is predicate, which is its primary syntactic function. *Rotation* is a word derived from *rotate*. The syntactic function of *rotation* is subject. From the perspective of syntactic derivation, we consider *rotation* and its syntactic function of subject to be a secondary syntactic function of *rotate*. Take now the derived participle *rotating* with its syntactic function of attribute.

We consider *rotating* with its syntactic function of attribute as another secondary syntactic function of *rotate*.

In accordance with the Principle of Superposition (see 6.4), if a part of speech P_1 occurs in the position of another part of speech P_2 , then P_1 acquires a new syntactic function which coincides with the syntactic function of P_2 and is considered a secondary syntactic function of P_1 . Applying the Principle of Superposition to the comparison of *the red table* and *the table is red*, we see that *the red table* belongs to the fundamental word combination class of English because in this word combination both the noun and the adjective have their primary syntactic functions, while *the table is red* must be regarded as derived from *the red table* because in the position of predicate *red* has taken on the secondary function of predicate. The copula *is* is the marker indicating the addition of the secondary function of predicate on top of the primary syntactic function of *red*. We conclude then that despite a clear parallelism between the hierarchy of deep and surface structure of generative transformational grammar and the hierarchy of primary and secondary functions of semiotic grammar, these hierarchies are based on different and incompatible principles.

The research program of generative transformational grammar is wrong because it is based on ideas that confuse the concepts of linguistics with concepts of logic. Yet, while we must reject the research program of generative transformational grammar, we must not discard wholesale the massive body of work produced by the generativists. Any positive results must be carefully reinterpreted from the semiotic perspective, any mistakes learnt from.

Eventually, the hegemony of generative transformational grammar gave way to various reactionary trends. One of them advocated that linguistics ought to abandon the mistaken notion of deep structure and concentrate entirely on the surface structure and the surface phenomena of language. While this trend has enjoyed wide success, we may wonder whether it is healthy for linguistics. If we think of generative transformational grammar as an affliction that befell linguistics, the surface trend cannot constitute recovery. The ideas behind the notion of deep structure have proved wrong. But this does not mean that the notion of deep structure is in itself bad. On the contrary, any science needs to transcend surface phenomena and seek insight into the deep structure. The goal of every science is to study the deep structure of its particular domain.

Semiotic Linguistics pursues the goal of revealing the true deep structure of language. Thus, Semiotic Linguistics conceives of *the phoneme* as a semiotic class of sounds distinct from *the sound* as a physical class of sounds. The phoneme as a semiotic class of sounds and the sound as a physical class of sounds relate to each other as the deep class of sounds and the surface class of sounds.

By analogy with the distinction between the phoneme as a semiotic class of sounds and the sound as a physical class of sounds, I introduce the distinction between the *meaning proper* as a semiotic class of meanings and *information* as a logical class of meanings. The meaning proper as a semiotic class of meanings and information as a logical class of meanings relate to each other as the deep class of meanings and the surface class of meanings.

Ultimately the totality of the primary functions and primary meanings of linguistic signs constitutes the deep stratum of language superposed with a hierarchy of secondary strata. Stratification is part of the deep structure of language.

Having said that as independent and autonomous branch of knowledge linguistics must be totally independent of logic, is there more to the relation between linguistics to logic? The independence of linguistics from logic does not mean that linguistics and logic have no relevance to each other. On the contrary, paradoxical as it may seem, the separation of linguistics as a branch of knowledge independent from logic means at the same time a closer connection of linguistics with logic. The important thing to note is that language and thought form the unity of the language-thought continuum. As part of this continuum language can be understood only in its relation to thought. To study language is to study language in its contrast with thought. Yet insofar as contrast exists between distinct objects, contrast presupposes distinction. If by mixing linguistic and logical concepts we blur the distinction between language and thought, we are unable to study language in contrast to thought.

Contacts between linguistics and logic are very important. Again, I wish to emphasize the special importance of the contact of linguistics with the branch of logic called *combinatory logic*.

Semiotic Linguistics and logic are two pillars of the study of what I call the *theory of the language-thought continuum*. Contact between Semiotic Linguistics and logic is important because in spite of their fundamental differences there are laws common to language and thought. One such law — the Range-Content Law — will be presented in this book (6.7).

Language pervades all aspects of our life. Language is no less important prerequisite for cognition and the human society itself than human biology. Semiotics of language opens new horizons for the investigation of language and the human mind. Semiotic Linguistics provides the necessary basis for the study of the human mind just as physics provides the basis for understanding nature.

1.2 The place of Semiotic Linguistics among other semiotic disciplines

Contrary to Saussure's idea that linguistics must be merely a part of semiotics, the general theory of signs, I define Semiotic Linguistics as the central semiotic discipline, to which all other semiotic disciplines must be subordinated. By examining objects of various other semiotic disciplines, I demonstrate that natural languages are the only complete sign systems, with a structure that ensures an efficient signifying function. In comparison with natural languages all other sign systems are severely limited in one way or other, making impossible any productive generalization with the aim of developing semiotics as a general theory of signs. Instead of unrealistically thinking of semiotics as a general theory of signs, we must contend ourselves with establishing a hierarchy of semiotic disciplines, which must be subordinated to Semiotic Linguistics.

Saussure linked linguistics to a general theory of signs he called *semiology*:

A science *that studies the life of signs within society* is conceivable. It would be part of social psychology and consequently of general psychology. I shall call it *semiology* (from the Greek *sēmeîon*, 'sign'). Semiology would show what constitutes signs, what laws govern them. Since this science does not yet exist, no one can say what it would be; but it has a right to exist, a place staked out in advance. Linguistics is only one part of the general science of semiology; the laws discovered by semiology will be applicable to linguistics. [...] Here I will merely call attention to one thing: If I succeeded in assigning linguistics a place among sciences, it is because I had related it to semiology. (Saussure 1972: 33)

[...] The necessity or specific value of semiology is not clearly recognized. But for me the linguistic problem is semiological in the first place, and all developments derive their significance from this particular fact. (Saussure 1972: 34)

Saussure's discovery that the nature of language was foremost semiotic and his placing linguistics within the purview of the general theory of signs marked a decisive progress in the study of language. It led the way for linguistics to become an autonomous science. But, paradoxically, although Saussure's placing linguistics within the purview of the general theory of signs opened up the road to progress, at the same time it contained the germs that finally blocked that road. What is semiology — or, as it is now called, semiotics — as general theory of signs? And what is linguistics as part of semiotics? No one can give a reasonable answer to this question. There does not exist a general theory of signs, and there is no place for linguistics in a nonexistent science.

Why is there no semiotics as a general theory of signs? Is such a science not feasible?

It is one thing to study the various areas of sign use, but it is quite a different thing to develop a fruitful general theory of signs. In saying that linguistics must be part of semiotics — even if a most important part of it — Saussure left open the question in which sense linguistics must be part of semiotics. He left open the nature of the connection between linguistics and semiotics.

In all fairness, Saussure spoke about semiotics only as of a prospective science and said very little on this topic. But investigating his notion that linguistics must be part of semiotics, we must ask ourselves this question: what is the place of language among other sign systems, and how can semiotics as a prospective science of sign systems make fruitful generalizations from natural languages and other potential objects of its study? To answer this question, we must consider some representative sign systems and how they relate to language.

Every sign system by definition must consist of signs. An exact analysis of the concept of sign will be given later (3.1). Here it is enough to rely on the commonsense notion of the sign. The function of the sign is to represent, to replace a thing, serving as its substitute for consciousness. All our life we are surrounded by a great multitude of very different types of signs. How can we classify signs to understand their mutual relations?

The essential feature of anything we call 'sign' is its capacity to *mean*. The capacity to mean is a condition for something to be a sign and so to be considered to belong among the objects of semiotics. An important principle characterizing meaning is that a sign's capacity to mean depends on the sign system it belongs to. Thus, the red color of the traffic signal has nothing in common with the red of a tricolor flag, just as the white of this flag has nothing in common with the white color as a sign of mourning in China.

An important property of meaning is *interpretation*. Interpretation is a relation between sign systems. We distinguish between an *interpreting* and an *interpreted* system. By introducing this important relation between sign systems we discover that human language is the only sign system that can function as an *interpretant* of all other sign systems in human society, while the converse is not true: human language cannot be interpreted by any other sign system, except for special cases like the mutual interpretability between Morse code and the alphabet of a language. Interpretation between sign systems occurs in one direction only: from any sign system into language, and never the reverse. We come up with a semiotic hierarchy, with human language accorded the privileged place and all other sign systems subordinated to it. The study of this

semiotic hierarchy, that is, the study of the relations between the members of this hierarchy, must be the primary task of semiotics.

The fact of semiotic hierarchy raises a question: What kind of useful generalizations about the nature of signs can be made by studying the semiotic hierarchy? What general principles and laws concerning the nature of signs can we hope to discover? One principle was discovered by Saussure. This is the *principle of the arbitrariness of the sign*: in all sign systems the relation between sign and meaning is arbitrary. What other principles or laws of signs can we hope to discover?

In trying to find an answer to this question, let us formulate the necessary conditions for semiotic systems of different types. Any semiotic system must include: 1) a finite set of signs, 2) a finite set of rules for generating an infinite set of sign combinations. Another central concept for characterizing sign systems is the concept of the *unit*. No serious theory can be constructed without defining an elementary unit, because every meaningful system must be defined on the basis of the method it uses to communicate meaning. It is also essential that all units must be signs. Units and signs are different things. Every sign is a unit, but not every unit is a sign.

Human language has units, which are signs. Do other semiotic systems have units? Arts are often considered to be semiotic systems. Music consists of sounds arranged in different sequences. Every sound can be viewed as a unit, but musical sounds do not have the function of meaning. Language is a system with units having the function of meaning, while music is a system with units having no meaning. When we consider visual arts, like painting or sculpture, it becomes altogether questionable whether these 'systems' have units. What is indisputable is this: no semiotics of musical sounds, colors, or images can be formulated in terms of sounds, colors, or images. Any semiotics of a non-linguistic system must use language semiotics for self-interpretation. Hence, any semiotics of a non-linguistic system can exist only due to the existence of language semiotics. It does not matter that in this case language is used as an instrument rather than object of analysis. The important thing is that language is the interpretant of all other semiotic systems, both linguistic and nonlinguistic ones.

Language is the only system that is semiotic with respect to both its formal structure and functioning. As to its formal structure, language articulates into units that are signs. All signs are conventional, that is, accepted by every member of the linguistic community. Language is a complete semiotic system with the capacity of being used to interpret all other semiotic systems that are specialized in comparison with language.

We see that language radically differs from and is vastly superior to all other semiotic systems. One may ask: What is the source is for the vast superiority of language over other semiotic systems? My answer is that it lies in the fact that language is a form of thought. Without its rich structural and meaning capacities, language could not serve as an adequate form of thought. To sum up, there is an abyss between the structural and functional capacities of language and all other sign systems. This is why no useful generalizations from natural languages and other semiotic systems are possible. Hence, the term ‘semiotics’ cannot denote the general theory of signs but must refer to a complex of semiotic disciplines, each concerned with a particular member of the hierarchy of semiotic systems and each subordinated to language as the head of this hierarchy. As the head of this hierarchy, language is the interpretant of all other semiotic systems.

Saussure was wrong to think of linguistics as merely part of semiotics, as the general theory of signs. Semiotics as the general theory of signs is not feasible. Linguistics must become Semiotic Linguistics — an independent discipline whose aim it is to discover principles and laws of language viewed as a system of signs.

1.3 Language defined

Let us start our quest for the essence of human language by defining language:

[D1] LANGUAGE

Language is part of a language-thought continuum, being a conventionalized communicative interpretation of thought imposed through social coercion on all the members of a human community by the need for communication — an essential condition for the existence of the human community. Language analyzes human thought — each language differently — into signs having vocal forms and meanings. The vocal form, in turn, is analyzed into successive and distinctive units, called phonemes. Each language has its own inventory of mutually interrelated phonemes. As a conventionalized communicative interpretation of thought, every language stands between thought and reality as a particular folk model of the world.

The function of language as the communicative interpretation of thought is not the sole function of language. Language has many other functions. Why then is only the communicative function part of the definition of language? The reason is that the communicative function defines the essence of language. The communicative function is the *raison d’être* of language. Language exists only

insofar as it satisfies the need of society to have a means of communication. Society cannot exist without language as a means of communication. Nor would language exist if there were no need for communication. If by a mental experiment we imagine a language which has no other but communicative function, such a language remains a language. But we cannot imagine a language without the communicative function. The essence of any language is in its communicative function. No matter how important, all other functions of language are secondary. They are parasitic on its communicative function.

In what follows I will consider the important questions that can and must be raised in connection with this definition of language and will give my answers to them. As a result, we will come up with a picture of language and grammar from a semiotic perspective.

1.4 Grammar and semantics

Our definition of language states that every language analyzes human thought into signs, each of which has a vocal form and meaning; the vocal form, in its turn, is articulated into phonemes. Thus, in any language every sign has three attributes, or aspects: (1) vocal form, (2) meaning, (3) the articulation of the vocal form into phonemes.

Let us now see how the study of language must be organized in accordance with the distinction of the three aspects of the sign considered above.

We start with the fundamental distinction of the two domains of the present study: 1) *semantics* — the study of the meanings of the signs of language and 2) *phonology* — the study of phonemes.

Many linguists do not agree with this dual distinction of the fundamental domains of the study of language. They argue that syntax is an autonomous or at least separate area of study on a par with semantics. The idea that grammar in general and syntax in particular are more or less autonomous of semantics and that grammar and semantics are separate domains of study and can be pursued independently is fairly widespread. But this is an illusion. I contend that if we recognize that signs are fundamental units of language, if we recognize that meanings are necessary attributes of signs, if we recognize that the idea of signs having no meanings is plain nonsense, we must recognize that syntax — that is, the study of how words link with one another to form sentences and parts of sentences — is the study of the meanings of these links. Therefore we must consider syntax to be part of semantics. Generally, grammar and semantics are not two separate domains of the study of language. They are one. Since

the notion of meaning is implied by the notion of the sign, and since the study of signs implies the study of meaning, we could dispense with the term ‘semantics’ altogether. But conceding to the widespread habit of using the term ‘semantics’ as a kind of a honorific term, I divide the field of linguistics into *grammatical semantics* (and syntactic semantics in particular) and *lexical semantics*. Actually, the term ‘semantics’ is redundant in these expressions; we should speak merely about grammar and lexicon. Since the study of signs implies the study of meanings, we could use the plain terms ‘grammar’ (and ‘syntax’ as part of grammar) and ‘lexicon’ without any ambiguity.

Where did the whole confusion about grammar and semantics as autonomous domains of the study of language come from? The origin of this confusion must be sought in the works of logicians in the field of the study of artificial sign systems called *logical syntax* and *logical semantics*. Investigations in this field were codified by Charles Morris, who divided the study of sign systems into semantics, syntax, and pragmatics. Morris did not distinguish between the study of the artificial sign systems of logic and the study of the sign system of natural languages. The work of Morris implies that his division of the study of sign systems is equally valid both for logic and linguistics. The ideas of Morris and other logicians caught the imagination of many linguists, who applied his distinction between semantics, syntax, and pragmatics to linguistics. This is unfortunate. It may well be that the ideas of Morris and other logicians make good sense for some artificial sign systems (although some logicians question the usefulness of this distinction for logical systems, as well), but they do not have any sense whatsoever with respect to the study of the sign systems of natural languages, because any sign of a natural language has meaning as its attribute, there is no sign without meaning, sign and meaning cannot be separated from each other.

Most linguists stick to the unfortunate distinction of syntax, semantics, and pragmatics in natural languages, but there are linguists who understand that these allegedly separate and independent areas of study are one. I wish to mention Anna Wierzbicka, who published a book with the eloquent title *The Semantics of Grammar* (Wierzbicka 1988).

1.5 Transfer Principle

Let us turn back to our fundamental distinction between the two areas of the study of language: semantics and phonology.

How must the study of semantics be organized?

To answer this question, I must address an important phenomenon in the operation of language.

The important thing to note is that, as far as the communicative function is concerned, a sign and the meaning it represents are not on a par. The vocal form of a sign is subordinate to the meaning of the sign, because a sign is only an instrument for communicating a meaning. It is not important which sign device is used to mean a thing. A sign is variable and the meaning is constant. We can replace a given sign by any other sign, and its meaning will remain the same. We can use the sign /pen/ to refer to 'book' and the sign /buk/ to refer to 'pen' — the meaning remains the same.

Meanings are manifested in signs insofar as signs are the instruments and meanings are the goals of communication. From the functional standpoint, what matters is meanings themselves, rather than the way they are communicated by their signs. From the functional standpoint, signs and their meanings are characterized by the means-goals relationship. Just in this sense are signs subordinate to their meanings. The system of meanings of language is invariant of a wide class of the changes of the vocal forms of signs.

To capture the observations above, we introduce the Transfer Principle:

[D2] **TRANSFER PRINCIPLE**

Meanings of signs are invariant of the vocal forms of their signs, so that they may be transferred from one sign form to another without changing.

For example, subject-object relations can be represented by case markers or by word order. Subject-object relations are invariant of their sign representations.

Various forms of the sign representation of meanings may be divided into six main types: 1) vocal segments, 2) word order, 3) composition, 4) alternation of vowels or consonants, 5) reduplication, and 6) accentual differences. To exemplify what is meant by vocal segments, take the word *un-like-ly*, where three distinct vocal segments — *un*, *like*, and *ly* — represent three distinct meanings. Word order is illustrated by the contrast *John killed that bear* : *That bear killed John* or *dress night* : *night dress*. An example of composition is *killjoy*, that is, 'one who kills joy.' Examples of the alternation of consonants are *goose:geese*; *sing:sang:sung:song*; the alternation of consonants is illustrated by *wreath:to wreathe*, pronounced with *th* as in *think* and *then*, respectively, or *house:to house*, pronounced with *s* and *z*, respectively). Reduplication is illustrated by the English *pooh-pooh* and the Indonesian *orang-orang* 'people,' where *orang* means 'man.' Accentual differences are illustrated by '*ex-tract:to extr'act* or '*convict:to conv'ict*.

1.6 Genotype grammar and phenotype grammar

Under the Transfer Principle, we must ascend to a new level of abstraction lying above the level of the distinction of signs and phonemes. By a new process of abstraction, we must consider signs under the single viewpoint of their meanings while disregarding the form of material elements serving as signs of meanings. Signs considered solely from this viewpoint, regardless of their forms, constitute what I call *the genotype of language*. The structure of the genotype is independent of its implementation by the linear word order or other sign means of expression. The genotype and the sign representation it employs are separate objects, being simultaneously bonded to each other by the means-goals relationship: signs are means for representing language concepts which serve — to borrow Sapir's (Sapir 1921) metaphor — as 'thought-grooves' for the purpose of communication.

We come up with the necessity to split semantics into two areas of the study of language: 1) the study of the genotype, that is, the study of the system of meanings insofar as meanings are represented by sign devices but in the total abstraction from the form of the sign devices; 2) the study of the *phenotype*, that is, the study of the system of sign devices for the representation of the genotype.

It is important to stress that any meaning is a fact of language only insofar as it is represented by some sign device. Therefore genotype grammar never separates meaning from sign devices representing meaning. What it does is study the bond between sign devices and meaning in total abstraction from the form of sign devices.

The distinction of the genotype and the phenotype — of genotype grammar and phenotype grammar — has counterparts in the groundbreaking studies of Sapir in the field of linguistic theory and language typology and Haskell B. Curry in the field of logic. The genotype-phenotype-like distinction underlies Sapir's conception of language and language typology. Thus, Sapir wrote in his *Language*:

The question of form in language presents itself under two aspects. We may either consider the formal methods employed by a language, its "grammatical processes," or we may ascertain the distribution of concepts with reference to formal expression. What are the formal patterns of the language? And what types of concepts make up the content of these formal patterns? The two points of view are quite distinct. (Sapir 1921: 57)

Chapter IV “Grammatical processes” of Sapir’s *Language* (1921: 56-81) is devoted to what I would call studies in phenotype grammar, and Chapter V “Grammatical concepts” (1921: 84-119) is devoted to what I would call studies in genotype grammar. Finally, Chapter VI “Types of Linguistic Structure” (1921: 120-146) is devoted to what I would call studies in the typology of genotypes.

A distinction akin to my distinction between genotype and phenotype grammar can also be found in Curry’s revolutionary conception of logic, which is of great importance both for logical studies and for computer science, where Curry’s combinatory logic served as a theoretical basis for the programming language Haskell, created and developed by Paul Hudak and his associates at Yale University (Hudak 2000). Curry formulated his combinatory logic as a system where formal objects were conceived differently from standard formalizations of logic. The standard procedure at that time was to demand that formal objects be strings of symbols formed by the operation of concatenation. Concatenation is the operation of combining symbols in a linear sequence. Curry adopted a different approach to the formalization of logic. In combinatory logic formal objects, called *obs*, were wholly unspecified as to the form of their sign representation. It was merely postulated that by a combination operation, called *application*, *obs* be constructed from primitive objects, called *atoms*. *Obs* were thought of not as strings of symbols or any other expressions of a formal language but as objects completely independent of the form of their representation by signs. Similarly, *obs* were thought of not as strings of atoms but as structures like genealogical trees.

Curry came up with the distinction of two types of formal systems: the *ob-system*, that is, a system of structures independent of the form of expressions representing them, and the *concatenation system*, that is, a system of expressions that are strings of symbols linked together in a linear sequence. An *ob-system* is invariant of the concatenation systems expressing it. This agrees with the tendency in mathematics to seek intrinsic invariant formulations such as vectors, projective geometries, topological spaces, etc.

The application of his ideas to linguistics came to Curry as an afterthought. In his paper “Some logical aspects of grammatical structure” (Curry 1961), referring to the concept of the *ob-system*, Curry wrote:

Now this situation suggests that we may think of a language in an analogous fashion. That is, we may think of it not as a system of expressions, but as a system of phrases. (Curry 1961: 65)

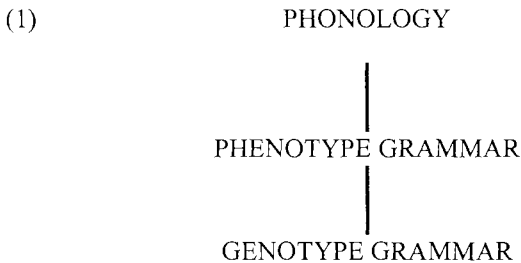
Curry regarded phrases as structures independent of their sign representations. Referring to his conception of phrases, Curry wrote:

This gives us two levels of grammar, the study of grammatical structure in itself and the second level that has much the same relation to the first that morphophonemics does to morphology. In order to have terms for immediate use I shall call the two levels *tectogrammat-ics* and *phenogrammat-ics*, respectively. (Curry 1961: 65)

There is a close parallel between the genotype system of linguistics and the ob-system of logic and between the phenotype system of linguistics and the concatenation system of logic. My distinction of genotype and phenotype grammar parallels Curry's distinction of tectogrammat-ics and phenogrammat-ics.

1.7 The organization of Semiotic Linguistics

The discussion in the foregoing sections can be summed up in the following schema of the organization of the study of language:



This tripartite distinction of the domains of the study of language corresponds exactly to the tripartite structure of the sign: genotype grammar is the study of the meaning of the sign, phenotype grammar is the study of the form of the sign, and phonology is the study of the articulation of the form of the sign into phonemes.

This book is concerned exclusively with genotype grammar. An earlier version of genotype grammar, its mathematical model, and an outline of phenotype grammar is presented in Shaumyan 1987.

1.8 Research Program for Semiotic Linguistics

Research program is a set of guidelines, called ontological and methodological postulates, for developing a theory, in our case — Semiotic Linguistics.

Ontological postulates define in a general way the only legitimate entities in the domain of the theory. To these postulates all problems of the theory must be reduced.

Methodological postulates define the methods which are allowed and which are not allowed in developing the theory.

The ontological postulate central to Semiotic Linguistics is that the only legitimate entities in the domain of Semiotic Linguistics are either the sign defined with respect to its meaning or the meaning defined with respect to its sign. In defining a sign we must look how the sign correlated with its meaning, and in defining a meaning we must look how the meaning is correlated with its sign.

Neither the properties of the sign can be defined separately from its meaning nor the properties of the meaning can be defined separately from its sign. The sign separated from its meaning is not a sign, not part of the language, but a physical phenomenon. The meaning, separated from its sign, is not a meaning, not part of language, but a concept, a phenomenon of thought.

Signs, meanings, and phonemes form *classes* and *combinations*. I use the term 'class' as a synonym of the term 'class' and the term 'categorization' as a synonym of the term 'formation of classes.'

The methodological postulate of Semiotic Linguistics based on its ontological postulate is that the only legitimate method of studying the sign is in connection with its meaning and the only legitimate method of studying meaning is in connection with its sign. Neither can the properties of the sign be defined separately from its meaning nor can the properties of the meaning be defined separately from its sign.

The sign-meaning bond is what distinguishes language from thought in the language-thought continuum. Since as part of the language-thought continuum language resides in the mind, Semiotic Linguistics inputs into the theory of the mind.

1.9 Anomalies, antinomies, and concepts of Semiotic Linguistics

A new theory is often a result of an explanation of an anomaly in an existing science. An anomaly is a fact that contradicts to established concepts and laws, so that to remove the contradiction we need either a new theory or a new science. A classic example is an anomaly with respect to the Relativity Principle in physics. Since it was discovered that the velocity of light is constant, this fact contradicted the Relativity Principle. The attempts to remove this anomaly

by the transformation of physical concepts resulted in the creation of the theory of special relativity. An anomaly is an initial state that as a result of a complex work is transformed into new fundamental concepts, theories or sciences.

A special and very important kind of anomaly is antinomy. An antinomy is the existence of two contradictory statements, each of which must be recognized as true. Since an antinomy is inadmissible for a theory, it must be explained by introducing new concepts or by a complete change of the existing theory. The contradiction is removed not by rejecting one of the two statements or by the declaration that the contradiction is false, but by synthesizing the two contradictory statements into a dialectical unity of a higher order. By the term 'dialectical unity' I mean a unity where the contradiction is not removed, but is treated as two legitimate complementary aspects of a concept of a higher order. This is a special case of Bohr's Complementarity Principle.

An example of an antinomy is the two contradictory statements about the behavior of the electron. It was discovered that the electron behaved both like a particle and like a wave. 'The electron is a particle' and 'The electron is a wave' both were true contradictory statements that excluded each other. The contradiction was resolved by synthesizing the contradictory statements into the dialectical concept of quantum where neither of the contradictory properties of the electron was removed but the two were reconciled by considering them as complementary properties of the unit of a higher order.

The discovery and investigation of anomalies and, especially, of antinomies is an essential condition of the progress of science. The goal of science is to raise the level of our understanding of the world. A new theory created as a result of the transformation of anomalies raises our understanding of the world to a new level owing to the fact that it changes our view about the facts well known to us. The new laws and concepts change our technique of inference; they are parasitic on the technique of inference. Separated from the new technique of inference, they mean nothing. A correct theory is parasitic on a correct technique of inference. A false theory is parasitic on a false technique of inference.

The investigation of anomalies and especially of antinomies is important for linguistics, as well. It was due to the investigation of antinomies in linguistics that I understood that antinomies must be transformed into a new science — Semiotic Linguistics. For the first time Semiotic Linguistics was described in 1987 in my book *A Semiotic Theory of Language*. This book presents the contemporary state of Semiotic Linguistics which has changed considerably since 1987 and contains a large number of significant innovations.

The necessity of building Semiotic Linguistics from scratch is explained by the fact that the concepts of contemporary linguistics cannot be used in the framework of semiotic research. Contemporary linguistics suffers from problem-blindness. It is blind with respect to anomalies that flow from the intrinsic nature of linguistic signs.

Chapter 2

Language as a Phenomenon of the Social Mind

2.1 Facts of the social mind

The term 'social mind' means a system of representations of the forms of public communal procedures that are different in nature from representations and mental states that constitute the mental life of the individual. Facts of the social mind are facts of social coercion that cannot be inferred from the laws of individual psychology or from the laws of biology. Social coercion is imposed on the biological and individual psychological processes of the human mind, forming a new independent level. The social mind must be a special domain of the study of the human mind — the *theory of the social mind*.

Linguists who, following Chomsky, regard language from the perspective of individual psychology, will insist that the social mind can have no other substratum than the individual mind: either the social mind floats in a vacuum or it is attached to a substratum of the individual, it ultimately depends on. Therefore, these linguists will say, language must be explained by the laws of individual psychology and ultimately by the laws of biology.

To this objection I answer as follows. Unless we observe merely a sum of isolated elements, whenever elements of any kind combine they give rise to new phenomena. The properties of a new phenomenon can be explained not by individual elements but by the entity formed by the union of individual elements. A collective is formed only by individuals, just as the living cell is formed only by chemical particles. The living cell is a radically new phenomenon compared with the chemical elements it consists of: the biological properties of the living cell cannot be discovered in the atoms of hydrogen, oxygen, carbon, or nitrogen. The important thing is the structure of the union of the elements. Any structured union of elements is a radically new phenomenon

compared with the elements it has been formed of. The important thing is to distinguish between a mere sum of elements and a structured whole — a structured combination of elements.

Let us now apply this approach to the theory of the social mind. Coercion upon every individual produced by a system of social relations between the individuals of a collective is a social fact that cannot be created by any individual alone. This forces us to admit that social facts are specific facts that reside in the whole of a collective, not in the individuals forming the collective. We face a structured whole, a structured combination whose properties cannot be reduced to the properties of its parts. Therefore a system of representations of social facts in the minds of individuals — the social mind — cannot be inferred from the properties of any individual consciousness, just as the biological properties of life cannot be inferred from the properties of the chemical molecules that make up a living organism.

The social mind differs from the individual mind not only in quality but also in substratum. Paradoxically, even though both the social mind and the individual mind reside in individuals, they differ in their substratum because they do not evolve in the same environment or according to the same conditions. True, both the social mind and the individual mind are of a psychic nature: both consist of the ways of feeling, thinking, and acting. But the two differ radically as to their states. The psychic states of the social mind radically differ from the psychic states of the individual mind; they are of an entirely different kind. The mentality of groups is not that of individuals — it has its own laws.

Whatever relationships exist between the theory of the social mind and the theory of individual psychology, they are sharply distinct as entirely different fields. The content of the two fields is different because social life cannot be explained by the individual mind. The content of collective representations is the way a group thinks about matters that affect it as a social body. Therefore collective representations and individual representations cannot have the same causes.

2.2 Independence of language from psychology

The acquisition of a language by a child is a psychological process. But language is part of the social mind of individuals and therefore language is outside individual psychology. Let us consider facts supporting the notion that language is a phenomenon of the social mind.

Language is a system of signs. Signs must be understood by all members of the collective using a given language or else communication between them is

impossible. A member of a collective is not free to choose signs or their meanings. Due to the requirements of communication, the collective use of the system of signs is coerced on the members of a collective.

A language used by a collective is external to its individuals because it existed before any of these individuals was born.

Language is thought organized in signs differently in each language community. It is a collective sign mold imposed on the thoughts of individuals of a language community: each of the individuals of a language community thinks his own thoughts, but he shares his signs with his fellow men.

In this respect the problem of understanding the social status of language displays some parallels to the central problem of social and political theory: the problem of accounting for the corresponding coercion which moral rules and customs, collective laws and institutions exert over the individual members of a society. These parallels are implicit in the arguments of Hegel, Marx, and other philosophers who were concerned with the analysis of types of social institutions and establishments. These philosophers argued that the exercise of individual rights presupposes the existence of society and is possible only within the framework of social institutions. We could add that the expression of individual thoughts — the individual use of a language — presupposes the existence of a language as a social institution imposed on the members of a language community.

The communality of a language and the freedom of its use by individuals seem to contain an inherent contradiction that reminds us of the paradox of political freedom, as stated by Jean-Jacque Rousseau, “Man is born free, and everywhere he is in chains.” But on a deeper analysis these fetters turn out to be the necessary instrument of effective political freedom. The same is true with respect to language. Man is born with the power of expression of his original thought and everywhere this originality is constrained by the communal sign mold imposed on his or her thought by the language they use; yet on a closer analysis this sign mold turns out to be the necessary instrument of effective thought and communication.

We may also recall Toulmin’s argumentation in support of the communal notion of the language of science in his book *Human Understanding* (1972). There is a parallel between natural languages and languages of science. Both are part of the social mind. The difference between a natural language and a language of science is that the former belongs to a wide language community while the latter belongs to a narrow group of scientists. Actually, a language of science is a natural language with new words added to be used as technical terms and some old words redefined to turn them into technical terms.

2.3 Independence of language from biology

Language presupposes biological processes underlying its functions. The biology of language is a legitimate topic of research, it may become important. Of course, the recognition of biological processes underlying language does not mean that we have to recognize the innateness of universal grammar, to say nothing of a universal grammar of a particular style. To any claim that universal grammar is innate, an immediate healthy skeptical reply is, 'Why must it be?' So far, claims that universal grammar is innate have been based mainly on arguments from ignorance, such as 'Grammar is unbelievably complicated and so must be innate,' or 'A child does not appear to have access to the data from which grammar could be learned; hence grammar must be innate.'

Questionable hypotheses aside, the biology of language can become important. But no matter how important the biology of language will become, this does not mean that the biology of language will now or in the future replace linguistics. Language is a phenomenon of the social mind. But are the laws of the social mind reducible to the laws of biology? We may doubt it. The laws of chemistry are reducible to the laws of physics; but the laws of chemistry remain independent of the laws of physics insofar as the laws of chemistry concern specific chemical phenomena different from physical phenomena. Neither will physics replace chemistry nor will the biology of language replace linguistics.

Language has both biological and social nature and the essence of language is in its social nature. Why must we recognize this duality and why the social aspect constitutes the essence of language? Language is a phenomenon of the social mind, and the social mind is a complex phenomenon. The social mind has a biological support and it is an attribute of individuals. But individuals live in communities. And they communicate. We cannot imagine that even in the most ancient stages of their existence human beings could exist outside communities. Man is a biological phenomenon, but the conditions of his existence as man are social. No human beings could exist without communication. Now, the rules of communication, which are the rules of a language, are imposed on the consciousness of every individual who is coerced to observe these rules.

An analogy between a language and a game may be helpful. Both a language and a game are supported by the biological aspect of the brain: the faculty of language and the faculty of game. But the essence of a game is in its rules, not in biology. Similarly, the essence of language is in the rules of its grammar, not in biology. Both games and languages are supported by biology, but their essence is in that they are systems of rules serving as specific forms of human communication.

2.4 Methodological fallacy of reductionism

Both natural languages and languages of science are cultural entities. We must correctly understand the relation of languages to human nature. As part of human nature language has biological inheritance. But is biological inheritance a cause shaping languages as cultural entities? No, it is not. Biological inheritance imposes constraints on human action. Culture permits us to transcend biological limits like limits on articulatory capacity, memory capacity, or auditory range. Language is a sign system of culture, and culture is constitutive of mind. The meanings of signs, the semantic properties of language are not caused or shaped by the biological inheritance of language. The facts of language are radically different from the facts of individual psychology and biology. They must be explained by the laws of language *sui generis*, not by the laws of individual psychology or biology.

Linguists who seek to reduce language — a social phenomenon, a phenomenon of culture, a phenomenon of the social mind — to individual psychology and biology commit a methodological fallacy known as *reductionism*. Reductionism is a methodological procedure seeking to explain the properties of a structured whole by the properties of its constituents. This methodological procedure is fallacious because the properties of a structured whole are radically different from the properties of its constituents. To recall our analogy, the biological properties of a living cell are totally different from the chemical properties of its constituents — hydrogen, oxygen, carbon, and nitrogen. The social mind underlying language is a structured combination of social relations reflected in the human mind. This structured whole is a social fact that cannot be created by an individual alone. Constituents of the social mind may belong to psychology or biology. But the properties of the social mind as a structured whole *sui generis* cannot be explained by the properties and facts of individual psychology and biology. The social mind is a supra-psychological and supra-biological phenomenon.

The practice of reductionism is not limited to linguists who seek to reduce the facts of language to the facts of individual psychology or biology. Some elementary particle physicists are often liable to the charge of reductionism. Most serious physicists, however, are opposed to reductionism. Scientists oppose reductionism as a failure to understand that reality is stratified into a hierarchy of structured levels where facts of one structured level are related to constituents of a higher structured level, whose properties differ entirely from the properties of the lower structured level. Opposition to reductionism in all branches of science is so strong that reductionism has become a standard ‘bad

thing.’ The fact that reductionism is fashionable in linguistics is a striking indication of the methodological provincialism of contemporary linguistics.

Reduction of the facts of language to the facts of individual psychology and biology as a general prescription for progress in linguistics does not hold water. I do not think that linguists should drop everything they are doing and devote themselves to the psychology and biology of language, just as chemists do not think they should drop their business to devote themselves to solving the equations of quantum mechanics for various molecules; just as biologists do not think they should stop thinking about whole plants and animals and think only about cells and DNA.

Language is a social phenomenon, a social institution. In quest for its essence we must seek to gain insights into the mysteries of its sign structures rather than expect help from psychology, logic, or biology.

2.5 Language versus knowledge of language

The essential fact about language is that as a system of rules it is a social institution independent of individuals. Hence, we must distinguish two different concepts: language as a system of rules imposed on individuals by the necessity to communicate and knowledge of language by individuals. While language as a system of rules and a social institution is the subject matter of theory of language, knowledge or mastery of language is a psychological phenomenon and is the subject matter of the psychology of language. Linguistics is independent of the psychology of language, but the psychology of language must be based on linguistics.

An analogy with games is helpful again. Consider chess. Chess and knowledge of chess are different things. There is the theory of chess as a system of rules and there is the psychology of chess. There are a lot of interesting books on the psychology of chess, but these books are quite different from the books on the theory of chess. The study of the acquisition of chess is part of the psychology of chess. The psychology of chess is based on the theory of chess, not vice versa. Similarly, the psychology of language must be based on the theory of language, not vice versa.

The data for linguistic research are *texts* (which may be recorded, written down, etc.). They must be investigated adequately. We are concerned with the *product*, not with *processes*. Our concern is the product — language implemented in texts. Rather than be concerned with processes mostly inaccessible to research or non-existent, we face an observable object that, unlike all those processes, fulfills the communicative function.

2.6 Language-thought and the method of the distinction of language from thought

Dependence between language and thought has many unsolved problems and is controversial. One difficult question is whether thought is possible without language. For our purposes there is no need to go into this dispute. We concentrate not on all aspects of relation between language and thought but on the undisputable fact that any oral or written text contains language and thought in their unity.

Thought is represented by language through text, by which I mean a stream of signs in both written and oral discourse. Text is what can be observed directly. And by observing text we discover that thought and language are tied to each other. Thought is not an independent object, which can be observed directly. But language, as well, exists only in connection with thought as its representation. Hence, approaching the study of either language or thought, we cannot take them as separate from each other at the initial stage of our research, but face a single complex, undifferentiated object having thought and language as its two interwoven aspects. This complex undifferentiated object I call *language-thought*. Language and thought are only different projections of integral object — language-thought.

Taking language-thought as a primitive object at the initial stage of our research, we fix the limits of our object and state definite requirements to all further definitions of language and thought. Hence by thought we will only mean the content of its conventionalized organization, that is, the content of a language, and by a language only a conventionalized organization of thought by a system of signs.

The assumption of language-thought as the starting point of our research and the definition of the relation between language and thought will account for the phenomena due to intrinsic tie between language and thought. This approach will allow us to avoid methodologically irrelevant questions such as whether thought is always represented by language, or whether there is a kind of thought that is independent of language, or whether there is language that does not represent thought.

The idea of an intrinsic connection between language and thought is not new. This idea can be traced to the ancient Greeks, who posited the identity of language and thought — an idea facilitated by the meaning of the Greek word *logos*, which meant both ‘word’ and ‘thought.’ What is new about my concept of language-thought is the dialectic interplay between continuity and discreteness. The language-thought duality is both continuous and discrete: on the one hand, the meaning of a sentence is identical with the thought it expresses, but

on the other, the meaning of a sentence has linguistic and logical constituents as its discrete components. From the perspective of continuity, language and thought are not distinct objects: language is identical with thought and thought is identical with language. But from the perspective of discreteness, language and thought relate to each other as distinct entities. Language and thought — as both continuous and discrete components of the duality of language-thought — have relative autonomy, and *the proper object of linguistics is language as the conventionalized organization of thought*.

It is the continuity of language and thought that gives rise to the subject matter of linguistics. Language and thought as a whole is contained in text. Text is our fundamental data. Our task is by analyzing text to discover language as an entity distinct from thought. We start our research by facing language-thought as the object where facts of language proper and facts of logic and psychology are intermingled into an indistinguishable mass. Our task is to draw a clear distinction between linguistic and logical or psychological facts by using the power of abstraction. Unless we are able to do this, we understand neither language nor thought.

What is the method of drawing distinction between linguistic and logical or psychological data?

This method is provided by the research program of Semiotic Linguistics. To define language as distinct from thought is to define the laws of sign and meaning in their interconnection. Meaning considered separately from sign is concept — part of thought. Sign considered separately from meaning is a physical phenomenon. Only the connection of sign and meaning, sign-meaning, belongs in language. To define the laws of language is to define the laws of sign-meaning.

2.7 Semiotic versus objectivist view of language

Language is an immensely complex network of relationships between signs. A sign appears at first sight an extremely obvious, trivial thing, but its analysis shows that in fact it is a very strange thing, abounding in subtleties, with most important consequences that are easy to overlook.

Let us start with what seems obvious about the sign. Consider the basic signs of language — words. The explicit or implicit axiom underlying most theorizing about language is this: every word represents an object of reality. This is, essentially, the *objectivist view of language* — signs are *surrogates* of things that exist independently of language. Objectivism accepts as axiomatic the precept that words have meaning for us because they ‘stand for’ — are rep-

representations, substitutes for — something else. Therefore the key question always is: ‘What does a word stand for?’ As long as we think of words as essentially functioning as names of objects or properties given in advance of language, there is nothing mysterious about them. It seems obvious that signs *mean* things — that signs *stand for* things external to language. On this view, words are names of things outside language, and language is essentially a nomenclature — a list of signs corresponding to a list of things.

Objectivism has a long history in the Western linguistic and philosophical tradition. We find the following account of the origin of language in chapter 2 of the Book of Genesis:

And out of the ground the Lord God formed every beast of the field and every fowl of the air; and brought them unto Adam to see what he would call them: and whatsoever Adam called every living creature, that was the name thereof. And Adam gave names to all cattle, and to the fowl of the air, and every beast of the field. (Genesis 2: 19-20)

These verses had a lasting influence on the history of Western linguistics and philosophy in part because a number of philosophers were committed to the view that language was a divine gift. If one accepts the view that language is a divine gift, then it is natural to take the words of the Bible as a description of the nature of this gift.

There were disputes about other matters. Plato’s dialogue *Cratylus* is the first in the long history of disputes about whether names given to physical objects or concepts are arbitrary or motivated by the nature of objects. The essential feature of objectivism is that physical objects or concepts exist in advance of the signs that name them. Thus, *Cratylus* holds that everything has a right name of its own, which comes by nature, whereas his opponent *Hermogenes* champions the view that names are simply vocal labels devised to suit human convenience — one name in itself is as good as another. Later, *Locke* advocated arbitrariness, while *Leibniz* held that there were natural relations between words and the things they name. But regardless of their views about the nature of the relation between the sign and the thing it names, neither *Cratylus* or *Hermogenes* nor *Locke* or *Leibniz* call into question that things denoted by signs come in advance of signs. Objectivism holds that, reduced to its essentials, language is a list of terms corresponding to a list of things.

Another model of sign objectivism was developed by *Aristotle*, who explicitly claimed that thought precedes language. In his *On Interpretation*, *Aristotle* starts with an assumption that the external world exists independently of those who observe it and is the same for everyone. Then he says that a sign can be interpreted in two ways: 1) as an element representing an object of the external world or 2) as an element representing an idea or an image of an object of the

external world. This dual interpretation is applicable not only to verbal signs, but to other kinds of signs, as well. For example, a sculpture of Plato may be viewed either as a representation of Plato or a representation of an idea (image, memory) of Plato. A map may represent either a terrain or an analysis of the terrain done by a cartographer. Thus, Aristotle introduced a new configuration of the objectivist notion of the sign, consisting of three elements: 1) word, 2) external object, and 3) idea of an external object. This ternary model of Aristotle's was first adopted by Peirce and later, independently, by Ogden and Richards.

Aristotle's model makes a distinction between two kinds of objectivism — external and internal, — depending on whether the objects words 'stand for' are perceived by language users as physical or mental. Various compromises between the two kinds of objectivism may take place. Thus, for Russell and Frege, the meaning of a word can be either a physical or abstract object. What Frege considers an object includes numbers, classes, directions of lines, and truth values. Frege (1892) split the concept of meaning into two concepts: denotation (*Bedeutung*) and sense (*Sinn*). According to him, sense belongs to a third world, which is different both from the physical world and the world of thought. Like material objects, senses exist independent of our thought; but unlike material objects, senses are not accessible to our perception.

The objectivist view of language was developed in various ways in the works of many philosophers, including Hobbes, Locke, Leibniz, Frege, Russell, and Wittgenstein. It underlies Wittgenstein's early work: according to his *Tractatus Logico-Philosophicus* (1922, proposition 3.203), "The name means an object. The object is its meaning."

Similarly, in linguistics: what, according to Montague, Chomsky, and most other linguists, words stand for are various physical, psychological, or logical objects or concepts.

Do linguistic signs stand for things outside language? Paradoxically, the answer is no. True, in using language we mean things outside language, but these things are in a sense created by language. Linguistic meanings are a *system* whose content depends on our cultural organization of the world into classes. This system is not linked to the representation of our actual experience, but rather serves as a conventionalized form — as a conventionalized mold — for expressing and communicating our thoughts.

How is it possible for language to be a conventionalized form of the representation of the world? The linguistic sign is a differential entity defined by the concepts of *semiotic difference* and *value*. Semiotic difference is a difference between meanings matched by a difference between vocal forms. Value is the differential property of signs and the differential property of meanings. Signs

and meanings do not exist independently of semiotic differences between signs and semiotic differences between meanings.

It is wrong to think that differences between meanings reflect pre-existing differences between things of the world. The paradoxical property of semiotic differences is that they constitute structures that create signs and meanings. Signs and meanings come into existence once the whole structure of semiotic differences is in place. Hence the fundamental entities of language are differences between signs and differences between meanings, rather than signs and meanings themselves.

This is a very difficult, but a very important idea. To illustrate this idea with a picture, Saussure was fond of drawing an analogy between language and chess. Just as the properties of chess units are defined not by their objective material nature, but by their functional differences — by their structural relations, so the differences between signs and differences between meanings are defined not by properties of things given in advance of language, but by their semiotic differences — by their structural relations.

We see that the differential concept of the sign is diametrically opposed to the traditional objectivist notion of it. The differential concept of the sign has consequences that are of paramount importance for the understanding of the relation between language and thought and for the method of linguistic research.

Under the traditional objectivist notion of the sign, thought precedes language. The process of thinking starts directly with the objects of the real words; words come afterwards, at the final stage of the process. It is assumed that words are merely means for the expression of thought. To find out what a word means, we must find out what the thought expressed by it is. If we understand signs in this way, it is reasonable to show an object when we want to define the meaning of a word. Say, to define the meaning of the word 'kangaroo,' it is reasonable to show a kangaroo.

Things are, however, completely different when we model language as a game. If words are like chess pieces, it does not make sense to show a bishop to define what thought is expressed by the word 'bishop,' just as it does not make sense to point to a bishop to explain the chess piece 'bishop.' Rather, to understand the meaning of the chess piece 'bishop,' we must find out the function of this piece in the chess game. Likewise, to find out the meaning of the word 'bishop,' we must define the place of this word in the linguistic system.

Semiotic Linguistics rejects the traditional understanding of sounds as means of the expression of pre-existing thought and replaces it with the idea of the unity of sound and thought. Sound and thought are intrinsically inseparable. The inseparability of sound and thought is illustrated by Saussure's apt com-

parison: it is as impossible to separate thought from sound, as it is impossible to cut a sheet of paper without simultaneously cutting *recto* and *verso*. We come up with the *sound-thought duality* — a dual object that follows from the differential concept of the sign. Language is not a means of expressing thought understood as an autonomous phenomenon. Rather, thinking and operating signs make up a complex biplanar process.

We should not think that in rejecting objectivism Saussure denied that signs could be names of ready-made things. It is a fact of life that things may precede names. Consider manufacturing. A company develops and manufactures new goods, which it subsequently names (brands and trademarks). For example, the names for new antacids — Zantac, Prilosec, Nexium, and Pepsid — were given to the corresponding products after these products were designed or manufactured. In this respect, the description in the Bible of how Adam gave names to living creatures is faultless. The Lord God acted like a manufacturer. He manufactured living creatures and brought them to Adam to see how he would call them. The fault with objectivism is not that it recognizes that linguistic signs can be the names of things that precede them, but that it views signs solely as the names of things that precede them and thus fails to see the specific mechanisms of the functioning of linguistic signs. It was these mechanisms that Saussure discovered.

2.8 Language as a theoretical construct and language universals

So far we have been concerned with the concept of language as the sound-thought articulator, disregarding differences between languages. We have abstracted language from the complex, undifferentiated object language-thought. Let me call this process of abstraction *vertical abstraction*. But language is not merely an abstract notion as opposed to thought. It is also a general notion with respect to Russian, English, Japanese and other particular languages. We infer language as a general concept by a different process of abstraction, which I will call *horizontal abstraction*. Let us consider this process.

Let me reiterate what is generally meant by abstraction from a group of objects. Such abstraction considers a group of objects from a *single* point of view disregarding all other properties of the group. The purpose of such an abstraction is to identify one feature which, in contrast to all other properties, is considered particularly important in a given situation. Many types of concept formation depend on this sort of abstraction.

How do we form the concept ‘language’?

Before we answer this question, let us take an example of concepts formation in biology. Under the old division into zoology and botany, biology was concerned mainly with a taxonomic description of the many forms of life on earth. These forms were compared with the aim of discovering laws or regularities in the organic realm. There naturally arose the question of from what viewpoint the various organisms should be compared. To answer this question, biology had to abandon its old approach to the study of organisms. The 'new' biology abandoned its characteristic concern with individual organisms and instead directed its inquiry to biological functions like growth, metabolism, reproduction, respiration, and circulation that are characteristic properties of living organisms. These abstractions proved more fruitful than they were initially perceived to be. They displayed an independent cognitive power in promoting the creation of new concepts which brought about deep insights in extensive regions of biology under a broad unitary view. Thus, the study of processes of inheritance gave rise to Darwin's theory of evolution. The investigation of respiration and metabolism led to the investigation of chemical processes in the living organism. The questions about biological functions were transposed into the questions about the material realization of these functions. At this stage of abstraction biology extended into chemistry and atomic physics, which allowed for a uniform explanation of certain biological phenomena that extended to all living organisms.

Let us return to linguistics. In our science we observe processes of abstraction similar to what happened in biology. Traditional linguistics was concerned mainly with a taxonomic description and comparison of the individual languages of the world. Particular languages were compared with the aim of discovering the laws or regularities of many individual languages or groups of individual languages on earth. Modern theoretical linguistics has abandoned the taxonomic approach to studying languages. Just as modern biology is interested in biological processes rather than individual organisms, so modern theoretical linguistics should be interested in universal linguistic synchronic and diachronic processes rather than in individual languages — this is what is meant by *language universals*. The study of individual languages can supply us with interesting data as, for example, the data from the American Indian language Hopi showing that this language has no affixes referring specifically to dimensions of time. Although these data may be intriguing or present challenges for our descriptive skills, modern theoretical linguistics should prefer to concentrate first of all on the puzzles provided by the everyday data of well-known languages. Hence it should be concentrated on a limited number of languages. Chomsky has gone so far as to argue that the best way of studying language universals is to carry out an abstract investigation of one particular lan-

guage. This is, of course, overkill. Chomsky's argument is based on his contention that language universals are innate properties of the human mind. It is not crucial whether or not we accept that language universals are innate. But it is important that the study of language universals include not only universal constants but also universal differentiation parameters. The real problem we face is establishing a sample of human languages that would be representative of both universal constants and universal differentiation parameters. This sample must include languages from different language types.

The desideratum of establishing a representative language sample suitable for inferring universals is recognized by most theoreticians. Semiotic Linguistics imposes a further requirement on what is to be considered language universals. Since language is a system of signs, language universals must be linguistic principles that follow from the properties of language signs and the system of coordinates used to define the speech situation. In this sense all the principles presented in this book are language universals.

Drawing a parallel between the development of linguistics and biology may seem to ring the bell of old-fashioned and inconclusive nineteenth-century debates about the 'organic' nature of language. There is no cause for alarm. The analogy between the development of linguistics and biology concerns only the logic of the development of the two sciences. Quite simply, there is a remarkable similarity in the changes in the level of abstraction in biology and linguistics from the level of taxonomic generalization to a higher level of abstraction of the study of abstract biological and linguistic universals. The substance of language has nothing in common with the substance of organisms. The similarity between linguistics and biology lies in the logical aspects of the processes of abstraction as practiced in these two sciences.

Modern theoretical linguistics should not be concerned with the notion of idiolect and with the question of how we form the abstraction of a particular language like English from the idiolects of Tom, Dick, and Harry. Modern theoretical linguistics should take the terms 'English language,' 'Russian language,' etc. as primitives — that is, as not defined through other concepts.

How should the terms 'English language,' 'Russian language,' etc. be taken as primitives? While each of us speaks his own English or his own Russian — his own idiolect — the meanings of words we share with our fellow-men. The language we use is public property. To understand what the English or Russian language is, we must come to terms with the central relationship between what is individual and personal and what is our social inheritance. The English language, as all other human languages, is a social institution, and the problem of understanding what the English language is displays a remarkable parallel to the central problem of social and political science: that of accounting for the

intellectual authority which community laws, customs, and morals exert over individuals. Accordingly, to know what the English language as the language of educated Englishmen or Americans, it is acceptable to concentrate on the English of one particular educated individuals or a small group of educated individuals without the risk of losing the essential details of the English language. This is really what happens in practice of the linguistic research of particular languages. For example, the classic pronouncing dictionary of English is based on the description of the personal pronunciation of its author Daniel Jones.

Language as a theoretical notion sharply differs from the notion of a concrete language like German, Russian or English. It is important to understand that language as a theoretical notion is not a variable that ranges over all objects called 'languages,' taking as its values such objects as 'English,' 'Russian,' 'French,' etc. Language as a technical term is a system of language universals. Language universals are not common properties of languages in the generic sense of the word 'common': they are not properties shared by all languages of the world. Rather language universals are common properties of concrete languages insofar as a given language universal may be — but is not necessarily — found in any language. For the modern theoretician, language is a system of possible structural and functional processes which may be discovered in one or another concrete language but not necessarily in all languages.

To confuse the everyday notion of language with the theoretical one is the same as to confuse the everyday notions of work or energy with the physical concepts of work or energy. An example of the confusion of the everyday notion with the theoretical concept of language can be found in N. L. Wilson's book *The Concept of Language*. Wilson (1959: 4) claims that "the word 'language' has a clear and correct use only as an individuating term." This claim is meaningful only with regard to the everyday use of the word 'language.' Not only Wilson confuses the everyday use of the word 'language' with the theoretical concept of language, but his analysis of the everyday use of this word is wrong. It is wrong to assert that the word 'language' can be correctly used only as an individuating term. In everyday use, the word 'language,' as any other common noun, applies correctly both to individual objects and to classes of individual languages, as when, for example, we say 'the English language' or 'the French language.' Clearly, Wilson's theory is influenced by false nominalist philosophies (like that of Quine), whose utopian goal was to ban all abstraction from science, including class names.

2.9 Semiotic universals as genetic factors

2.9.1 *Communicative function of language*

An important problem in the study of language as an independent object is the determination of the function of language. On a widely held view, language is an *instrument*, or *tool*, of *communication*. The exchange of signs between the speaker and listener suggests an analogy with the use of an instrument. This relates to language use rather than to language as a system. Language use — or the speech situation, or the process of communication between the speaker and the listener — is an actualization of language as a system.

Let us consider the analogy more closely. The analogy suggests that just as we use tools to facilitate some tasks, so we use language to aid communication. Language is a medium through which people communicate with one another. Words are perceived by the speaker-listener as signs, and signs are means of communication.

Clearly, the analogy is useful. But we must be careful in using it because it can lead us to false views if we forget that tools are inherently material artifacts of man, while language is inherently a mental entity existing in the minds of men. Wheelbarrows, spades, and hammers were all invented by man. They are man's inventions. But language was neither made nor invented by man: it is part of man.

The language-as-instrument analogy might mislead us by suggesting that we should imagine a primordial epoch when one primitive man who invented language discovered another primitive man, so that language could start to develop. This is a fairy tale. It is as impossible to imagine man without language as it is to imagine man inventing language. It is impossible to imagine an isolated man suddenly discovering the existence of another man. There is a dialectical unity of the individual and society. Individuals are part of society and society constitutes the essence of individuals. The definition of man includes being part of society, and speaking language is an essential feature of man. There have never been men outside of society and without language.

2.9.2 *Subjectivity*

We come now to the question: What feature of language as a system determines its use as a means of communication between the speaker and the listener? The use of language in the process of communication between the speaker and the listener is determined by the feature of language that may be called *subjectivity*. This rather inconspicuous feature constitutes an essential genetic aspect of language as a system.

What is subjectivity? Subjectivity is a fundamental feature of language that allows a human to be conscious of himself as a *subject*, as EGO — as ‘my I.’ As it belongs to language, subjectivity is a supra-individual unity that transcends individual experience and ensures the continuity of consciousness. The reality of EGO is in language.

Since all properties of language are derived from subjectivity, we may view language as the *subjectivist model of the world*.

2.9.3 *Polarity of persons*

Subjectivity is correlated with the notion of *person*. Consciousness of oneself is possible only in opposition. I may call myself *I* only in addressing someone who can be called *you*. This dialogue relation defines PERSON. It presupposes a reversible process between *I* and *you*, when *I* becomes *you* in the speech of someone, who in turn calls himself *I*. Language is possible only because every speaker can represent himself as a subject who calls himself *I*. This reversible process may be called the *polarity of persons*. The process of communication is possible solely as a consequence of the polarity of persons.

A further important consequence of the polarity of persons is that *personal pronouns* are signs of a special kind: they mean neither a concept nor an individual. There is no concept of ‘I’ that covers all instances of *I* uttered by different speakers at various points of a communication in the same sense as, for example, the concept ‘dog’ covers all individual usages of the word *dog*. Thus, *I* does not have the lexical properties of a word.

As signs, personal pronouns differ from all other signs. What is then the referent of *I*? *I* refers to an individual instance of communication where it is uttered and where it signifies ‘the speaker.’ The design of language allows every speaker, when he refers to himself, to use language as if it were his own property. Pronouns are variables — empty forms — available in language. These empty forms are appropriated by the speaker.

2.9.4 *Complementary duality of society-individual*

The fundamental consequence of the polarity of persons is the complementarity of the individual and society. They presuppose each other. We face the duality relation *individual-society*. Is there a more basic member of this duality, which led to the emergence of the other one? Was there an individual who established social relations with other individuals, or did society precede the event when individuals became conscious of their EGO? Our answer is that the linguistic foundation of subjectivity presupposes a dialectical unity of the individual and society. The reality is that neither does the individual precede society, nor does

society precede the individual to the extent that a 'society of individuals' is required in order for individuals to become conscious of themselves as individuals.

A new question may be posed: If the individual presupposes society and society presupposes the individual, why, then, do we infer the duality relation of individual-society from subjectivity? Does this inference not contradict our statement that the individual presupposes society and society presupposes the individual? There is no contradiction here. Subjectivity is a fact of consciousness, and language, as such, reflects both the individual's being conscious of himself and his relation to other individuals. Subjectivity is a source of the existence of language. Although *I* presupposes *you*, and *you* presupposes *I*, the foundation of this polarity lies in *I*. We could not think of *you*, nor think at all, if we were not conscious of *I*.

2.9.5 *Arbitrariness and conventionality of the sign*

As another consequence, the polarity of persons presupposes that the meanings of signs must be identical for all persons belonging to a language community, so that the possibility of communication between persons is ensured. How is the identity of meanings of signs ensured? To answer this question we must take into account the fact that signs are *arbitrary*. There is no logical motivation for the fact that what is called *window* in English, is called *Fenster* in German or *okno* in Russian. In order to ensure that the meanings of signs are obligatory for any individual, there must be some convention about the connection between the sign and its meaning imposed on every individual. Hence, the *conventionality* of linguistic signs.

Language is a system of signs. By using language we are able to speak about the extralinguistic reality, about the world. The function of signs is to represent — to replace a thing as its substitute for consciousness.

How does language relate to the extralinguistic reality, how does it relate to the world? To answer this question, we must bear in mind that language, due to the conventionality of signs, is only able to present a conventionalized analysis of the world. Language is a conventionalized model of reality. Language is a conventionalized form of the expression of thought about the reality. As a conventionalized model of the world, language constitutes a dialectical unity with thought: on the one hand, they complement and do not exist independently from each other; but on the other hand, they conflict with each other. This conflict results in the change of language, so that it becomes a better form of thought temporarily until the next conflict between language and thought.

2.9.6 *Ego-coordinates*

One of the most important aspects of individual languages is the relation between word classes and their syntactic functions. Word classes and their subclasses may differ from language to language, but our recognition that the faculty of language is proper to humans presupposes some common features inherent in all languages. The linguist must look for the aspects of language that offer certain points of reference, a starting point for the rise of some fundamental linguistic classes developed and differentiated in individual languages. This is the genetic point of view. The genetic point of view must be sharply distinguished both from the functional and the diachronic points of view. The genetic point of view is a panchronic point of view that is concerned with constant genetic forces acting in the languages of the world.

As a starting point for deriving fundamental linguistic classes common to all languages, we could assume a fundamental model of language use, with a speaker and a listener in a certain place at a certain time. This model is based on *deixis*, that is, on the pronominal elements (pronouns and pronominal adverbs of space and time). The assumption is justified because the conditions of language use may be considered panchronic and independent of any specific language system. The conditions of language use reflected in *deixis* presuppose certain prerequisites in language. The source of *deixis*, just as of all the essential properties of language, is the subjectivist model of the world. Therefore, we have to search for *ego-coordinates*, which are part of language as a system.

The first thing to note is that the *ego-coordinates* relativize space and time with respect to the human subject's view of the universe. This is true *linguistic relativity*, as opposed to *linguistic relativism* in the sense of Whorf. In Whorf's view, everything in language is relative, so that cross-linguistic judgments are impossible. This view reflects relativism rather than relativity. With its slogan 'Everything is relative,' relativism dismisses comparisons between different frames of reference as meaningless. Yet this is not the intellectual strategy of true linguistic relativity. True, linguistic relativity sets out to establish impartial procedures for making comparisons between different frames of reference in order to discover invariants underlying them. While Whorf's approach points solely to the differences between languages, the system of the *ego-coordinates* points to the unifying basis of the languages of the world; it is universal and constitutes the underpinnings of *semiotic universal grammar*: the laws of the *ego-coordinates* are valid for all languages. These laws explain both the stable common features and variability among the world's languages.

2.9.7 *Fundamental linguistic classes*

Let us now look at how subjectivity gives rise to deictic elements, and how deictic elements give rise to universal linguistic classes.

Personal pronouns are the starting point for expressing subjectivity in language. They are the deictic elements other deictic elements depend on. Let us consider them in a very general outline.

The common definition of personal pronouns as a class consisting of three members — EGO, TU, and ILLE — ignores the essential difference between EGO, TU, on the one hand, and ILLE, on the other. The essential property of EGO and TU is that they correlate with the *reality of language use*.

What is the reality of language use? It is communication between the speaker and the listener. *I* is a sign that functions only when it is uttered. A symmetric definition applies to *you*: it is a sign that functions only when it is uttered. The signs EGO and TU differ from all other signs of language by their reference to the speaker and the listener. These signs are instruments of language use. In contrast, all other signs function outside the speech situation between the speaker and the listener. They belong to the domain of what is called *the third person* — the unmarked member of the correlation of persons, that is, the ‘non-person.’ Third person is a way of using language to refer to things outside the actual speech situation. The signs *he*, *she*, *it* radically differ from *I* and *you* with respect to their function of being used as *noun substitutes*.

The inherent and constant reference of EGO/TU in the act of the use of language puts these elements in a close relation with other deictic elements: HERE and NOW link the speech situation containing *I* to a given place and time. A relation of a deictic element to a given speech situation is a source of universal *tense* and *case* categories, as well as of a number of other universals.

The opposition of EGO/TU and non-personal ILLE implies the opposition HUMAN:NON-HUMAN as the basis for classification of all nouns. HUMAN is the marked member of the opposition HUMAN:NON-HUMAN. This means that EGO/TU apply only to humans, while ILLE applies both to humans and nonhumans. This opposition may then be elaborated into PERSONAL:IMPERSONAL, ANIMATE:INANIMATE, with various subclasses like MASCULINE:FEMININE and so on.

The fact that HUMAN is the marked member of the opposition HUMAN:NON-HUMAN accounts for the anthropocentric nature of language. This can be illustrated with the well-known universal fact that languages use agent suffixes for nouns denoting instruments; for example, *screwdriver* in English. We recognize a range of derivational and inflectional processes from human to animate and inanimate, which may be considered a genetic universal.

Here are examples of how reference to the act of the use of language may have led to the development of tenses. Modern English distinguishes between *I have memorized this poem* (perfect, meaning past action) and *I have this poem memorized* (meaning result of past action). But in older English there was no difference between these expressions. Both meant ‘state at the moment of the speech situation.’ Now if the state resulting from an action is simultaneous with the act of language use then the action itself must be supposed to have taken place in the past. This created a favorable condition for the development of the meaning of the past tense. An analogous condition was created for the development of the future. The expression *I shall see him* originally meant ‘I ought to see him,’ and *You will see him*, ‘You desire to see him.’ But if the obligation or desire is simultaneous with the act of language use, then the action itself must take place afterwards. These developments are genetic universals because they happened independently in many unrelated languages.

Just as time, space is an essential coordinate of the act of the use of language. Thus, HERE, as opposed to THERE, means ‘position of the speaker as opposed to the position of the listener or of any other object.’ Some languages differentiate this fundamental contrast further. The system based on the pronominal adverbs HERE:THERE forms a nucleus variously elaborated by various languages.

The system of the so-called *concrete cases* is formed by the spatial opposition WHERE:WHENCE:WHITHER:WHICH WAY. This opposition is the nucleus of the following opposition of cases:

- (2) LOCATIVE ‘lack of movement’ :
- ABLATIVE ‘movement from’ :
- ACCUSATIVE ‘movement to’ :
- INSTRUMENTAL ‘intermediate movement between source and goal’

For example, in Sanskrit: *grāme* ‘in the village’ (locative), *grāmāt* ‘from the village’ (ablative), *grāmam* ‘to the village’ (accusative), *grāmena?* ‘by way of the village’ (instrumental). Concrete cases can change their concrete meanings to abstract. Thus, Latin *Caesar petit Romam* (accusative), which initially meant ‘Caesar moves towards Rome,’ in classical Latin came to mean ‘Caesar reaches Rome.’

The study of linguistic universals reveals their anthropocentric character determined by instances of language use, which in turn is rooted in the subjectivity of language.

2.9.8 *Distributive and integrative relations*

The sentence consists of words. But words are not just segments of the sentence. The sentence is a whole that cannot be reduced to the sum of its parts. The sentence may appear as a mere sequence of words, but in reality the relation between words and the relation between words as parts of the sentence is quite different, because words and sentences belong to the different levels of language.

In order to better understand the nature of changes from the word to sentence level, we must see how language articulates into units depending on the level of articulation. There are two different sorts of relations between language units, which we must strictly distinguish: *distributive relations* between units of one and the same level and *integrative relations* between units of different levels. The notion of distributive relations refers to environments in which a lexical or grammatical form can occur and is well-covered in the current literature. Let us consider integrative relations.

When we decompose a unit of a given level into its components, we do not get units of a lower level, but segments of the given unit. Decomposing the English words *resign* and *rebuild* into *re-sign* and *re-build* does not prove that *resign* consists of two morphological units *re-* and *sign*, on the one hand, and *rebuild* consists of *re-* and *build*, on the other. In order to determine whether segments obtained by decomposition are real units rather than just segments, we must investigate how these segments enter other units as their constituents. Thus we observe formations like *re-write*, *re-try*, *re-consider*, etc. and *build-er*, *build-ing*, *build-up*. In these two sets of words *re-* means 'again' and *build-* means 'to make something.' This proves that the two segments of *rebuild* are separate morphological units *re-* and *build* because their meanings are in keeping with the meanings of the identical segments of words we obtained. This analysis does not hold for *resign* because its segments *re-* and *sign* are not meaningful parts that can be identified with the morphological units of the higher level where the segments *re-* and *sign* function as separate units constituting respective classes. Thus, by considering the higher level of language articulation, we obtain the proof that *rebuild* consists of two units *re-* and *build*, and *resign*, while being divisible into segments, is not divisible into smaller units and so is one simple word. Every unit is a segment, but not every segment is a unit.

Our analysis of *resign* involves opposite but at the same time mutually complementary operations. Physically, a sign is formed by its constitutive elements, but the method of establishing that the constitutive elements of a sign are in fact units is to identify them inside a higher-level unit where they have

an integrative function. An element is recognized as a unit for a given level if we can identify it inside a unit of a higher level whose *integrant* it becomes.

For the purposes of notation, let us introduce the notion of *sign correlator*. The sign correlator is a matrix of an incomplete sign, where the slot to be filled in to obtain a complete sign is denoted by the underscore. Thus the above examples may be represented by sign correlators: *re_* and *build_*. This notation correlates the incomplete signs *re_* and *build_* with complete signs after the slot marked by the underscore are filled with hypothetical integrants. The *re_* and *build_* are integrants that combine with slotted in units to form complete signs. The sign correlator is a device for testing whether a given segment is a true unit. Thus, the segments *re* and *sign* of *resign* cannot serve as integrants of other signs because taken separately they lack meaning: *resign* is one rather than two units.

Where does the distinction between constituent elements and integrants occur? This distinction covers the area delimited by two levels. The lowest level of this distinction is represented by the distinctive features of phonemes. Any distinctive feature of the phoneme serves only as integrant: it does not contain constituents. The highest level is the level of the sentence, which contains constituents but, as will be discussed in 3.1.3, language does not have units higher than the sentence, so that the sentence does not have a level at which it serves as an integrant. Between these two limit levels there is the intermediate level of words and morphemes are both constituent and integrant levels.

The distinction of the constituent and integrative functions of units is fundamental to language. This distinction controls the correlation of form and meaning in language. Form and meaning correlate with and determine each other. They constitute a duality that is inherent in the levels of units and in the constituent and integrative functions of the units of language.

When we reduce a language unit to its constituents, we merely reduce it to its *formal elements* that are segments but not necessarily are units. What must be done to establish whether formal constituents are units of a lower level? We must perform a reverse operation to verify whether these constituents can function as integrants of units of a higher level. What is important is this: the decomposition of units gives us their form, while integration reveals their meaning. The analysis of a unit carries in two opposite directions and, with one direction leading to the discovery of form and the other of meaning.

We formalize the foregoing as follows:

[D3] FORM AND MEANING OF A LINGUISTIC UNIT

The form of a linguistic unit is its capacity to decompose into units of a lower level. The meaning of a linguistic unit is its capacity to be constituent of units of higher levels.

[D4] PRINCIPLE OF COMPLEMENTARITY OF FORM AND MEANING

Form and meaning are interrelated properties of units in the process of language functioning. Their interrelation is determined by the articulation of language linked to the operation of decomposition and integration.

The Principle of Complementarity of Form and Meaning is of a paramount importance for grammatical theory. Serious distortions in the theoretical study of language are linked to the violations of this principle, when either form is isolated from meaning or meaning is isolated from form.

We must understand that in the sign system of language, units are signs, and every sign must have a meaning. This means that a unit is identified by its capacity to be inserted into sign correlators. For every unit we can imagine a list of admissible sign correlators into which the given unit can be inserted. In all cases such lists are based on the general condition of identification of units by their capacity for integration.

Chapter 3

The Linguistic Sign

I propose a new definition of the linguistic sign, which is antithetical to the various traditional notions of the linguistic sign and redefines Saussure's concept, as well. Like any sign, the linguistic sign represents a 'thing' in the most general sense of this word. What is called the meaning of a sign is the correspondence of the sign to the thing it represents. The sign and the meaning are bonded to each other by their correlation, so that they lose their essential properties if separated from each other. Below we will see that both linguistic signs and meanings are differential entities, that is, that differences between linguistic signs must correlate with differences between their meanings, and conversely, that differences between linguistic meanings must correlate with differences between their signs.

Sign and meaning are external to each other, but at the same time they presuppose each other, constituting a bond, so that the meaning is an attribute of the sign and sign is an attribute of the meaning. There is no sign without a corresponding meaning and no meaning without a corresponding sign. A sign separated from its meaning loses its sign properties, and a meaning separated from its sign loses its meaning properties. Recall Saussure's analogy between the sign-meaning bond and the chemical bond of hydrogen and oxygen constituting water. If by a chemical analysis water is decomposed into hydrogen and oxygen, neither element on its own has the properties of water.

One can never overstate the importance of the understanding that the linguistic sign and the meaning operate as differential entities. Without this understanding one can understand neither the nature of language nor its relation to thought and reality. The idea that man perceives reality through the prism of language is not new, and can be traced to Humboldt and beyond. Since Humboldt it has been believed by many philosophers and linguists. But what is the

language-internal mechanism that determines language as an instrument of perception of reality, an instrument of thought and communication? What are the operations of the language-internal mechanism which are not directly observable? The answers to these questions lie in the dark. Certainly, modern linguistics with its tendency to confuse linguistic concepts with the concepts of mathematics, logic, psychology, biology and other sciences, will not furnish any answers to these questions.

The key to the understanding of the internal mechanism of language and its functioning lies in the proper analysis of the notion of the linguistic sign.

3.1 Sign and meaning defined

Let me now introduce a precise definition of sign and meaning.

In my approach 'sign' is not a primitive concept. Rather, I take the following three relations as primitive:

- (3). a. 'to be the sign for': X is the sign for Y
- b. 'to be the meaning of': Y is the meaning of X
- c. 'to be the field for': Z is the field for the pair $\langle X, Y \rangle$

These relations characterize things as relations and not things in themselves. There is no class of things that can be called 'sign' or 'meaning' due to their inherent properties just as there is no class of things that can be called 'master,' 'ancestor,' or 'husband' due to their inherent properties. When we speak of a sign, we mean the binary relation 'to be the sign for,' which may hold between things of many different types. In this respect, the terms 'sign' and 'meaning' are analogous to such terms as 'master' and 'servant,' 'ancestor' and 'descendant,' or 'husband' and 'wife.' Thus, when we speak of a master, we mean the binary relation 'to be the master of,' which can hold between various people. The term 'sign' is an abbreviation for the binary relation 'to be the sign for.' Similarly, the word 'master' is the commonly used abbreviation for the binary relation 'to be the master of,' or 'husband' is the commonly used the abbreviation for the binary relation 'to be the husband of.'

The common use of words such as 'master' or 'husband' as abbreviations for the relative terms 'to be the master of' or 'to be the husband of' is explained by the fact that we often concentrate our attention not on the relation but on an object only insofar as it is a member of the given relation. In such cases we apply the words 'master' and 'husband' to the objects conceived of as the first terms of the relations 'master of' and 'husband of.' Accordingly, I will use the

terms 'sign' and 'meaning' to name objects that are first terms of the relations 'to be the sign for' and 'to be the meaning of.'

A sign conceived of as the first term of the relation 'to be the sign of' has the two facets: a vocal form and property of having a meaning. A meaning conceived of as the first term of the relation 'to be the meaning of' has two facets, too: it is a thing and it has the property of having a sign. Similarly, any other term of a binary relation has two facets. For example, a husband has the physical form of a man and property of having a wife.

While the relations 'to be the sign for' and 'to be the meaning of' are analogous to the binary relations like 'to be the master/servant of', 'to be the ancestor/descendant of' and 'to be the husband/wife of,' they also possess peculiar properties that are crucial for the operation of language. These properties will be considered later.

The sign conceived of as the first term of the relation 'to be the sign of' and the meaning conceived of as the first term of the relation 'to be the meaning of' presuppose each other, forming a pair of objects bonded to each other: the *sign-meaning*.

3.1.1 Sign

The linguistic sign is not necessarily merely a sequence of sounds. The linguistic sign can be a change of stress (compare '*convict* and *con'vict*), an alternation (compare *take* and *took*), a change of a grammatical context (compare *I love* and *my love*), or a change in word order (compare *John killed Tom* and *Tom killed John*). There can be zero signs; for example, if we compare *quick*, *quicker*, and *quickest*, we see that *er* is a sign of the comparative degree and *est* is a sign of the superlative degree, but the positive degree is expressed by the absence of any sound sequence, with *quick*, that is, by a zero sign, that is, by a zero that serves as a sign.

Physical things are signs of language because they are interpreted as signs by the users of this language. From the viewpoint of an external observer, however, a sign is merely sound and nothing more. Similarly, certain things are meanings in language only because they are interpreted as meanings by the users of this language. But from the viewpoint of an external observer meanings are merely certain things.

Since I consider only linguistic signs, unless otherwise noted, the terms 'sign' and 'linguistic sign' are used interchangeably in this book.

3.1.2 *Meaning*

We shall say that Y is the meaning of X if and only if Y is the thing for which X is the sign, that is, if and only if Y is the thing represented by X. The term ‘thing’ is used here in the widest sense possible: the thing is anything which can be perceived, represented, named, and so on, for example, ‘dog,’ ‘electron,’ ‘universe,’ ‘hate,’ ‘Pegasus,’ any quality, any relation, and syntactic relations among them. I use the term ‘thing’ in Husserl’s sense of the *intentional thing*. By things in the intentional sense Husserl did not just mean real things, but also concepts of things or anything which could be posited by an act of thought: a thing may be real, fictional, or even absurd (Husserl 1984 [1913]: 353).

3.1.3 *Field*

I introduce the concept of the field to answer the question: How is the meaning of a sign affected by its contexts? We discover that not every context changes the meaning of a sign; some contexts rather produce variations in the meaning of a sign. The field is a term for the totality of relevant contexts characterizing the primary (or basic) meaning (or, more generally, function) and secondary (or complementary) meanings (or, more generally, functions) of a sign as opposed to contexts that are irrelevant to the changes of the meanings and functions of the sign.

The field is the property of signs of natural languages that distinguishes them from signs of artificial languages like languages of logic, chemistry, genetics, computer programming, etc. The signs of artificial languages have regular contexts, but no special contexts changing the meanings or functions of signs.

Natural languages are *sign-cum-field systems*, as opposed to artificial languages that are plain sign systems. Therefore natural languages have two tiers: the *sign tier* and the *field tier*. The fundamental unit of the sign tier is the word. The fundamental unit of the field tier is the sentence.

The sentence does not have a field; it is a combination of signs, which are words, but not a sign itself. But for the sake of generality in the formulation of the rules of grammar we will call the sentence a sign with a *zero field*.

The specific characteristics of field as the totality of the special contexts of a sign distinct from regular contexts will be explained below (see sections 6.3.7, 5.2, 5.10.3, 8.5).

3.1.4 Assignment of attributes to sign and meaning

Let us consider the statement 'X is the sign for Y' and its equivalent converse statement 'Y is the meaning of X.' Each of these statements contains a binary relation — 'to be a sign for' or 'to be the meaning of' — and its two terms X and Y.

Why draw attention to these statements? We wish to treat them as statements that assign *attributes* to sign and meaning. By the term 'attribute' I mean a property possessed by a thing that is a term of a relation. Assigning attributes to sign and meaning will allow us to reveal the striking dualism of both sign and meaning.

We interpret the statement 'X is the sign for Y' as the statement that assigns to sign X the attribute that sign X has a meaning Y. And we interpret the statement 'Y is the meaning of X' as the statement that assigns to meaning Y the attribute that meaning Y has sign X.

To present the assignment of attributes by statements explicitly, we can adopt the convenient logical notation used by Fitch (1952: 94). Let P be a predicative statement of the form $X R Y$ or its converse $Y R' X$. Let A be a variable for the sign or meaning mentioned in the statement P. Then there is an attribute that P assigns to A. We will designate this attribute by the notation A/P . For example:

(4) $arbor \setminus$ "arbor is the sign for 'tree'"

(4) is the attribute assigned to the sign *arbor* by the statement "arbor is the sign for 'tree,'" and it is the attribute of having the meaning 'tree.' The converse attribute is designated by:

(5) 'tree' \setminus "'tree' is the meaning of arbor"

The notation in (5) represents the attribute assigned to the meaning 'tree' by the statement "'tree' is the meaning of arbor," and it is the attribute of having the sign *arbor*.

The dualism of the sign lies in that although its meaning is external to it, the sign is characterized by its having a meaning. The sign has a dual character: 1) it is a physical entity and 2) it has a meaning that is external to it. Similarly, the dualism of meaning lies in that although its sign is external to it, meaning is characterized by its having a sign. Meaning has a dual character: 1) it is a thing and 2) it has a sign that is external to it.

Beware of confusing two different senses of the verb 'to have' that we can discover by comparing 'John has black eyes' and 'John has a wife.' In the first case 'has' means that black eyes are part of John, in the second case 'has'

means that a wife is external to John. In my examples I use the verb ‘to have’ only in the sense of having an external object.

It is important to understand that although ‘having a meaning’ is an attribute of the sign and ‘having a sign’ is an attribute of meaning, the sign and meaning are external to each other. As we will see below (3.2), Saussure’s analysis of the linguistic sign is incorrect, and it is incorrect because Saussure confounds the concept ‘meaning,’ which is external to the sign, with the concept ‘having a meaning,’ which is an attribute of the sign. The predicate “to be the sign for ‘tree’” is part of the sign *arbor* as its attribute, but from this it does not follow that ‘tree’ is part of the sign *arbor*. The predicate “to be the sign for ‘tree’” and the meaning ‘tree’ are entirely different concepts.

Meaning is external to sign, but it is not external to language. Language as a system of signs and meanings is a conventionalized analysis of reality regardless of whether this analysis reflects real facts or is the product of human imagination, where both signs and meanings are the elements of this conventionalized analysis.

3.1.5 Conventuality of the sign-meaning relation

The relation ‘to be the sign for’ differs from causal implication. In everyday parlance we may speak of a wet pavement as a sign that there was rain, of smoke as a sign of fire, of withering leaves as a sign of frost, and so on. Although causal implication has the same structure as the relation ‘to be the sign for,’ there is an essential difference between the two relations: the relation ‘to be the sign for’ characterizes a conventional connection between a sign and its meaning whereas causal implication characterizes a non-arbitrary, natural connection between cause and effect. Since a causal relation has the same structure as the sign relation, we can interpret the causal relation as a sign relation. The term ‘index’ used by Peirce can be understood as an interpretation of a causal relation as a sign relation. But we must never forget the essential difference between the sign relation as a conventionalized connection between things and the causal relation as a natural connection between them. A similar consideration applies to Peirce’s term ‘icon.’ The relation of iconicity in Peirce’s sense is the relation of similarity interpreted as a sign relation. The concepts of index and icon are acceptable as interesting and fruitful extensions of the concept of sign. But we must never forget the essential difference between sign proper as a conventional phenomenon, and index or icon, which are natural phenomena and may merely serve as surrogates of the sign.

3.1.6 *Meaning and referent*

A language as a system of signs and meanings is a conventionalized system of the analysis of actual or imaginable reality imposed on the members of a language community as a folk model of the world. We must distinguish between the system of signs and meanings and the use of this system in the process of communication. Language in itself and the use of language in the process of communication are quite different events like chess and playing chess. A language is the same for all members of a language community, but it is used differently by different members of that language community. Likewise chess is the same for all people, but different people play chess in different ways.

The meaning of a word has an instrumental function. Words force the listener to see what is meant. The meaning of the word forces the listener to look at certain things in the process of communication, no matter whether the things are actual or imaginable. For example, the sentence *Theseus killed Minotaurus* refers to Theseus and Minotaurus, which are facts of imagination. The actual or imaginable things referred to by the speaker and the listener I call *referents*.

The meaning of a word and its referent differ drastically. The meaning of the word belongs to language while the referent belongs to the world. Take, for example, *Peter is drinking wine*. One can drink the referent of the word 'wine,' but one cannot drink its meaning.

In a language itself we see only meanings. Referents never appear there; they must be identified in the process of communication, using meanings as instruments of the identification. Suppose someone says: *Her new black dress*. The word *her* indicates the possessor of the thing referred to by the speaker, unknown or not to the listener; *new* and *black* indicate the properties of the thing to help its identification; *dress* presents the final clue for the identification of the referent: the referent belongs to the class of dresses, not other things.

We can also compare language with a map of a terrain. The meanings of the words of a language are like the meanings of signs of a map of a terrain. The meanings of words are part of a language just as the meanings of signs on a map are part of the map of a terrain. The meanings of words of a language are clues to the identification of referents just as the meanings of signs on a map are clues to the identification of locations meant by these signs.

It is clear from the foregoing that the meanings of words, like the meanings of any signs, are part of language, while referents are part of the real or the imaginable world the speaker and the listener refer to in the process of their communication.

3.1.7 *Meaning and information*

The sign has two facets: a physical form and the property of having a meaning. Similarly, any other term of a binary relation has two facets. For example, the husband has a physical form of a man and a property of having a wife. Likewise meaning also has two facets: the property of carrying information and the property of having a sign. Meaning is a concept bonded to a sign.

Just as we must distinguish between a vocal segment in itself and a vocal segment as a sign, so we must distinguish between information in itself and information as meaning, that is, the function of information as the meaning of a sign.

Information in itself may or may not be represented by a language sign directly. It functions as the meaning of a sign only insofar as it is represented by some physical entity as a sign.

To illustrate the difference between information in itself and information as the meaning of a sign, let us look at the color spectrum. We can divide the color spectrum differently, depending on the purpose of our analysis. But the concepts constructed by our analysis are facts of thought and not necessarily facts of our language. To take a trivial example, the expressions 'dark blue' and 'light blue' describe different pieces of information, but these pieces of information are not represented in English directly. English does not have different signs to directly represent these different pieces of information. By contrast, Russian does have different words, that is, different signs for distinguishing this difference in information. These different pieces of information serve as meanings of different signs in Russian; they are linguistic facts in Russian, but merely different variations of the same information for users of English. By a suitable choice and combinations of words, any information can be described in any language, but information is a fact of language only insofar as a given language has a sign to represent it directly, in other words, insofar as information functions as the meaning of a sign. Otherwise, concepts are facts of thought rather than facts of language.

Concluding the above analysis of sign and meaning, I need to emphasize some important conceptual distinctions and make remarks on the use of terminology.

It is important to distinguish strictly between three concepts: 1) sign, 2) meaning, 3) having a meaning. A sign has a meaning, but the meaning is not part of the sign. What is part of the sign is its having a meaning, that is, the correspondence of the sign to the meaning, but not the meaning itself. The meaning is external to the sign.

The relation between sign and meaning is analogous to the relation between husband and wife or between master and servant. These are pairs of entities

that presuppose one another and cannot be separated from each other, but at the same are distinct entities. Sign and meaning are a couple formed by the converse relations 'sign for' and 'meaning of,' but at the same time being members of these converse relations, sign and meaning are distinct entities at the same time. Husband and wife are a couple, called a married couple, formed by the converse relations 'husband of' and 'wife of,' but the wife is not part of her husband, nor do husband and wife constitute two parts of a whole. Saussure's fundamental error was that he confused the relation between a pair of entities that presuppose each other, but are distinct entities at the same time, with a part-whole relation. Hence his confusing concept of the sign as a combination of two parts: *signifier* and *signified*.

My concepts of sign, meaning, and referent are an analytic explication of the intuitive notions of sign, meaning, and referent. I replace the intuitive concepts with new theoretical concepts of sign, meaning, and referent explicated as terms of the converse relations 'sign for' and 'meaning of.'

Having introduced the theoretical concepts of sign, meaning, and referent, which are an analytic explication of the traditional intuitive notions, I must emphasize the need to distinguish strictly between the two entirely different concepts: 'meaning' and 'having a meaning'.

The referent is outside the sign and outside language, but meaning is part of language. Meaning is part of language insofar as it in conjunction with its sign is a conventionalized representation of elements of reality regardless of their existence or non-existence.

As commonly understood, language is a system of signs, or, as I propose, language is a sign-cum-field system. We must distinguish between the system of language and the use of the system of language; these are distinct things that roughly correspond to what Saussure meant by his distinction between *langue* and *parole*.

3.2 Critique of Saussure's concept of the linguistic sign

Saussure's concept of the linguistic sign as a two-sided entity consisting of the signifier and the signified was an innovation which had a revolutionary consequence: by defining language as a system of signs understood as two-sided entities Saussure delineated a new object of study. Saussure was aware of this consequence, and indeed it is a crucial insight that in language a concept is a quality of the phonic substance just as a particular segment of sound is a quality of the concept, so that sound and meaning only in their unity constitute the object of linguistics, whereas separated from each other, they are outside the

domain of linguistics. However, Saussure's concept of the linguistic sign suffers from lack of precision. What is a sign as the combination of the signifier and the signified?

In support of his theory of the two-sided sign Saussure states:

One tends to forget that if *arbor* is called a sign, it is only because it carries with it the concept "tree," so that the sensory part of the term implies the reference to the whole. (Saussure 1972: 99)*

The first part of this statement is correct: it is true that a phonic segment is called 'sign' because it relates to another entity called 'concept'; in our case it is true that the phonic segment *arbor* is a sign because it relates to the concept 'tree.' But it is wrong to deduce from this correct statement that a sign and the concept it relates to constitute a whole. Saussure confuses two quite different notions of class membership: 1) a thing A belongs to a class K because it bears a relation R to another thing B, and 2) things A and B together are members of the class K. The second type of class membership is not implied by the first type. For example, if a man is a husband because he has a wife, it does not follow from this that husband is a combination of a man and a wife.

As discussed in 3.1 (page 46), statements in (3) describe the fact that there is a certain relation between sign X and meaning Y: sign X has meaning Y. But although the predicate 'has meaning Y' defines an essential and an inseparable attribute of sign X, this does not mean that meaning Y is part of the sign X.

We must not confuse but strictly distinguish three completely different notions: 1) sign, 2) meaning, 3) attribute of having a meaning. A sign is a sign because it has a meaning, but meaning is not part of the sign — it is external to the sign. Similarly, we distinguish three completely different concepts: 1) husband, 2) wife, 3) attribute of having a wife. A husband is a husband because he has a wife, but wife is not part of husband. To infer that a wife is part of her husband is no less absurd than to conclude that if a phonic segment is a sign because it represents a concept, it follows from this that a sign is a combination of a phonic segment and a concept. The sign really has two facets, but not in Saussure's sense of the combination of sound and meaning, but as an entity having a physical form of sound and an attribute of having a meaning. Similarly, husband has two facets: on the one hand, a husband is a man, that is, a

* All quotations from Saussure are given in my own translations, which draw on but in some essential respects differ from the corresponding passages in the two existing English translations of Saussure — by Wade Baskin (Saussure 1959) and Roy Harris (Saussure 1983). Concerning Saussure's main terms, I translate *langage* by "speech," *langue* by "language," and *parole* by "speaking." Page references are to the pagination of the French edition (Saussure 1972).

biological phenomenon, but on the other hand, this biological phenomenon is the first member of the relation 'to be a husband,' that is, he has a wife.

As an entity having two facets, the sign has a meaning and a material form: we distinguish between the meaning of the sign and the material form of the sign. For example, the meaning of the sign *dog* is 'dog,' and the material form of the sign *dog* is the phonic segment /dog/.

The word *arbor* is a sign not because it includes the concept 'tree,' as Saussure claimed, but because it *represents* the concept 'tree.' According to Saussure, a linguistic sign consists of a *signifier* and a *signified*. But in fact, using Saussure's terms, we must distinguish three completely different concepts: 1) signifier, 2) signified, 3) attribute of having a signified. But then the term 'sign' becomes equivalent to the term 'signifier.' In Saussure's terms, his mistake lies in the confusion of two completely different notions: 'signified' and 'attribute of having a signified.' Indeed, the linguistic sign constitutes a duality. But not in the sense of the combination of the signifier and the signified, but rather in the sense of sound or other material entity which has the attribute of having a signified. Similarly, husband constitutes a duality but not in the sense of the combination of a husband and a wife, rather in the sense of an entity having the physical form of a man and the attribute of having a wife.

The proposed definition of the linguistic sign has all the advantages of Saussure's notion without its defects.

The present critique should not be construed as something meant to undermine the merits of Saussure's contribution to linguistics. On the contrary, the redefinition of the linguistic sign puts the profound ideas of Saussure's theory into a proper perspective. Saussure's fundamental idea was that the essential characteristic of language is the sound-concept bond: the sound and concept cannot be separated from each other without losing the special quality created by their bond. In order to make this idea concrete, Saussure introduced the notion of sign as a bilateral entity. As I have shown, Saussure's notion of sign is seriously flawed. But what is fundamental in his theory is not his definition of the sign but the notion of the sound-concept bond. By rectifying Saussure's notion of the sign, I introduce the theoretical notion of the sign which is more consistent with the essence of Saussure's theory.

The definition of the sign as a combination of the signifier and the signified is an error. But this is an interesting error. The history of sciences presents many examples of developments where an ill-defined notion may contain a revolutionary idea that opens up new horizons for research. By defining the sign as the combination of the signifier and the signified Saussure presented — albeit in a wrong form — the revolutionary idea of the specific linguistic qual-

ity of the union of sound and meaning — the quality that neither sound nor meaning has on its own outside this union.

3.3 Critique of Peirce's conception of semiotics

Two concepts of the sign relation — as an arbitrary relation between sign and meaning or as an interpretation of the causal relation — have led to two very different conceptions of semiotics advocated by Saussure and Peirce.

What do these two concepts of the sign relation mean for our understanding of reality? In our reflections about the world we strive to discover the primary characteristics that determine all the variety in empirical data. Studying language, we seek insights into features that distinguish language from all other phenomena of the world. And how does language differ from all other phenomena of the world? When we consider language in use, as a speech activity consisting of a multiplicity of factors — such as biological, physical, and psychic, individual and social, historical, esthetical, and pragmatic — we ask ourselves: Where is language? This question can be specified in more detail as follows: What are the primary facts linguistics must be founded on and how can we establish them? What is the nature of language phenomena and what type of relations underlies their mutual connections?

In a search for answers to these questions we discover that the essential characteristics of language as a phenomenon distinct from all other phenomena of the world lie in the differential properties and arbitrariness of the sign relation. Arbitrariness is quite different from the interpretation of a causal relation (or any motivated relation) as the sign relation. The interpretation of a causal relation as a sign relation does not make the causal relation arbitrary. A causal relation or any motivated relation does not become arbitrary when we interpret it as a sign relation. Herein lies the essential difference between the sign relation proper and the sign relation conceived of as an interpretation of the causal relation or any other motivated relation.

Starting from these two very different concepts of the sign relation, we discover a striking difference between Saussure's and Peirce's conceptions of semiotics. In their understanding of semiotics Saussure and Peirce are antipodes. These names are often mentioned when philosophers and scientists refer to the founders of semiotics, but no one takes care to understand that we must distinguish strictly between two totally different kinds of semiotics. Let us consider the difference.

It is interesting to note that these two very different conceptions of semiotics were connected originally with two different names — *semiology*, introduced

by Saussure, and the term related to the contemporary *semiotics*, introduced by Peirce. These two geniuses, very different, even polar opposites to each other, who knew nothing about each other, came up almost simultaneously with the idea of an independent branch of knowledge, the idea of a science of signs.

Using the term *semeiotic*, Peirce revived the theory of signs conceived and used by John Locke, who identified the theory of signs with logic. Peirce dedicated all his life to the development of his theory of signs. In the framework of his conception of semiotics, Peirce analyzed not only logical, mathematical, and physical concepts, but also psychological and religious ones. Peirce's eventual aspiration was to classify everything that exists, everything that can be thought or perceived, under various classes of signs represented by a 'universal algebra of relations.' To construct this kind of algebra, Peirce established an initial trichotomic classification of signs into *iconic signs*, *signs-indices*, and *signs-symbols*. This trichotomy is what is best remembered today from the extremely complicated logical construction Peirce developed on its basis.

Peirce does not formulate any precise concepts concerning language. For Peirce language is words, and words are signs. But Peirce is not interested in the nature of words as signs. Rather than investigate the nature of the relation between the word and its meaning, Peirce is concerned with a logical classification of meanings of words. Peirce classifies words as *qualisigns* (sign types), *sinsigns* (sign tokens), *legisigns* (class of signs with the same meaning, such as 'and' and '&'). It is not clear how this classification of words as signs can help to understand the nature of language. The important property of words as signs is in the arbitrariness of the relation between the vocal expression of the word and the meaning of the word. From the investigation of this important property we come up with the deepest insights into the nature of language.

The insurmountable difficulty in the application of Peirce's conception of semiotics is that Peirce considers his principle of sign not as the principle that controls the operation of language but as the principle that explains both the whole world and every individual thing that is part of the world. Man is a sign, his thought is a sign, his emotions are signs. If all of these are signs, then signs are everywhere and nowhere. The sign can be understood only in relation to its meaning. Saussure concentrates on the investigation of this relation while Peirce is not aware of the necessity of this investigation. It is in this point that Saussure is a polar opposite of Peirce. Through the investigation of the nature of the relation between sign and meaning Saussure comes up with the view of language as an exclusive object, as an object *sui generis*, while Peirce's approach as program of research leads nowhere; this program has failed although the rich legacy of Peirce, full of deep insights into the nature of the world, deserves careful study by both philosophers and semioticians.

Chapter 4

The Anomalies of Categorization and the Principle of Differences

4.1 Anomalies of categorization

By observing the data we can easily see that any word usually has not one meaning but many. How do the meanings of a word relate to each other? Linguistics recognizes the importance of this question. Many linguists think that the meanings of a word have some shared properties, so that the common meaning of the word can be discovered.

The first linguist who claimed that the meanings of a word must have shared properties and that the linguist must seek to discover the fundamental meaning (*Gesamtbedeutung*) underlying the particular meanings of a word was Roman Jakobson, who severely criticized a number of eminent linguists for their lack of the idea of fundamental meaning, reproaching them in atomistic approach to the study of meaning (Jakobson 1971: 23). Jakobson's claim that the categorization of words must be based on the shared properties of their meanings characterized by the underlying fundamental meaning looks attractive; it has enjoyed and still enjoys support among many linguists. Some schools of functional grammar base semantic analysis on the assumption that there has to be a single core meaning underlying the meanings of a word. Jakobson's claim has become the classical view of categorization in linguistics. But upon a careful scrutiny we discover that the claim encounters some serious difficulties.

One difficulty is that besides their proper meaning, many words have figurative meanings as their secondary meaning, as for example, *fox* in *He is a wily old fox*. Although the secondary meanings of a word are based on its primary meaning, we must recognize a hierarchy of meanings here rather than some meaning common to the primary and secondary meanings of the word.

Another difficulty is that in spite of Jakobson's claim we discover cases where the relation between the meanings of a word does not seem to be based on shared properties. Hence, not every linguist is ready to accept the classical view of the linguistic categorization. The classical view is disputed in George Lakoff's book with an eloquent title *Woman, Fire, and Dangerous Things*. The title of the book was inspired by Australian aboriginal language Dyrbal, which has the word *balan*, which denotes a category that includes women, fire, and dangerous things. This is an example of a case when categories are not based on shared properties. Lakoff's book abounds in examples challenging the classical view. The classical view of categorization can be challenged on purely empirical grounds, by an empirical analysis of the facts of languages. Thus, Sydney M. Lamb has developed convincing arguments against the classical view. To support his arguments against what he calls the assumption of monosemy by an example, Lamb discusses the results of applying the assumption of monosemy to the analysis of the English preposition *of*. He writes:

It is an assumption of some schools of functional grammar, even though they claim to be striving for cognitively realistic descriptions, that there has to be a single core meaning for any linguistic form (the term 'Gesamtbedeutung' was used in some earlier work on semantics). To illustrate, let us apply this assumption to the English preposition *of*.

We have this preposition, for example, in *throne of gold* (the throne is made of gold), *woman of virtue* (compare *virtuous woman*; is the woman made of virtue?), *the teacher of my daughter* (not *daughterous teacher*, and not made of daughter), *a touch of fall in the air*, and so forth. We can distinguish about a dozen different conceptual functions related to the expression *of*, each of which can be distinguished from the others on the basis of alternative expressions not shared by them (**a fallous touch in the air*). It is clear that, using the ingenuity of the linguist to find something in common between any two or three things, one can find some subtle conceptual similarity among the various functions of *of*. Those who champion the exercise of such ingenuity conclude that there is only one *of*. (Never mind that analytical linguists, being intellectuals, can find something in common between any two concepts.) But whatever common function they might thus come up with, whether rationalized or based on something historical, will be of no help to the foreigner trying to learn English. It is essential for the student to know about the different functions in order to be able to have an ability to speak and understand English.

There is another point connected with this situation: Those who would argue in favor of one *of* believe that in 'finding' a single underlying conceptual unity they have discovered something significant about the cognitive systems of English-speaking people. But rather than a finding this

‘discovery’ is the product of the method, which insists on ‘finding’ a single conceptual unity wherever there is a single expression. Even if there is some diachronic explanation based on times in the past at which *of* (or some predecessor morpheme) started to take on new functions, that is a fact about the cognitive systems of the person or persons making that innovation back in the distant past. From that time, after the usage became established, the new kinds of *of* were just learned by successive generations, in just the same way as irregular past tense forms like *took* are learned by successive generations. This is another example of allowing analytical results to be introjected into a cognitive model — like supposing that the soft drink vending machine pours the liquid into each can at the time of the customer's purchase.

The fact that one can find something semantically common to two meanings is often put forth as support for such arguments. But such a finding cannot be taken as evidence, since any reasonably intelligent person can find something semantically common between *any* two concepts. I have demonstrated the plausibility of this claim repeatedly in the classroom: I ask everyone to pick a concept out of thin air and write it down. I then ask one randomly selected student what concept he wrote down; then the same for another student. Then I ask a third student to find what these two concepts have in common. It has never been at all difficult, and in fact we usually get different students coming up with equally plausible semantic linkages between the concepts. (Lamb 1998: 275-76)

Lamb's arguments against the monosemy assumption are well chosen and are conclusive with respect to a large body of empirical linguistic facts. On the other hand, facts can be discovered in support of the monosemy assumption. In itself the monosemy assumption seems plausible. It is natural to assume that the meanings of a single expression must have something in common, must have certain semantic affinities. It is common that depending on different contexts a word can have different but conceptually related meanings. For example, the English word *spill* has different but related meanings in the different contexts of the expressions *He spilled the liquid* and *He spilled the powder*. The word *spilled* indicates two physically different but related actions in these two different contexts. Similarly, the word *open* indicates two physically different but related actions in the different contexts of expressions *open the book* and *open the door*. Examples like these can be easily multiplied.

In fact, arguments can be brought both in support of the heterogeneity of the meanings of an expression and in support of the semantic affinity of these meanings, that is, in support of the monosemy assumption.

If it is the case that arguments both against and in support of the monosemy assumption can be brought forward, and if it is the case that both types of arguments may prove valid depending on the different bodies of facts adduced,

we run into a fundamental problem: What is the nature of linguistic identity? What determines that the meanings of a single expression happen to be heterogeneous in a large amount of cases, and have a conceptual affinity in no fewer cases?

We face an anomaly that must be explained

In search for an answer to our problem we surmise that the semantic affinity or semantic heterogeneity of the meanings of one and the same expression has probably nothing in common with linguistic identity. In search for an answer to our problem we turn to the Principle of Differences.

I will show that the explanation of the anomaly in meaning leads to a novel theory of language and novel techniques of linguistic analysis that are in a sharp contrast with the established linguistic theories and techniques of analysis.

4.2 Arbitrariness and conventionality of the linguistic sign

The Principle of Differences follows from a careful analysis of the notion of the linguistic sign. The starting-point of our inference is the generally accepted view that the sign is arbitrary. The sign is arbitrary in the sense that the concept 'dog,' for example, is not connected by any internal property to the sound sequence *dog*, which forms the corresponding acoustic image. Passing from one language to another, we see that the concept 'dog' is connected with different sound sequences: *dog* in English, *Hund* in German or *sobaka* in Russian, etc. Signs are arbitrary and have nothing in themselves which links them to concepts for which they stand.

Saussure never tired of emphasizing the arbitrariness of the sign:

Nobody disputes the principle of the arbitrariness of the sign, but it is often easier to discover a truth than to assign to it its proper place. This principle dominates the whole linguistics of language; its consequences are numberless. It is true that not all of them are equally obvious at first sight; only after many detours does one discover them, and with them the primordial importance of the principle. (Saussure 1972: 100)

The reader will notice that in this quotation Saussure uses the term 'sign' in its everyday sense, as he sometimes does in the *Cours*. In this context Saussure does not care about the technical meaning of the term as defined by him because he wishes to secure the greatest consensus on the matter, and because no matter how we understand 'sign' — in its everyday or his technical use — it is arbitrary in both cases.

If we reflect on the nature of language and the linguistic sign, we come to realize that the fact that the sign is arbitrary holds a key to the understanding of how language operates. This fact belongs to the fundamental principles of the semiotics of language:

[D5] PRINCIPLE OF THE ARBITRARINESS OF THE SIGN

The link between a sign and its meaning is arbitrary.

The notion that the sign is arbitrary does not mean that the individual is free to choose any sign to express an idea. Signs are not arbitrary in the sense that they depend on the free choice of the individual. The whole language community could not change a sign because it is imposed on it by the evolution of language. The sign is arbitrary only in the sense that the sign-meaning link is not fixed a priori.

There is no necessary connection between a thing and a sign that refers to it, say, between the thing ‘table’ and the sound sequence /teɪbl/ that refers to it. This aspect of the sign is taken care of by the Principle of the Arbitrariness of the Sign. With respect to the linguistic community, however, which uses signs, they are not chosen freely — signs are imposed as a necessary means of communication. The link between the sign and meaning is imposed by the tradition: in every period of its existence, a language is always inherited from the previous period. Hence, an immediate consequence of the Principle of the Arbitrariness of the Sign is the Principle of Conventionality:

[D6] PRINCIPLE OF THE CONVENTIONALITY OF THE SIGN

The link between signs and meaning is conventional: the existence of language signs is possible solely due to a social contract of the members of a linguistic community to establish and maintain the links between signs and meanings.

If links between signs and their meanings were motivated, it would not be necessary to establish them by a convention. A convention establishing links between signs and meanings is necessary because they are arbitrary. The Rousseau-style term ‘social contract’ is, of course, a metaphor, but a useful one because it helps to understand the matter. Leaving out the metaphor, we say that conventionalized relations are a habit of a society. They are opposed to non-conventional relations determined by physical, biological, physiological, psychological or other laws depending on the subject matter they are concerned with.

The crucial consequence of the Principle of the Arbitrariness of the Sign is that the essential aspect of the sign is not the sound itself, but the phonic differences permitting us to distinguish signs. This statement may seem paradoxical, but how could it be otherwise? If the sign is arbitrary, if for expressing a mean-

ing one sign is as good as another, then it is clear that distinctions between signs can be based only on their non-coincidence with one another. As Saussure pointed out, *arbitrary* and *differential* are two correlative qualities (1972: 163). This condition concerns not only signs, but their conceptual contents as well. Just as the distinction between signs is based on their non-coincidence with one another, so the distinction between conceptual contents of words is based on their non-coincidence. As Saussure put it:

A linguistic system is a series of phonic differences matched with a series of conceptual differences. (Saussure 1972: 166)

4.3 Principle of Differences and the Concept of Value

We discover that identities and differences between meanings depend exclusively on the vocal forms of words and their correlations with meanings. We discover that what is regarded as three different meanings in English but three variants of one meaning in Russian (see example (6), page 65), or, conversely, what is considered two different meanings in Russian but variants of one meaning in English (see 3.1.7, page 52) — all this depends exclusively on the correlation of meanings with the vocalic forms of words. If two or more meanings correlate with different signs, they are considered different, and if they correlate with one sign, they are considered variants of the same meaning. We come up with the law I call the Principle of Differences:

[D7] PRINCIPLE OF DIFFERENCES

In language differences and identities between meanings and between signs are subject to the following conditions: 1) Only those meanings are different which correspond to different signs; and conversely, only those signs are different which correspond to different meanings. 2) If two different meanings correspond to one and the same sign and their differences are solely due to the contexts in which they occur, they are variants of one and the same meaning. And conversely, if two signs correspond to one and the same meaning, and their differences are solely due to the contexts in which they occur, they are variants of one and the same sign. 3) If two meanings correspond to one sign, but freely alternate in identical contexts, they are different meanings.

It should be noted that by speaking of the variants of one and the same meaning, I do not mean to say that the variants of one and the same meaning are necessarily mutually related to one another. They may be related to one another, but often the variants of one and the same meaning are totally heterogeneous. The definition of the identity of the meanings has nothing to do with

whether they are mutually related or unrelated from the conceptual point of view. Actually, here we face the pure semiotic identity of meanings based on the pure semiotic fact that they are represented by one and the same vocal form.

The differential quality of signs and meanings defined by the Principle of Differences determines their value: if two meanings correlate with different signs, they have different values, and if they correlate with one and the same sign, they have the same value; conversely, if two signs correlate with different meanings, they have different values, and if they correlate with one and the same meaning, they have the same value.

[D8] VALUE

Value is the property of the sign and the property of the meaning defined by the Principle of Differences.

One may wonder whether the Principle of Differences is not circular: while relevant distinctions between meanings are defined by their correlation with the distinctions between vocal forms, relevant distinctions between vocal forms are defined by the correlation with the distinctions between their meanings. In fact, this principle does not involve circularity. The point is that correlation between vocal forms and meanings makes vocal forms and meanings interdependent: neither do distinctions between vocal forms determine the distinctions between their meanings, nor do distinctions between meanings determine the distinctions between their vocal expressions. Each kind of distinctions presupposes the other. Neither distinctions between vocal expressions nor distinctions between meanings should be taken as primitives. What is really primitive is the correlation of the distinctions between vocal forms and distinctions between meanings. There is no circularity here because both relevant distinctions between vocal forms and relevant distinctions between meanings are determined by their correlation.

I must emphasize the abstract nature of the Principle of differences. This principle is not a generalization over the properties of meanings as concepts. By contrast, this principle abstracts from conceptual properties of meanings and concentrates on the correlation of meanings with their signs.

The Principle of Differences and the concept of value define the new field of the science of language I call *Semiotic Linguistics*.

4.4 Explaining the anomaly of meaning by the Principle of Differences

4.4.1 *Anomalies of meaning*

If we apply the Principle of Differences to explain the anomalies, we understand that different meanings are assigned to the same word not on the basis of shared properties but because they correspond to the same sign — the same word is the same sign. Three heterogeneous meanings ‘women,’ ‘fire,’ and ‘dangerous things’ are assigned to the same category in Dyirbal because they correspond to one sign *balan*. Heterogeneous meanings of the English preposition *of* are assigned to the same category because all of them correspond to one and the same sign. It is irrelevant whether the meanings of a word share or do not share common properties. What is relevant is whether different meanings correspond or do not correspond to one sign. If they correspond to one and the same sign, they are assigned to one and the same category. If they correspond to different signs, they are assigned to different categories.

The mystery of the linguistic categorization is revealed by the Principle of Differences.

It is important to see that the Principle of Differences explains linguistic relativity as a special case of the linguistic categorization.

Consider:

- (6) *swim*: fish swim in water
float: the leaves float on the water
sail: the ship sails in the coastal waters

In English, *swim*, *float*, and *sail* correspond to three different concepts ‘swim,’ ‘float,’ and ‘sail.’ English speakers distinguish between three different concepts denoted by *swim*, *float*, and *sail*. The distinction between these three concepts is relevant because for English because they correlate with three different signs *swim*, *float*, and *sail*. In contrast, in Russian these three different concepts are considered the variants of one and same meaning denoted by the word *plavat*. Meanings are concepts. What seems strange is that what is considered in English to be three different concepts is considered to be variants of one and same meaning in Russian. And here is an opposite example. The English word *spill* has different but related meanings in the different contexts of the expressions *He spilled the liquid* and *He spilled the powder*. The word *spilled* indicates two physically different but related actions in these two different contexts. But Russian regards the two meanings in these two different contexts as two different concepts denoted by two different words *prolivat* and *rassypat*. Again, what seems strange is that what Russian regards as two dif-

ferent concepts is regarded by English as two variants of one and the same concept. These examples can be easily multiplied by further comparison of English with Russian or with any language of the world.

We discover that identities and differences between meanings depend exclusively on relation between the meanings of words and their signs. We discover that what is regarded as three different meanings in English and as three variants of one meaning in Russian, or, conversely, what is considered two different meanings in Russian and variants of one meaning in Russian — all this depends exclusively on the correlation of meanings with the vocalic sides of words: if two or more meanings correlate with different signs, they are considered different and if they correlate with one sign, they are considered variants of the same meaning. We come up with the Principle of Differences.

4.4.2 *Semiotic identities and semiotic differences*

The Principle of Differences totally overthrows our common ideas about linguistic identities and differences. We recognize that the whole mechanism of language turns on linguistic identities and differences. But what is the true nature of linguistic identities and differences? The answer to this question has so far been veiled in darkness. We see the light through the Principle of Differences. Under this principle, two meanings are related to each other or are different from each other not because of their semantic affinity or semantic heterogeneity but because of the differences or identities in their correlation with signs that represent them. Differences or identities in the correlation of meanings with signs that represent them is what I call the *semiotic identities* or *semiotic differences* of meanings: two meanings are related to each other, that is, are semiotically identical, if they correlate with one and the same sign, or with one and the same expression; and two meanings are semiotically heterogeneous if they correlate with different signs, or with different expressions that represent them.

Semiotic differences and semantic heterogeneity have nothing in common; they are totally different phenomena that belong to totally different levels of language and are completely unrelated to each other. If different meanings correlate with one and the same sign, they are semiotically identical regardless of their semantic affinity or heterogeneity.

In the investigation of the nature of signs and meanings we come up with a totally novel view of the nature of identities and differences underlying the mechanism of language. We come up with a new definition of the concept of the *identity of linguistic meanings*. What is the identity of linguistic meanings? We come up with the paradoxical idea that the identity of linguistic meanings is subordinated to their differences. What do I mean? The point is that linguis-

tic meanings are identical in the semiotic respect, that is, form one and the same class of meanings in the semiotic respect, because by correlating with one and the same sign they differ equally from all other linguistic meanings forming other classes of linguistic meanings by correlating with other signs. The meanings of a sign form one and the same class of meanings not because of their semantic affinity (although they may share semantic affinity in certain cases) but because they are equally different from other meanings forming other classes of meanings.

We come up with a paradoxical concept of the linguistic identities of meanings belonging to one class as *repetitions* of their differences with all other meanings belonging to other classes. We come up with a paradoxical definition. What is the identity of meanings? To answer this question, we subsume the notion of identity under the notion of difference. What is semiotic identity? Semiotic identity is the repetition of differences. What is the semiotic identity of meanings forming one and the same class? The semiotic identity of meanings is the repetition of their differences with all meanings forming other classes of meanings in language. In investigating signs of language we come up with a totally new concept of identity that is not only of paramount importance for linguistics but has great importance for science and philosophy in a wider perspective (see 4.9.2).

4.4.3 *Semiotic identities and semiotic differences in phonology*

There is a striking analogy between the problem of the semiotic identities and differences of the meanings of a sign and the problem of the semiotic identities and differences of sounds. Just as the semiotic identity or difference of meanings is totally independent of their semantic identity and difference, so in phonology, the semiotic identity and difference of sounds is totally independent of their physical identity and difference. Sounds totally different physically may form a class of semiotically identical sounds, while sounds identical physically may belong to different semiotic classes of sounds. In other words, sounds form a semiotically identical class or belong to semiotically different classes regardless of their physical identities and differences. Under the general definition of semiotic identity, the semiotic identity of the sounds of a given semiotic class of sounds is the repetition of all their differences with other semiotic classes of sounds.

The bottom line is that semiotic identity of meanings or the semiotic identity of sounds is nothing but a repetition of their semiotic differences. The semiotic differences and identities of meanings and sounds and the semantic or physical identities and differences of meanings or sounds belong to totally different lev-

els of language. I distinguish the *differential form* of meanings and sounds and the *content* of meanings and sounds. The two aspects of meaning and sound have nothing in common and must be strictly distinguished. To distinguish the content of meaning from the form of meaning, I introduce the term 'information,' which I distinguish strictly from meaning proper (see 6.1). Information relates to meaning proper as sound to phoneme.

The rigorous distinction of the differential form and content of meaning and sound throws a new light on the notion of *variant* in linguistics. Under this distinction, the term 'variant of a meaning' must be understood not in the sense that the variants of a meaning are necessarily semantically related to one another (although they may be), but in the sense that all of them are represented by one and the same sign. Similarly, the term 'variants of a phoneme' must be understood not in the sense that the variants of a phoneme are necessarily physically related to one another (although they may be), but in the sense that all of them share the identical distinctive function.

It is wrong to speak of the monosemy of the variants of a meaning, but it is correct to recognize their semiotic identity insofar as they are represented by one and the same sign, regardless of whether or not they share semantic affinity. It is wrong to speak of the monophony of the variants of a phoneme, but it is correct to recognize their semiotic identity insofar as they share an identical distinctive function, regardless of whether or not they share vocal affinity.

The rigorous distinction of the differential form and the content of meanings and sounds must become the cornerstone of linguistics. One understands nothing of the mechanism of language if one fails to see the crucial difference and mutual independence between the two aspects of meanings and sounds.

4.5 Principle of Duality of Categorization, and value and worth classes of signs and meanings

The vital part of the discovery of the Principle of Differences is the very possibility of representing *value classes* of signs and *value classes* of meanings as opposed to phonetic classes of signs, which I call *worth classes* of signs, and logical classes of meanings, which I call *worth classes* of meanings.

The novel techniques of linguistic analysis based on establishing value classes of signs and meanings as opposed to worth classes of signs and meanings are determined by the Principle of Duality of Categorization, which is the corollary of the Principle of Differences:

[D9] PRINCIPLE OF DUALITY OF CATEGORIZATION

Sign and meaning each has two facets — value and worth. Value is the differential property of sign and meaning. Worth is the information implied by meaning or the vocal property of the sign. These facets are independent from each other and at the same time presuppose each other, so that two signs with different worth may have an identical value, and conversely, two signs with a different value may have identical worth. Similarly, two meanings with different worth may have an identical value, and conversely, two meanings with different values may have identical worth. Accordingly, language has two kinds of classes of meanings and sounds: 1) value classes of meanings and value classes of sound, 2) worth classes of meanings and worth classes of sounds.

I use the term ‘value’ in the same way as Saussure did, that is, in the sense of the property of sounds and meanings as terms of differential relations within the linguistic system. And I use the term ‘worth’ to denote the physical characteristics of signs and logical characteristics of meanings: by its worth a sign is merely a vocal expression; by its worth a meaning is its conceptual content, its information. I have borrowed the technical term ‘worth’ from the old treatises on political economy, where this term is used in the sense of Marx’s ‘use value,’ as opposed to ‘exchange value,’ of commodities. The correspondence between the terms is mentioned by Marx (1977: 126).

The Principle of Differences and the Principle of Duality of Categorization have their counterparts in phonology. Just as the semantic value of meanings is totally independent of their informational worth, so the vocal value of sounds is totally independent of their vocal worth. It is a banal fact for phonology that sounds totally different vocally may form a class of functionally identical sounds while sounds identical vocally may belong to different functional classes of sounds. In other words, sounds form a functionally identical class or belong to functionally different classes regardless of their vocal worth — that is, regardless of their vocal identities and differences.

The concept of the value of the vocal expressions and the meanings of the word is central to the investigation of language as a phenomenon *sui generis* distinct from the psychological and logical processes of the human mind. Differences dominate language. The important thing to notice is that identities are subordinated to differences: every word is defined by its differences from other words. From this perspective, language is a system of vocal differences correlated with a system of meaning differences.

Taking the concept of value as our vantage point, we face the necessity to split the concept ‘meaning’ into ‘meaning proper,’ or meaning taken under its value, under its differential form, and ‘information,’ or meaning taken under its worth, under its informational content. This split is analogous to the split of the

concept 'sound' into 'phoneme,' or sound taken under its value, under its differential form, and 'sound proper,' or sound taken under its worth, under its physical content. Classes of meanings as opposed to classes of informations are deep classes of meanings as opposed to its surface classes. Similarly, classes of phonemes are deep classes of sounds as opposed to physical classes of sounds. The phoneme is a venerable concept of linguistics, but its nature was never clear until the discovery of the Principle of Differences and its consequences.

Semiotic differences lead to a concept that must be central to the investigation of language — semiotic values. What are semiotic values? Semiotic values of signs and semiotic values of meanings are their properties defined by semiotic differences. And semiotic differences are differences between meanings linked to the corresponding differences between signs. The concept of semiotic value is used to answer the question: How does language operate as a form of an analysis of thought and reality? Signs and meanings do not exist outside differences between meanings and corresponding differences between signs. It is wrong to think that differences between meanings reflect differences between things in the world outside, independently of language. A paradoxical property of semiotic differences is that they form relations that give rise to signs and meanings. Therefore, the fundamental elements of language are differences between signs and differences between meanings rather than signs and meanings themselves.

4.6 Critique of Saussure's conception of the arbitrariness of the sign

Saussure has explicitly stated the Principle of the Arbitrariness of the Sign:

The linguistic sign is arbitrary. (Saussure 1972: 100)

Recognizing the importance of the Principle of the Arbitrariness of the Sign formulated by Saussure, let us consider this principle in relation to the Principle of Differences. Saussure has not advanced a precise formulation of the Principle of Differences. Even though he recognized and emphasized the significance of the concept of differences for linguistics, Saussure did not view differences as the primary concept of linguistics, but considered them merely as a consequence of the Principle of the Arbitrariness of the Sign.

From a purely logical point of view, there can be no objection to Saussure's view. In fact, differences and arbitrariness are correlated properties of the sign and it is a matter of logical convenience whether we take one of them as primitive and the other as derived. What is crucial is not the logical approach to the

selection of the primitive, but to view differences and arbitrariness from the perspective of their place in the mechanism of language. This perspective leaves no doubt as to the selection of the primitive. It is clear that the whole mechanism of language is determined by the Principle of Differences, which makes the arbitrariness of the sign its consequence. In fact, the Principle of Arbitrariness of the Sign has little to do with the mechanism of language but is an important consequence of the Principle of Differences that determines the relation of language to thought and reality.

The first linguist to criticize Saussure's Principle of Arbitrariness was Benveniste. He rejected this principle as an extralinguistic statement because on his view this principle had to do merely with the relation of language to reality and did not concern the mechanism of language. At that time the formulation of the Principle of Differences was not available and Benveniste could not see that the arbitrariness of the relation between sign and meaning was a necessary consequence of the Principle of Differences (Benveniste 1939).

4.7 Homonymy

Homonymy is a traditional problem of linguistics. Linguists have found the phenomenon of homonymy so puzzling that a lot of work in linguistics has been done to explain homonymy. As result of this work an impressive body of data accumulated along with various proposals of ingenious criteria for drawing a line between the cases of homonymy and non-homonymy. All these attempts failed to produce a solution because although every linguist knows that language is a system of signs, the true nature of this system has always been unknown to linguists. The understanding and the solution of the problem of homonymy comes with the Principle of Differences, which explains homonymy as a natural and integral part of the operation of language.

How does the problem of homonymy look from the perspective of Semiotic Linguistics? Let us first consider the traditional definition of homonymy. Traditionally, homonyms are two words that have identical physical forms but two different meanings. The traditional definition of homonyms, and hence of homonymy, is untenable because different words must have different vocal forms. If what we regard as two different words have the same vocal forms, then these are not two words but one word with two different unrelated meanings. Recognizing this, we face the question: How can a given word have two or more totally mutually unrelated meanings?

Instead of speaking of two words having one physical form and different meanings it is correct to redefine homonymy as a phenomenon when one word

has several totally mutually unrelated meanings. We redefine the concept 'homonym' as a word, or more generally, a sign, having two or more totally mutually unrelated meanings. Accordingly, the problem of homonymy must be redefined as follows: How can one word, or more generally, one sign, have two or more totally mutually unrelated meanings?

The problem is solved by the Principle of Differences which provides an explanation for all cases of homonymy. The phenomenon of homonymy is a natural consequence of the Principle of Differences because for the identity of two meanings it is irrelevant whether or not they are related conceptually. The only factor that determines identities and differences between meanings is value: two meanings are identical if they have an identical value, that is, if they correlate with one and the same sign; two meanings are different if they have different values, that is, if they correlate with different signs.

Apart from the fact that the Principle of Differences allows us to infer as its consequence the explanation of the general nature of homonymy, we can also infer from it the very important special case of homonymy, covered by condition 3 of the Principle of Differences:

3) *If two meanings correspond to one sign, but freely alternate in identical contexts, they are different meanings.*

To reiterate, our problem is: How can one word have two or more totally mutually unrelated meanings? The answer is this: Under the Principle of Differences, if the differences between the meanings of a word depend exclusively on the differences between contexts, then the meanings are variants of one and the same meaning; if, however, these differences do not depend on contexts, then they are alternating meanings of the homonymous word. The diagnostic cases are ones of ambiguity.

Compare *the bank of the river* and *a bank account*. The two meanings of the word *bank* depend on different contexts. But there are cases when these two meaning alternate freely in the same contexts, as in *This happened not far from the bank*. Such cases prove that the word *bank* has two meanings: 1) 'organization for financial services,' 2) 'side of the river.'

Ambiguous cases are diagnostic for recognizing homonymy. Homonymy is a special relation between different meanings of a sign form when they can alternate freely in identical contexts.

4.8 Principle of Phonological Differences and Principle of Phonological Duality of Categorization

Since under the definition of language (1.3), the vocal form of the sign is articulated into successive and distinctive units, phonemes, what is valid for the vocal form of the sign must also be valid for phonemes. There is a striking isomorphism between the essential aspects of the semantic and the phonological system of language. Just as semiotic identity and differences between meanings are independent of their semantic identities and differences, so semiotic identities and differences between sounds are independent of physical identities and differences between sounds. In terms of the concept of value we say that just as identities and differences between meanings depend solely on the values of meanings, so identities and differences between sounds depend solely on the values of sounds.

It is important to understand that as distinctive units of signs, phonemes are sounds that function as members of minimal phonological oppositions. The term ‘phoneme’ does not denote a more general concept than ‘sound.’ It is merely a convenient term to denote sound as a term of a minimal phonological opposition. The term ‘phoneme’ is not necessary but as sheer terminological convenience. Instead of phonemes we can speak of sounds as members of phonological oppositions, in contrast to sounds viewed merely as physical entities.

As the counterpart of the Principle of Differences, we formulate the Principle of Phonological Differences:

[D10] PRINCIPLE OF PHONOLOGICAL DIFFERENCES

In language differences and identities between sounds are subject to the following conditions: 1) Only those sounds are different which can correlate with different signs as the only minimal segments that distinguish one sign from another, 2) If two different sounds correspond to one and the same sign and their differences are solely due to the contexts in which they occur, they are variants of one and the same sound; 3) If two different sounds correlate with one sign, but freely alternate in identical contexts, they are free alternants of one and the same sign.

The free alternation of sounds is analogous to the free alternation of meanings. For example, the French guttural *r* is the normal realization of the phoneme /r/, but it can freely alternate with the rolling version of this phoneme. In Russian, on the other hand, the rolling *r* is the normal realization of the Russian phoneme /r/, while the guttural *r* is only a possible free deviation from the norm. Similarly, in Russian, in oblique cases of the word *bog* ‘god’ — *boga* (genitive), *bogu* (dative), etc. — the occlusive /g/ freely alternates with the fricative /ɣ/.

As the corollary of the Principle of Phonological Differences, I formulate the Principle of Phonological Duality of Categorization:

[D11] PRINCIPLE OF PHONOLOGICAL DUALITY OF CATEGORIZATION

The phoneme has two facets — value and worth. Value is the differential property of the phoneme. Worth is the physical properties of the phoneme. These facets are independent from each other and at the same time presuppose each other, so that two phonemes with different worth may have an identical value, and conversely, two phonemes with a different value may have identical worth. Accordingly, language has two kinds of classes of phonemes: value classes of phonemes and worth classes of phonemes.

In accordance with the Principle of Differences and Principle of Duality of Categorization we discover value classes of phonemes and worth classes of phonemes.

4.9 The significance of the Principle of Differences

4.9.1 *Principle of Differences as the cornerstone of linguistic analysis*

The Principle of Differences has a comparable importance for linguistics as Galileo's discovery — formulated a generation later by Newton as the principle of inertia — had for mechanics. The principle of inertia is the keystone of mechanics. One can quite well imagine a mechanics in which some laws were different. But mechanics could still exist as a subject. By comparison, the principle of inertia seems to be indefeasible: to give up this law would involve abandoning mechanics as we know it. Questioning the principle of inertia puts the whole subject at stake. Similarly, the Principle of Differences and the connected with it concept of value are the keystones of theoretical linguistics. This principle is at the heart of the model of language envisioned by Saussure:

The characteristic role of language in relation to thought is not to create the material vocal means for expressing ideas, but to serve as bonding between thought and sound, in such a way that their union necessarily produces a mutual delimitation of units. Thought, chaotic by nature, is made precise by this process of decomposition. What happens is neither a transformation of thoughts into matter, nor a transformation of sounds into ideas; the somewhat mysterious fact is rather that "thought-sound" implies divisions and that language works out its units while taking shape in between two amorphous masses. (Saussure 1972: 156)

The Principle of Differences develops what Saussure calls bonding between thought and sound. It is this law that decomposes thought and sound, producing a reciprocal delimitation of units of conceptual content and sound.

The Principle of Differences defines linguistic value, which is nothing but the communicative form of thought. The subject matter of theoretical linguistics arises from the problems generated by the Principle of Differences and the concept of linguistic value, and, in the words of Saussure's, they are the essential condition for the functioning of the mechanism of language:

The linguistic mechanism turns entirely on identities and differences. The latter are merely counterparts of the former. (Saussure 1972: 151)

This is exactly what the Principle of Differences does: it defines the condition of the existence and operation of the mechanism of language. Relinquishing the Principle of Differences would involve abandoning theoretical linguistics as an autonomous and independent science.

The Principle of Differences as elaborated in this book extends and deepens the profound idea of Saussure about the linguistic mechanism of language entirely turning on identities and differences. The Principle of Differences goes much further by subsuming the notion of identity under the notion of the repetition of differences. Our development of Saussure's profound idea not only goes into the very heart of language but establishes a new bridge between linguistics, science in general and philosophy.

Principle of Differences allows us to recast the various dualities of language as proper subject matter of linguistics. The most important of these dualities are:

1. Language sounds have no independent existence but as instruments of thought: a sound, in itself a complex auditory-articulatory unit, combines with an idea to form another complex unit: sound-thought. The Principle of Differences provides for a uniform method of defining the differential classes of meanings and differential classes of signs: different meanings have the same value, and so belong in the same differential class of meanings, if they correlate with the one and the same signs; and conversely, different signs have the same value, and so belong in the same differential class of signs, if they correlate with one and the same meaning. The totality of differential classes of meanings and differential classes of signs is what constitutes the object of linguistics.
2. Language has two aspects: individual and social. One is not conceivable without the other. One consequence of the Principle of Differences and its corollary Principle of Duality of Categorization is that we must not confuse but strictly distinguish the two dimensions of meaning: linguistic and logi-

cal. The logical dimension is the dimension of thought. The communicative dimension is the dimension of the conventionalized form of thought, a social phenomenon — a necessary condition of communication. Thought distinguishes colors regardless of how this or that language distinguishes them. What is distinguished by thought is not necessarily distinguished by language, and conversely, what is distinguished by language is not necessarily distinguished by thought. Identities and differences in language are conventionalized identities and differences lying at the base of communication. Identities and differences of the communicative dimension of meaning are totally independent of those of its logical dimension. What is essential is that for the purposes of communication the conceptual content of thought must be expressed in terms of the convention-based formal classes of language. To this extent linguistic structure determines language as an essentially social phenomenon and a social institution. Linguistic structure is simultaneously a form of the mental processes of individuals who use language and a form of communicative processes by means of which society functions as a cultural entity.

3. At any given time language involves an established system and an evolution — it is an institution in the present and a product of the past. The Principle of Differences presupposes the contrast between language as an established system at a given time and language as a result of evolution — a contrast between a synchronic and diachronic aspects of language. We deal with the linguistic mechanism only in the synchronic aspect of language, where we distinguish between determining and determined facts, whereas in the diachronic aspect we distinguish between cause and effect. For Saussure the worst mistake that could be made in linguistics was to confuse synchronic facts with diachronic facts:

The contrast between the two points of view — synchronic and diachronic — is absolute and admits no compromise (Saussure 1972: 30).

Saussure identified linguistic units with linguistic value. He said that all sciences concerned with values are characterized by an internal duality. These sciences distinguish the axis of simultaneity and axis of succession. Thus, economics is forced to recognize this duality: political economy and the study of economic history constitute two clearly distinguished disciplines belonging to one and the same science.

4.9.2 Philosophical implications of the Principle of Differences

The Principle of Differences makes us rethink the philosophical categories of identity and difference. The modern world is the world of simulacra, the world

of what is called virtual reality. A simulacrum is defined as a symbol that serves as a copy of copies. So simulacra must be viewed as part of the universe of signs. But the notions of identity and difference with respect to simulacra — with respect to signs — differ from the traditional philosophical classes of identity and difference. As was shown above, the Principle of Differences redefines identity as repetition of differences, and so subsumes identity under the notion of difference.

The traditional philosophical categories of identity and difference have been investigated from new points of view by the French philosopher Gilles Deleuze (1972). Deleuze focuses on signs not as representations of objects, but on signs as linked to essences constituted by differences. Deleuze goes as far as to reject identity as an obsolete philosophical category and replace it by the notion of repetition. Deleuze replaces the notion of identity by the notion of repetition. He substitutes the pair of difference and repetition for the dialectical unity of identity and difference.

My approach to these categories is radically different. Rather than reject the dialectical opposition of identity and difference, I recognize that the investigation of the world of signs — the world of symbols and simulacra — and the discovery of the Principle of Differences lead us to a deeper understanding of the opposition between identity and difference, to a deeper view of identity in its opposition to difference. The opposition of identity and difference has a different status with respect to the world of signs, the world of symbols, the world of simulacra. With respect to this world, identity is subsumed under difference and so, rather than rejected, must be defined as the repetition of differences.

4.9.3 *Principle of Differences and cognition*

Let us now take a more general look at the Principle of Differences and consider what this principle reveals about the mind.

One important aspect of the mind is its ability to categorize, that is, its ability to distinguish between different categories, or classes of things. The ability to categorize is one of the most important properties of the mind.

Any adequate account of human thought and cognition must provide an accurate description of how human categories, both concrete and abstract, are formed.

Classic philosophy was not concerned about the theory of the formation of categories. The formation of categories was thought well understood and unproblematic. Things were assumed to be in the same category only if they shared some properties in common. The properties things had in common were

thought as defining a category of things. This conception of categories was implicit and taken for granted.

Due to the work of Saussure and Wittgenstein's later philosophy it was revealed that there is more to our categorizing objects than categorizing them on the basis of their shared common properties. Categorizing in science is not something that can be taken for granted, but something that must be subject to empirical research. In developed sciences like physics categories are introduced as part of the formulation of laws. To explain categorization in a developed science, I introduce the concept of *stratification of reality*. Reality is stratified into the observational level and a hierarchy of deep levels built upon the observational level. Both things and categories of things of a deep level are not accessible to direct observation but are defined by laws. What is accessible to direct observation is data. Things and categories of things are to be discovered by the investigation of data.

The late work of Wittgenstein has had a liberating influence on the philosophy of science and sciences. Categorizing has moved from the background to the centre stage.

What Wittgenstein has done for philosophy and the theory of cognition, Saussure has done for linguistics. Before Saussure, linguistic categories were taken for granted. Since by the venerable tradition linguistics was considered a branch of logic, the linguist did not think that linguistic classes may be different from logical classes. Saussure must be credited as the first to formulate clearly that linguistics is an autonomous branch of knowledge independent of logic. What followed from Saussure's theory of language is the stratification of language into two levels: the worth level, the level of physical properties of sound and logical properties of meaning, and the value level, the level of operational properties of meaning and sound.

There is a drastic opposition between the two levels in how they handle categorization. On the worth level, entities are categorized in accordance with their shared observable properties. Classes of sounds are determined by common physical properties of sounds belonging to a given class, and classes of meanings are determined by common logical properties of meanings belonging to a given class. On the value level, the nature of classifying changes radically due to the Principle of Differences. Under the Principle of Differences, whether or not meanings share common semantic features is irrelevant for their classification. What is relevant are their values, that is, their relations to signs representing them: if two meanings correlate with one and the same sign, they belong to one and the same class of meanings; if two meanings correlate with two different classes, they belong to different classes. Similarly, whether or not two different sounds share common physical features, is irrelevant for their classifi-

cation. What is relevant are their values, that is, if two different sounds correlate with two different signs, then these sounds belong to different classes of sounds; if the difference between two sounds depends solely on the difference between two different positions in which they occur, then these sounds belong to one and the same class.

We see that the categorization of meanings and sounds under their value is independent from the categorization of meanings and sounds in accordance to logical properties of meanings or physical properties of sounds. The concept of value is introduced into Semiotic Linguistics together with the Principle of Differences as a necessary concept implied by this principle.

The Principle of Differences and its implications accomplish the revolution started by Saussure. This opens new horizons not only for linguistics but for the theory of cognition, as well. Concern with mutual relation of language and thought is central to the theory of cognition. How does language relate to thought? The starting point for the investigation of this problem is provided by the Principle of Differences defining the value level of language. The Principle of Differences provides a clear characterization of language as opposed to thought: the value level of meaning is part of language while the worth level — the logical level of meanings — is part of thought.

4.10 Disassociation of the sign-meaning bond in modern linguistics

4.10.1 *Generative semantics*

Consider, for instance, McCawley's (1968) famous analysis of *kill* as a causative verb in English. On this analysis, the semantics of *kill* looks like this: CAUSE BECOME MINUS ALIVE. This analysis is misguided because it is based on the naive idea that a possible causative paraphrase of the verb *kill* is justification enough to consider it a causative verb. In accordance with the Principle of Differences, any difference between linguistic meanings must be correlated with the difference between signs. Real causative verbs are characterized by appropriate vocal markers as in the forms *sit:set* (*I sit by the table, I set the table*), *fall:fell* (*a tree falls, a lumberjack fells a tree*). The verb *kill* neither participates in the alternation *kill:*kell* nor has any other phonological markers of causative meaning.

McCawley was concerned with meanings but did not care about signs. He wanted to analyze meanings independently of signs representing them.

Yet, the true problem of linguistics is to study how meanings are organized in relation to their signs. We must recognize that the means of expression and what is expressed by this means complement each other. No grammatical

meaning, or function, exists independently of the means of its expression. The problem of grammar is a semiotic problem. We must not confuse linguistic meaning with various kinds of inferential meaning that are parasitic on the linguistic meaning.

Paraphrasing is widely used by logicians as a useful method of comparing expressions of artificial languages of logic with expressions of natural languages. Paraphrasing is useful and often necessary in linguistics if the linguist understands that paraphrasing as part of the logical analysis of natural languages and paraphrasing as part of linguistic analysis of natural languages are two very different things. The logician is interested in discovering how certain logical concepts are expressed in natural languages no matter how these logical concepts are represented by specific signaling devices, whereas it is the specific signaling devices used to represent concepts that are central to the linguistic semantic analysis. Linguistics is an autonomous science independent of logic.

It is important to see that my critique of the logical analysis of meaning concerns the method — not how successful this or that analysis is at inferring various information from the meaning of *kill*. Thus, the above analysis has been criticized and other analyses have been proposed. But all of them deal with information one can infer from the meaning of *kill* rather than with the meaning of *kill*.

4.10.2 Generative phonology

In their book on sound patterns of English, Chomsky and Halle (1968: 234) suggest that alternations such as *resign:resignation* can be accounted for by providing a unique base for each morpheme. Thus, they posit *re=sign* as a phonemic representation of *resign*, where the sign '=' represents a special morpheme boundary which is necessary for the following rule:

(7) $s \rightarrow z$ in the context Vowel=__Vowel

Chomsky and Halle posit *s* in the underlying form because they claim that the same morpheme occurs in words such as *con=sign*.

Is *sign* in *resign* identical with *sign* in *consign*? Are they allomorphs of the same morpheme? No, they are not. If Chomsky and Halle cared about the concepts of synchrony and diachrony and the fundamental opposition between these concepts, if they viewed linguistic units as signs, they would have recognized that from the synchronic point of view, neither *resign* can be divided into two morphs *re* and *sign*, nor *consign* into *con* and *sign*. From the synchronic point of view, *resign* and *consign* have nothing in common with each other ex-

cept for the partial similarity of their physical shapes: neither the word *resign* nor the word *consign* is related to the word *sign*.

But who cares about a conceptual analysis when what one is after is formal rules for generating the directly observable data? Formal rules are clear. The directly observable data are also clear: the physical shape of *sign* is identical with the physical shape of *sign* in *resign* and *consign*. Therefore *sign* is related to *resign* and *consign*. Following this method of determining morphemes, we must unflinchingly recognize that *mother* is related to *moth*, *liquor* to *lick*, *season* to *sea*, *butter* to *butt*, and *arsenal* to *arse*.

The idea that *sign* is a morpheme in *resign* and *consign*, as claimed by Chomsky and Halle, is a fiction. Their analysis closely follows that offered by Bloomfield (1933) in *Language*, staying at the same taxonomic level that Chomsky and Halle disparage. The examples from Chomsky and Halle represent early generative morphology. Nothing has changed since then in generative morphology and phonology. We find the same approach in a more recent survey of generative phonology by Kenstowicz (1994).

4.10.3 *The confusion of the functional and physical aspects of the concept of phoneme in violation of the Principle of the Duality of Categorization*

In accordance with the Principle of Duality of Categorization, the duality of sound and the duality of meaning imply two kinds of identity: semiotic identity and material identity. *Semiotic identity* is a technical term denoting identity determined by the correlation of sound and meaning, where the correlation is a semiotic phenomenon. *Material identity* is a technical term denoting identity outside the opposition, that is, identity determined by physical properties of sound or informational properties of meaning. Theoretically, we can have the following situations with sound and meaning, respectively: 1) two sounds X and Y can be identical semiotically and not identical materially, and conversely, they can be identical materially and not identical semiotically; 2) two meanings X and Y can be identical semiotically and not identical materially, and conversely, they can be identical materially and not identical semiotically. Material and semiotic identities are independent of each other: neither semiotic identity can be inferred directly from the material properties of sound or meaning, nor material identity can be inferred directly from the semiotic identity. The independence of material and semiotic identities poses a problem: How is this independence possible? Given that we can observe only material identities and differences, and that semiotic identities and differences cannot be inferred directly from the empirical data, how can semiotic identities be inferred at all?

To answer these questions, I refer to the concept of the social mind. My perspective of the social mind is diametrically opposite to that of Chomsky and

some other authors (see Jackendoff 1997), whose standpoint is that of individual psychology.

Conscious language processes become automatic and language is normally used in an automatic mode. But language patterns generated by the social mind are latent in the automatic mode of language use. To understand the nature of language, we must use objective linguistic analysis to bring its latent patterns out into the open. Individual psychological processes are irrelevant to understanding the nature of language as a social institution imposed on the members of a language community.

Consider the perception of sound from the perspective of the social mind. When we observe the acoustic facts of language directly or with the help of technical means, our consciousness mirrors the physical properties of sounds. Sounds and the acoustic properties of sounds exist independently of thought. But when we recognize phonemes and other semiotic properties of sounds, we recognize patterns generated by the social mind. The phoneme and the other semiotic properties of sounds do not exist independently of our system of collective representations — rather, they are products of our system of collective representations.

To illustrate the foregoing, I will use an example from my earlier work (Shaumyan 1987: 48-50). The analysis presented here is more precise in that it uses the concept of collective representations.

Every phoneme is characterized by a set of distinctive features. Since phonemes are ordered in linear sequences, the sets of distinctive features characterizing phonemes are also ordered in linear sequences. The assumption that phonemes are ordered in linear sequences of sets (or bundles) of distinctive features lies at the basis of modern phonology no matter how widely particular phonological theories may differ from one another (by ‘modern phonology’ I mean the phonological theories that continue the research tradition started by Moscow and Prague schools started in the early twentieth century; I most emphatically do not mean the various versions of ‘generative phonology’, which have little to do with phonology proper). This assumption was challenged by some experimental phoneticians.

One of the arguments against the assumption that bundles of distinctive features are tied to the linearly ordered phonemes of the speech flow concerns duration. If duration functions as a distinctive feature, phonology includes it among other distinctive features of a functional segment. For example, in English, duration serves as a functional cue to distinguish between short and long vowel phonemes, so that the opposition SHORT:LONG must be considered a segmental property of phonemes. However, studies in experimental phonetics have shown that duration has many other linguistic functions that are not re-

stricted to a single segment. It has been found, for example, that under certain conditions in English the phonological distinctive feature VOICED does not correspond to the phonetic feature VOICED. Perceptual tests with synthetic stimuli have shown that vowel duration is a sufficient cue for determining the perception of voicing in a final consonant: if you synthesize a sequence such as *jus* with a voiceless *s*, and lengthen the duration of the vowel, listeners will begin to hear *juz*, even though there is no voicing present in the fricative (for a review of the experiments, see Wardrip-Fruin 1982).

Similarly, it has been discovered that the FORTIS:LENIS (TENSE:LAX) distinction of stop sounds in German is not exclusively associated with the consonants themselves that presumably carry the distinctive features of FORTIS and LENIS, but that the distinction between words containing a FORTIS or LENIS stop sound is characterized by a different distribution of durations of the consonant and the preceding vowel. Thus, in the analysis of German word pairs such as *baten:baden* and *Laken:lagen*, the duration of the VOWEL+STOP sequence remains approximately constant but the durations of the vowel and the consonant vary: in words such as *baten*, the vowel is shorter and the consonant is longer; whereas in words such as *baden*, the relationship is reversed — a shorter consonant follows a longer vowel (Kohler 1981). Modern literature in experimental phonetics abounds in examples that seem to contradict the notion of the distinctive feature as a segmental property of the speech flow.

These findings of experimental phonetics have induced some linguists, and notably phoneticians, to question the validity of the phonological notion of the distinctive feature. In a paper on the experimental study of duration, Ilse Lehiste writes:

One of my long-standing complaints and criticisms of most current linguistic theories is the fact that they ignore the temporal aspects of spoken language almost completely. If duration enters into phonological theory at all, it gets segmentalized: [+long] may be included among the distinctive features of a segment. And this is where grammatical theory stops — implying that duration can have only a segmental function, i.e., that all duration can do is to differentiate between short and long segments.

Those phonologists who have some acquaintance with experimental phonetics have devoted considerable attention and effort to the study of temporal aspects of spoken language; unfortunately this seems to have had little or no impact on theoreticians, who continue to manipulate segmental distinctive features to the exclusion of anything larger than a segment. I have said it before, and I will say it again: phonologists ignore phonetics at their own peril. The peril is that they may operate in a fictitious abstract sphere that has no connection with reality. In this abstract

sphere, linguistic constructs are timeless. In the real world, spoken language unfolds itself in time. (Lehiste 1984: 96)

The contradiction between the two descriptions of duration — by phoneticians and phonologists — is serious. Is there a satisfactory way of resolving it? Maybe we should, following Lehiste, reject the phonological description in favor of the phonetic description because the phonetic description is based on the experimental data whereas the phonological description seems speculative? Before we do so, let us explore observation, or perception, as a cognitive process.

Perception is not a passive reflection of reality but an active process. We must distinguish between the perceptual stimulus and what is actually perceived. The requirement to distinguish these two aspects of perception may be traced back to Descartes's theory of perception. In his analysis of vision, Descartes distinguished between what one sees and what is really seen. Language includes collective representations. We must distinguish between the physical content of linguistic perception and the structure of linguistic perception, that is, what is really perceived. What is real — the physical content or its structure? Both are real, but in a different sense.

Like many other phoneticians, Lehiste rejects the phonological notion of the distinctive feature because she fails to see the fundamental difference between the physical and functional levels of the speech flow. Consider the above example concerning the sequence *jus*. True, if we synthesize the sequence *jus*, with a voiceless *s* and lengthen the duration of the vowel, listeners will begin to hear *juz*, even though there is no voicing in the fricative. This is an interesting phenomenon. But does it undermine the notion of the distinctive feature as a segmental property? From the phonological point of view, the essential thing is the perception of the opposition VOICED:VOICELESS rather than the acoustic properties that constitute the content of perception. The essential thing is that even though in the cited experiments the sound *s* does not change, it is perceived as *z* when the preceding vowel is lengthened. What matters is that at the functional level we have the opposition *s*:*z*. This opposition is a phonological phenomenon, which is no less real than the phonetic fact that acoustically the phoneme *z* is represented by the voiceless sound *s* plus the length of the preceding vowel.

Similarly, the discovery that in German the TENSE:LAX distinction is associated with the length of the vowel that precedes the consonant does not undermine the phonological notion of the distinctive features TENSE:LAX. What matters from the phonological point of view is not the distribution of the vowel-consonant durations in words such as *baten*:*baden* but the perception of consonants as members of the opposition TENSE:LAX.

Perception of phonological phenomena is a process of the social mind. The social mind imposes structure on phonetic phenomena. Phonological phenomena are structures generated by the social mind. Phonological perception has a form and a content. The content of phonological perception is phonetic facts; the form of phonological perception is patterns generated by thought and imposed on the phonetic facts.

The problems raised by experimental phoneticians are problems for the study of language from the perspective of the theory of the social mind. Why, as a result of the lengthening of the duration of vowels, do listeners perceive voiceless fricatives as voiced ones? Why is the TENSE:LAX distinction in German associated with the length of the vowels that precede the consonant? These are interesting problems for the study of sounds of language from the perspective of the theory of the social mind.

To explain the problems posed by the duality of sound we must introduce the concept of the social mind into linguistics, and we must assume that language is a phenomenon of the social mind, which generates the phonological structures in terms of which phonetic phenomena are interpreted. The duality of sound means the unity of the physical content and phonological form of sound. The physical content of sound comes from nature, its form — from the social mind. The same is true of meaning. The duality of meaning means the unity of the ‘material’ content and the linguistic form of meaning, where the term ‘material’ is used metaphorically to describe the informational aspect of meaning. Meaning is both information and a linguistic phenomenon. As information, meaning refers to reality; as a linguistic phenomenon, meaning is part of the relational network of linguistic oppositions — it has form. The informational content of meaning comes from the fact that language is used to describe reality; the form of meaning comes from the social mind.

Chapter 5

Linguistic Structure

5.1 Principle of the Contrast of Structural and Lexical Signs

If the Principle of Differences defines the condition of existence and operation of the mechanism of language, then how does it operate? The answer is: through the arrangements of morphemes into words and words into word combinations. To characterize these arrangements, I introduce the Principle of the Contrast of Structural and Lexical Signs:

[D12] PRINCIPLE OF THE CONTRAST OF STRUCTURAL AND LEXICAL SIGNS

In every language signs constitute two contrasting classes: lexical signs, which are signs the speaker chooses freely depending on the content of the intended expression, and structural signs, which must be expressed in conjunction with the lexical signs. Structural signs are a limited, closed set whereas lexical signs are a large, open set. Structural and lexical signs serve as structural and lexical constituents of the word or of the word combination.

The Principle of the Contrast of Structural and Lexical Signs involves the concept of the structure of the word and word combination defined as follows:

[D13] STRUCTURE OF THE WORD OR WORD COMBINATION

The structure of the word or word combination is the articulation of the word or word combination into lexical and structural constituents, invariant under the changes of lexical constituents.

What is the nature of lexical and structural signs? What is the nature of linguistic structure?

Language presents a *communicative interpretation of reality*, that is, a selective and conventionalized interpretation of reality geared to the purposes of communication. We must distinguish various types of the communicative in-

terpretation of reality. Let us start with the distinction between the direct and indirect communicative interpretation of reality.

Consider the sentence *The student sent the letter to his mother*. We can find out from the dictionary about the objects referred to by *student*, *letter*, and *mother* and about the kind of action indicated by the word *sent*. Beyond these meanings the dictionary does not go. And yet we get from this sentence a range of meanings not expressed in the dictionary. We see that it was the student who performed the action, not his mother; we see that only one student and one mother are involved; we see that the action took place in the past. These meanings are the *structural meanings* of the sentence that contrast with the meanings contained in the dictionary, which are *lexical meanings*.

Structural signs are a common feature shared by a class of sentences or by a class of words, whereas lexical signs are individual signs. Structural signs are a small and closed set, whereas lexical signs are a large and open set. Structural signs are not necessarily phonemic segments. Structural signs can be contexts or positions, as for example in *my work* or *I work*, where depending on context, the word *work* is either a noun or verb, or in *John likes vodka*, where depending on its position, a noun is either subject or object. There are other types of structural signs that we will not consider here.

The strict distinction between the two types of signs and meanings — structural and lexical — is absolute, that is, this distinction is necessary for any language. On the other hand, the content of these classes is relative to every language; structural signs in one language may be expressed by lexical signs in another language, and, conversely, what is expressed by lexical signs in one language may be expressed by structural signs in another language. For example, definiteness and indefiniteness have no structural signs in Russian or Latin; they are expressed by lexical signs or by context. Indonesian does not distinguish structural signs of tenses; the time of the action is expressed by lexical signs, by combining tenseless verbs with appropriate adverbs.

The notion of lexical signs covers individual facts of language in contrast to the notion of structural signs, which covers phenomena determined by the laws of language. Structural signs are markers of classes; they define classes of lexical signs.

Why is the distinction between structural and lexical signs necessary for every language? Why cannot a language have only one kind of signs? The answer is: because of the requirements of the economy of expression. Lexical signs are individual signs. Structural signs are class signs, that is, they are signs that indicate classes of individual signs. To see that a language needs structural signs, let us perform a thought experiment and imagine how English might be if all structural meanings were expressed only by lexical signs like

woman:women or *go:went*. In the absence of the structural signs for the plural or for the past tense we will have to double the number of lexical signs for nouns and verbs, and we would have a manifold increase in the number of signs for other structural meanings.

The lexicon deals with lexical signs while grammar is concerned with structural signs and the structure of words and word combinations. Just like the lexicon, grammar is a necessary constituent of any language because grammar allows a tremendous economy in the number of lexical signs by arranging lexical signs into classes.

Both lexical and structural signs interpret reality, but in a very different way. The lexical signs interpret reality directly; they distinguish different phenomena of reality which are not necessarily distinguished in all languages of the world, but structural signs interpret the products of the interpretation of reality by lexical signs. Structural signs interpret reality by interpreting lexical signs — they interpret reality indirectly. Hence, we have two stages of the interpretation of reality: lexical signs interpret reality, and structural signs interpret lexical signs. We have an interpretation of signs by signs, or more precisely, an interpretation of lexical meanings by structural meanings: the meanings of structural signs serve as signs for the meanings of lexical signs.

The distinction between lexical and structural signs is conventional. As we remarked before, what in one language is expressed by structural signs is expressed by lexical signs in another. Thus, while English has a system of structural signs to express various relations between the present, past, and future tenses, in Indonesian all temporal relations are expressed by lexical signs. Although articulation into lexical and structural signs is relative and is conventionalized with respect to particular languages, there is no language that does not distinguish between lexical and structural signs.

The distinction between lexical and structural meanings and signs must not be confused with the distinction between words and non-words. The distinction between words and non-words is based on the opposition DISCRETE:NON-DISCRETE, words being minimal discrete signs of a sentence. The distinction between lexical and structural signs is based on the opposition INDIVIDUAL:GENERAL — lexical signs are individual while structural signs are general, being a limited closed set that establishes the classes of lexical signs. Conjunctions, prepositions, articles, and particles are words because they are minimal discrete signs. They are structural signs, as well, because they are limited closed sets defining classes of lexical signs.

Observing relationships between the structural signs of a word or a sentence and the lexical signs that combine with the structural signs, we often find a striking antinomy of meanings between the two types of signs: often the mean-

ing of structural signs sharply contradicts the meaning of the lexical signs they combine with. Consider the words *rotation* and *redness*. The lexical constituents of these words denote a process and a quality, respectively. But the structural signs represent ‘thing’ in both words. We observe the antinomy between the meaning of the structural signs and the meanings of the lexical signs.

The correct semiotic analysis must reveal the antinomy between the meanings of structural signs and meanings of the lexical signs. The semiotic analysis of the structure of words and sentences contrasts with the logical analysis which is misleading and false. Logical analysis is misleading and false for the investigation of the communicative function of language because logical analysis is not interested in the investigation of the articulation of words and sentences into structural and lexical signs. Logical analysis is appropriate in logic, not in linguistics. Logical analysis is appropriate for the investigation of the facts of thought but is misleading for the investigation of the facts of language.

Language and thought constitute the language-thought continuum, but this does not mean that facts of language should be confused with facts of thought. The fundamental fact of language is the articulation of words and word combinations into structural and lexical signs and accordingly into structural and lexical meanings. By contrast, the fundamental fact of thought is the global meaning of the word or global meaning of the sentence. Thought is much more abstract than language. Thought abstracts from the distinction between structural and lexical meanings. Hence, semiotic analysis is appropriate for the investigation of language as the form of the language-thought continuum, and logical analysis is appropriate for the investigation of thought as the content of the language-thought continuum. We must beware of fudging the two types of analysis and of the application of logical analysis to the investigation of language.

Before concluding this section I must make an important terminological note. I use the term ‘structural’ instead of the term ‘grammatical’ used in the structuralist literature. The term ‘grammatical,’ as opposed to the term ‘lexical,’ is unfortunate because it involves a false or even pernicious notion of the subject matter of grammar. It is utterly wrong way to think of grammar as a mere study of the grammatical constituents of words and word combinations. The notion of grammar as a mere study of what structuralists called ‘grammatical constituents’ distorts the correct notion of grammar. Indeed, the true subject matter of grammar is *the study of structural constituents of words and word combinations from the perspective of the interaction of the structural constituents between themselves and with lexical constituents*. We distinguish between the structural and lexical constituents of words and word combinations not in order to disregard the lexical constituents, but in order to investigate how struc-

tural and lexical constituents interact with each other — in order to investigate the essential property of language as distinct from thought.

How do structural and lexical constituents of words and word combinations interact? Consider, for example, government, or rection. What linguists call ‘government’ is in fact the dependency of case morphemes or prepositions: the choice of case morphemes or prepositions depends on lexical morphemes that govern cases. Compare:

- (8) a. I see the picture.
b. I look at the picture.
c. I go down the street.
d. I come from the street.

By comparing these four phrases we discover the interaction between their lexical and the structural constituents. Thus, the choice between *the picture* and *at the picture* in (8a) and (8b) depends on the meanings of the lexical constituents of the verbs *to see* and *to look*. The choice of the preposition *down* or *up* in (8c) depends on the meaning of the lexical morpheme *go*. By contrast, the choice of the preposition *from* in (8d) depends on the meaning of the lexical morpheme *come*.

Lexical constituents define our experience and by defining our experience determine the range of structural constituents that must be combined with them. When we say *The farmer killed the duckling*, we understand that a definite single farmer in the past killed a definite single duckling. We cannot express our experience in such a way that we remain in doubt as to whether a definite or indefinite farmer or duckling are meant, one or more farmers or ducklings are involved, or event took time in the present or past. The lexical constituents of the phrase *The farmer killed the duckling* define our particular experience and thereby determine the range of the possible obligatory structural constituents that must be combined with them. Within this range we observe a further interaction between the structural constituents themselves. The choice of those depends on our need to express this or that particular aspect of our experience.

The Principle of the Contrast of Structural and Lexical Signs is stated in accordance with the Principle of Differences: differences between structural and lexical signs correlate strictly with corresponding differences between structural and lexical meanings. The strict distinction between the structural and lexical constituents of words and word combinations and the study of their interaction is what separates the study of language from the general study of thought. To dispense with the Principle of the Contrast of Structural and Lexical Signs is to abandon the enterprise of semiotic grammar as a whole.

5.2 Syntactic and paradigmatic meanings

The semantic system of language uses two sets of meanings: *syntactic* ones — for example, predicate, subject, attribute, and circumstance — and *paradigmatic* ones — verb, noun, adjective, and adverb. Hence, independently of the opposition LEXICAL MEANINGS : STRUCTURAL MEANINGS, there is the opposition SYNTACTIC MEANINGS : PARADIGMATIC MEANINGS. Although independent, these oppositions overlap.

Syntactic meanings are syntactic relations between words in different syntactic positions, whereas paradigmatic meanings are relations between words in the same position. Syntactic meanings characterize connections between words having different syntactic function in word combinations, whereas paradigmatic meanings characterize different kinds of words having an identical syntactic function. For example, to characterize words as predicates, predicate arguments, attributes, and the like, is to characterize them by the syntactic meanings of their morphemes, whereas to characterize verbs by their tense or aspect or nouns as determinate or indeterminate is to characterize these words by the paradigmatic meanings of their morphemes. All lexical meanings are paradigmatic meanings.

Paradigmatic meanings concern the paradigmatic content of words (actions, things, qualities, circumstances) and hence serve as a basis for dividing words into classes. The most important thing is that the paradigmatic content of words reflects their syntactic functions in the first place. The verb means action because it has the function of predicate. The adjective means quality of a thing because it has the function of attribute. The adverb means quality of an action or state because it has the function of circumstance.

The main characteristic of the paradigmatic system of language may be defined as follows: syntactic functions provide the basis for constructing word classes, which contain groups and subgroups with more specific meanings. In a way, word classes are paradigmatic transpositions of syntactic functions.

The significant difference between *syntactic signs* and *paradigmatic signs* is this: while paradigmatic signs reflect the extralinguistic reality, syntactic signs reflect only the capacity of a word to enter into a specific type of syntactic relations with other words.

It would be wrong, however, to assume that syntactic signs do not participate in the reflection of the extralinguistic reality. For example, the attributive syntactic relation between the words *cold* and *water* in the word combination *cold water* reflects the extralinguistic relation between 'water' and 'cold' — the fact that the property of coldness belongs to water. What serves in *cold water* as a sign of the extralinguistic reality is the combination *cold water* itself,

not the words *cold* and *water* taken separately. Thus, syntactic meanings of words participate in the reflection of the extralinguistic reality only indirectly, only as a means of constructing signs of another level.

We should not confuse the distinction between syntactic and paradigmatic signs with the distinction between *lexical* and *structural signs*. Although these distinctions intersect, they are independent of each other. The distinction between lexical and structural signs is based on the opposition INDIVIDUAL:GENERAL, whereas the distinction between syntactic and paradigmatic signs is based on the opposition RELATION BETWEEN WORDS : INTERPRETATION OF REALITY. All lexical signs are at the same time paradigmatic signs because by their nature lexical signs are meant to interpret reality. On the other hand, some structural signs are syntactic, while others are paradigmatic.

5.3 Antinomies between lexical and structural meanings

We observe a radical contrast between grammar and logic. Grammar is the investigation of the laws of articulation of words and sentences into structural and lexical signs and of the laws of the interaction of structural constituents between themselves and with lexical signs. By contrast, logic is the investigation of the laws of thought regardless of how thought is implemented in language, regardless of the articulation of the meanings of words and sentences into structural and lexical meanings. Logic needs only to consider the global meanings of words and sentences.

To take our previous examples, there is a contradiction between the structural and lexical meanings of *rotation* and *redness*. This antinomy is a fact of language which any semantic analysis must reveal. In contrast, logical analysis only concerns itself with the facts of thought, which are the contents of these words, regardless of their articulation into structural and lexical constituents. The only important thing for thought is that the first word carries the information about some process, and the second word, about some quality. These are the global meanings of the words.

We have two different types of semantic analysis of words and sentences: the truly semantic semiotic analysis and the pseudo-semantic logical analysis. The pseudo-semantic analysis starts from the undifferentiated total meaning of a word or a sentence and then analyzes undifferentiated meaning into logical components; while the true semantic analysis seeks to base its investigation of meaning on the discovery of the patterns of articulation of words and sentences into structural and lexical meanings.

The function of the indirect interpretation of reality is of a foremost importance for understanding the relation of structural signs to lexical ones. Consider the English words *rotation*, *construction*, or *invitation*. Each of these words has two constituents: lexical and structural. While these words have different lexical constituents — *rotat*, *construct*, *invitat* — they share the same structural constituent: *ion*. The lexical constituents of these words are signs that mean certain concrete processes, while their structural constituent is the sign that means ‘substance.’

We see that although the structural and lexical meanings of a word presuppose each other, they may also contradict each other, creating the antinomy between structural and lexical meanings. Without the concept of interpretation this antinomy cannot be resolved, for although structural meaning is meaning of a structural class of words and lexical meaning is the individual meaning of words that represent a structural class, nevertheless from a logical point of view the two types of meanings are heterogeneous in principle, whence antinomy arises.

How does the concept of interpretation resolve antinomy? It is one thing to claim that the structural meaning of the word *rotation* refers to a substance and its lexical meaning to a process, and it is another, to claim that the structural meaning of the word *rotation* is an interpretation — that is an understanding of something, in this case of a process, as a substance. In the first case, it is difficult to comprehend how something can be both a process and a substance. In the second one, it is quite plausible that anything can be understood as a substance; because structural meaning is an interpreting meaning, and the lexical one is an interpreted meaning, and the two are heterogeneous by definition.

Of course, the conflict between structural and lexical meanings does not always arise. For example, in the words *stone*, *tree*, or *house* the characteristics of the two meanings coincide: each refers to a substance. The correct semantic analysis of these words must be this: their structural meaning interprets as substance what is already substance in accordance with the lexical meaning. The important thing to see is that whatever the lexical meaning of a word is, its structural meaning is always an interpretation of the lexical one.

It follows from the foregoing that the study of the communicative structure of words and word combinations, the study of the opposition between the structural and lexical constituents of words and word combinations is the cornerstone of the investigation of language. Logic disregards the communicative structure of words and word combinations because logic is concerned with the global meanings of words and word combinations. To abandon the concept of the communicative structure of words and word combinations as defined above is to abandon the science of language.

Our distinctions between structural and lexical meanings and between syntactic and paradigmatic meanings should not be confused with the distinction between syntax and semantics in generative grammar. Generativist notions of syntax and semantics are more akin to the way these terms are used in the formal system of standard mathematical logic. It is unfortunate that standard mathematical logic uses the terms 'syntax' and 'semantics' that had been used in linguistics long before mathematical logic emerged as a discipline. As a matter of fact, the 'syntax' and 'semantics' of standard mathematical logic have nothing to do with the 'syntax' and 'semantics' of linguistics. Let me explain.

In standard mathematical logic, a logical system consists of a set of uninterpreted symbols combined into strings by production rules and changed from one into another by transformation rules. A number of initial well-formed strings or formulas are taken as axioms. Theorems are derived from axioms by production or transformation rules. A proof is a sequence of strings of symbols, where symbols are completely meaningless. Such a deductive system of production and transformation rules is called 'syntax' in standard mathematical logic. The term 'semantics' in logic is used in the sense of assignment of meaning to the uninterpreted, meaningless symbols of 'syntax.' A typical version of semantics is model-theoretical semantics. It consists of a model structure and rules for mapping the syntactic system into the elements of the model structure, which could be sets of entities, sets of n -tuples of entities and so on. In fact, models are equally meaningless. Formal semantics is a method of establishing exact correspondence between strings of symbols that have structure but no meaning with models that also have structure but no meaning. The expression 'to assign meaning' is used as a technical term characterizing a pairing of one meaningless system, called 'syntactic system,' with another meaningless system called 'interpretive system.'

Clearly, the syntax and semantics of standard mathematical logic is no more than the study of strings of symbols in its proof theory and the way strings of symbols can be paired up with structures containing entities and sets in its model theory. As part of the human mind, natural language serves to classify reality by using signs. Every sign by its nature has meaning — not in the sense of set-theoretical models of standard mathematical logic, but as an element reflecting reality. Attempts to impose mathematical logic on the study of language have proved empirically inadequate. They led to a confusion of logical and linguistic concepts.

5.4 Grammatical structure

To establish the structure of any word combination is to mention its constituents and the syntactic and paradigmatic relations that characterize it. It is structure that makes the number of possible sentences or other word combinations.

In both systems of language, phonological and semantic, units and classes of units are founded on the structure of combinations. This is a primordial fact rooted in the communicative situation. Language always manifests itself in the communicative situation through word combinations, whose privileged type is the sentence, and through phoneme combinations, whose privileged type is the syllable. Why does the form of combinations constitute the foundation of classes? Because the elements of classes enter into combinations with their constituents. There is a fundamental *meronymic*, or *part-whole* relation between the elements of a combination and the combination itself; therefore the valid definition of these elements must be founded on their place within the structure of the combination. The important thing to notice is that the structure of the word combination is a part-whole entity.

5.4.1 *Contensive autonomous words and their structures*

I use the expression 'contensive autonomous word' as a technical term to denote the four classes of words that differ from all other classes of words by their function to represent reality.

The four classes of *contensive autonomous words* are: 1) the noun, having the syntactic function of a subject, 2) the verb, having the syntactic function of a predicate, 3) the adjective, having the syntactic function of an attribute, 4) the adverb, having the syntactic function of an adverbial.

Let me now introduce the concept of the structure of the contensive autonomous word. From the definition given above (5.1), the structure of the contensive word is:

[D14] **STRUCTURE OF THE CONTENSIVE AUTONOMOUS WORD**

The communicative structure of the contensive autonomous word is its articulation into lexical and structural morphemes, which are invariant of the change of lexical morphemes.

In section 2.9.8 I introduced the device called sign correlator. The purpose of this device was to test whether a given segment is a true unit. Now we can see that sign correlators are word structures used as a device for testing whether given segments are true units, that is, true words. Consider the word *unconsciously*, which consists of three morphemes: *un-conscious-ly*. By comparing this word with *uncommonly*, *ungratefully*, *uncivilly*, etc. we establish the

common constituents of these words *un__ly*, which form their structure. By replacing the underscored blank in our notation with other lexical morphemes we find other words with the same structure, as, for example, *unscrupulously*, etc. The structure of a word may be so complicated that the notation involving blanks is inadequate to describe it. The reason for this is that neither structural nor lexical morphemes are necessarily directly identifiable segments of the word they are constituents of.

To take another example, suppose we start with the word *teacher*. Let us substitute *read* for *teach* and *ing* for *er*. We thus arrive at the word *reading*. The possibility of replacing *teach* and *er* with other elements shows that the word *teacher* possesses a grammatical form: there is a syntactic relation between *teach* and *er*, and there are substitution relations between *teach* and other elements that can be substituted for *teach*, on the one hand, and between *er* and other elements that can be substituted for *er*, on the other.

I expand the term 'syntactic relation' to apply to constituents of words — morphemes. The expansion is reasonable. We can distinguish two kinds of syntax: *macrosyntax*, or the syntax of words as the constituents of word combinations, and *microsyntax*, or the syntax of morphemes as the syntax of morpheme combinations as the constituents of words.

In languages with rich morphology every contentive autonomous word usually has a communicative structure that is defined by morphemes as morphological markers. Not so with languages having poor morphology, like English or Chinese. In such languages most words have no morphological markers and therefore no structure from the morphological point of view. But the morphological point of view is too narrow. Morphological markers are only a particular class of signs serving as structural markers. Structural markers need not be realized as particular sequences of phonemes; they may also be implemented by various patterns of the arrangement of words in a word combination. The fundamental property characterizing the contentive autonomous word is its syntactic field, which need not be represented by its morphological structure. The syntactic field of the contentive autonomous word can be represented by the structure of the word combination, as well. This is what happens in morphologically poor languages.

Signs are not merely sound sequences. Contexts of the word in a sentence can serve as structural signs, as well. Under the definition of the sign (3.1), the field is a constituent of the sign. The field is the totality of relevant contexts characterizing the sign. Word structure is the crystallization of the syntactic function of the word, regardless of whether or not the crystallization is indicated by overt markers. Therefore, relevant contexts of a word must be recognized as structural signs serving as constituents of the word. Accordingly, we

recognize *write* as a verb in structure, *chair* as a noun in structure, *white* as an adjective in structure. Under this generalization, I maintain that the main classes of words — verbs, nouns, adjectives, and adverbs — have structures distinguishing them from one another. The structure of the word correlates with the primary syntactic function of the word as its crystallization.

As a counterpart of the distinction of the primary and secondary functions of words we distinguish the primary and secondary forms of words representing the primary and secondary syntactic functions of words. The primary forms are basic forms with zero markers while the secondary forms are characterized by some markers added to the primary forms. For example, *redness* is a secondary function of the word *red*. The primary syntactic function is represented by the primary form *red*, and the secondary syntactic function is represented by the secondary form *redness*, where the marker *-ness* is added to the primary form *red*. In languages such as English, where syntactic relations are represented by word order, secondary syntactic functions of words are often represented not by their secondary forms but by their syntactic positions. For example, in English, on analogy with *I decide : my decision*, where *decision* is a noun being a secondary function of the verb *decide*, we have *I love : my love*, where *love* in *my love* is a noun, being a secondary function of the verb *love*.

We must distinguish *overt* and *covert* indicators of the syntactic field of the contentive autonomous word. Morphological markers serve as overt indicators of the syntactic field of the contentive autonomous word; and the word's place in the structure of the word combination serves as a covert indicator of the representational field of the contentive autonomous word. The essential universal fact is that every language has contentive autonomous words and that in every language contentive autonomous words have syntactic fields. But whether syntactic fields have overt or covert indicators depends on a language — languages with a rich morphology may have a lot of various and complicated word structures; languages with a poor morphology, like English, or with almost no morphology, like Chinese, may have mostly covert indicators of the syntactic field of the contentive autonomous words. In the latter case it is the context of a word in a word combination that serves as a sign of the syntactic field of the contentive autonomous word.

The fact of high grammatical importance is that the syntactic functions of a contentive autonomous word — like its meaning — belong to it permanently; they are not just a temporary qualification that gets attached to the word in the course of the communication between the speaker and the listener. Nor does the homonymy of word structures vitiate the statement that the syntactic function of a word belongs to it permanently as its integral part. (I take 'homonymy' in the sense that one sign has several meanings completely unrelated

to one another, like the word *bank* having two different meanings in *the bank of the river* and in *the bank of England*). The fact that one sign may have two meanings seems to some people so puzzling that they are disposed to devise all sorts of speculations to explain it away. Actually, we must recognize that it is a regular property of a sign that it can have two or more alternative meanings. Ambiguity is manifest usually when a sign is considered outside of its possible contexts. When the sign occurs in a certain context, the context selects the meaning or function compatible with it.

5.4.2 *The structure of the word combination*

Let us now consider the structure of the word combination. From the definition given above (5.1), the structure of a word combination is:

[D15] **STRUCTURE OF THE WORD COMBINATION**

The communicative structure of the word combination is the syntactic relations between words that are invariant of the changes of words.

As an example of the structure of a word combination, suppose that for words in a given sentence we substitute other words, but in a way that still leaves the sentence significant. Suppose we start with a sentence:

(9) John married Mary.

By substituting *Boris* for *John*, *visited* for *married*, and *Bill* for *Mary*, we obtain:

(10) Boris visited Bill.

The second sentence has the same structure as the first one. By substituting other nouns for *John* and *Mary* and other verbs for *married* in (9), we can get an enormous number of different sentences having the same structure. The structure of all these sentences can be characterized by the following formula:

(11) NOUN + VERB + NOUN

We find two types of relations in (11): 1) relations between the words in the word combination; in our case relations between the first noun and the verb, between the verb and the second noun, and between the first and the second nouns; and 2) relations between words that can be substituted for one another; in our case between *John*, *Boris*, and other nouns that can be substituted for them, and between the verbs *married*, *visited*, and other verbs that can be sub-

stituted in their place. Relations of the first type are called *syntactic relations*, and of the second type, *paradigmatic relations*.

From the standpoint of the distinction of syntactic and paradigmatic relations, the constituents of the word combination form two classes — a class of syntactic elements and a class of paradigmatic elements. The totality of the syntactic relations of a word constitutes its *syntactic meaning*, and the totality of its paradigmatic relations constitutes its *paradigmatic meaning*.

From the standpoint of the functioning of a word, the difference between its syntactic and paradigmatic meanings may be defined as follows: the paradigmatic meaning of a word is a linguistic interpretation of reality (things, events, properties, relations, etc), while its syntactic meaning solely indicates its ability to enter into certain types of syntactic relations with certain types of other words when a phrase is constructed. By drawing this distinction between the paradigmatic and syntactic meanings of a word I do not mean to say that the syntactic meaning has nothing whatsoever to do with the interpretation of reality. Thus, the attributive syntactic relation between the words *red* and *apple* in the phrase *the red apple* interprets the extralinguistic relation between an apple and the property of redness (that is, that the property of redness belongs to a certain apple). However, what serves here as an interpretation of reality is the meaning of the phrase *the red apple* as a whole. This total meaning cannot be simply decomposed into two parts that belong to words *red* and *apple*. Thus, syntactic meanings interpret reality only in an indirect way — as meanings that participate in the construction of paradigmatic meanings.

In view of the lexical difference between paradigmatic and syntactic meanings, some linguists recognize only paradigmatic meanings as meanings and do not apply the term ‘meaning’ to syntactic relations. This treatment of the concept of meaning is unwarranted since it conflicts with the concept of the sign properly understood. Sign and meaning presuppose each other, they are correlative concepts. There are neither signs without meanings nor meanings without signs. Syntactic relations are meanings denoted by special signs. Rather than deny meaning to syntactic relations, we must distinguish a hierarchy of meanings: paradigmatic and syntactic meanings belong to the different levels of language.

5.4.3 *The structure of the syllable*

The phonological syllable is the privileged phoneme combination just as the sentence is the privileged word combination. The structure of the syllable can be defined as follows:

[D16] STRUCTURE OF THE SYLLABLE

The structure of the syllable is the syntactic relations between the phonemes of the syllable that are invariant of the changes of the phonemes.

Note that I have further generalized the concept of the syntactic relation applying it not only to morphemes as above, but now also to phonemes.

To illustrate the structure of the syllable, suppose we start with the sequence of phonemes *man*. By substituting *p* for *m*, *e* for *a*, and *t* for *n*, we obtain different words, namely, *pan*, *pat*, *pen*, *pet*, *men*, *met*, and *mat*. In the sequence *man* there are syntactic relations between *m*, *a*, and *n* and paradigmatic relations between each of these phonemes and other phonemes that can be interchanged with it. The possibility of substituting phonemes shows that the interchangeable phonemes have an identical syntactic function and therefore all obtained sequences of phonemes possess identical structure and make up a class of syllables. I use the term ‘syntactic’ with respect to phonemes in a syllable deliberately because relations between phonemes in a syllable are isomorphic to relations between words in a sentence.

5.5 The concept of the structural class

5.5.1 *Fusion of meanings and structural series*

Analyzing a language, we observe multiple discrepancies between the vocal form and meaning of the word structure. One kind of discrepancy is homonymy discussed above (4.7). Another kind of discrepancy is the phenomenon I will call the *fusion of meanings*. The fusion of meanings occurs when one and the same structural constituent of a word has several heterogeneous meanings that are totally different from one another, so that there is no way of unifying them under a single perspective. For example, the Latin morpheme *-um* in *templum* has the meaning of the nominative case, the singular number, the neuter gender, and the noun part of speech. Such heterogeneity renders the analysis of homonymous structures extremely difficult. Since any sign is one, so any structure must be also one. It is inappropriate to speak of the structure of the nominative case, the structure of the plural, the structure of the neuter gender etc.

How can the problem of meaning fusion be solved? The proper solution is to introduce the concept of the *structural class*. As a sign every structure is one, but we can think of it as a single structure belonging to several structural classes.

What do I mean by a structural class?

Consider, for example, Latin nouns *stella*, *terra*, *rosa*, etc. We discover that the structural constituent *-a* of these words has what is called the meaning of the nominative case. But exactly the same meaning is found in the structural constituent *-us* of *lupus*, *amicus*, *cursus*, etc, in the structural constituent *-um* of *verbum*, *templum*, *bellum*, etc, in \emptyset (zero sign) of *puer*, *vir*, *ager*, etc. Since *-a*, *-us*, *-um*, \emptyset have the same meaning, they form a series of structures. We see that these four totally distinct structures form one series as to their structural meaning of the nominative case. Further, comparing the four nominative structures with *-ae* of *stellae*, *-i* of *lupi*, and *-a* of *verba*, we see that these latter structures also have the meaning of the nominative. Hence, we expand our series of structures having the meaning of the nominative case to *-a*, *-us*, *-um*, \emptyset , *-ae*, *-i*, and *-a*. Such a series of structures distinct as to their constitutive structural signs, but totally identical as to their shared single meaning, we call a structural class, in our case, the class of the nominative case.

Now let us compare *stella* with *stellae*, *lupus* with *lupi*, *verbum* with *verba*, *puer* with *pueri*, *genus* with *generis*, *cornu* with *cornus*, *stella* with *stellarum*, *lupus* with *luporum*, *verbum* with *verborum*, *puer* with *puerorum*, *genus* with *generum*, *cornu* with *cornuum*. The comparison shows that *-ae*, *-i*, *-is*, *-us*, *-arum*, *-orum*, and *-um* form another series with the meaning of the genitive case. Further comparisons will reveal the distinct series of the singular and the plural and so on.

The foregoing shows that one and the same structure may represent several structural classes. Every structural class is a series of structures such that: 1) all member structures are unified from the perspective of a single structural meaning; 2) this series is distinct from the series representing other structural classes both as to its meaning and the vocal form of its members, where the distinction in vocal form can be either complete or partial, so that part of the structures of one class may have same vocal forms as part of the structures of another class, so long as there is at least one member in the two series whereby they might be distinguished. Thus, the structural class of the nominative case is represented in Latin by the series *-a*, *-us*, *-um*, \emptyset , *-ae*, *-i*, *-a*. And the class of the genitive case is represented in Latin by the series *-ae*, *-i*, *-is*, *-us*, *-arum*, *-orum*, *-um*. Comparing the series of structures that represent the nominative and the genitive classes we see that these series partially overlap: thus, the constituents *-ae*, *-us*, *-i*, and *-um* are common to both series. The important thing to note is that the series of structures representing different structural classes must differ from one another minimally by a single vocal form.

5.5.2 *Meaning of structural classes*

Let us now consider the meaning of a structural class. We have seen that from the perspective of its realization, a structural class is represented by a series of heterogeneous vocal segments that differs from every other series representing other structural classes by at least one vocal segment. We ask now: What is the meaning of each structure that is part of the series of structures forming a structural class? To answer this question, I will consider an example from Russian.

Consider the structure of the Russian instrumental case *karandašom* ‘with a pencil.’ The meaning of this structure is instrumental: *pišu karandašom* ‘I am writing with a pencil.’ But this structure can also be used to mean a comparison: *on voet volkom* ‘he is howling like a wolf’; or it may also be used with the meaning of time (*prošloj zimoj ja byl v Moskve* ‘last winter I was in Moscow’), meaning of place (*on šel lesom* ‘he was going through the forest’), and some other meanings.

We see that some meanings covered by the structural class of the instrumental case in Russian are homogeneous and others are heterogeneous. For example, the instrumental and the comparative meaning have nothing in common. In this connection one may ask: Why must we consider the instrumental meaning and the comparative meaning to belong to one and the same structural class? Why not assign these meanings to different structural classes?

To answer this question, let us first consider the nature of the mutual relation of the vocal form and the meaning of the word. We have considered the phenomenon of the fusion of meanings whereby a single vocal form may carry several structural meanings. We have seen that, for example, the Latin structural morpheme *-um* in *templum* has a number of heterogeneous meanings: the meaning of the nominative case, the singular number, the neuter gender, and the noun part of speech. These heterogeneous meanings were assigned to different structural classes not only because they are heterogeneous but also because this assignment was based on the representational uniqueness: each sign series must differ from every other sign series by or in at least one sign.

The polysemy of the instrumental in Russian is totally different from the phenomenon of the fusion of meanings. The fusion of meanings occurs when two or more meanings are represented simultaneously by one and the same affix in one and the same context, as shown by our examples from Latin. But in the case of the Russian instrumental we face the alternation of heterogeneous meanings depending on different contexts. Further, if we try to find a different series of structures — one, say, for representing the instrumental meaning and another one, for representing the comparative meaning — we would come up with the identical series of structures for each meaning. We would come up with the series of structures where all the heterogeneous meanings of the Rus-

sian instrumental coexist, being represented by one and the same vocal form. No matter which variety of meaning we find in one structure, it is found in all the other structures. We will discover that all these structural series are identical to one another.

In spite of the differences of contexts causing differences in meanings, all the instrumental structure series are identical as to the vocal forms representing different meanings. The identity of structures is determined by the identity of the vocal forms representing heterogeneous meanings. Whereas with meaning fusion we are able to isolate separate meanings on the basis of unique sign series, in the case of the various meanings of the Russian instrumental we need to postulate the identity of these heterogeneous meanings. The identity of the heterogeneous meanings of the Russian instrumental is not based on whether they are mutually related or not from a logical point of view but solely on the differential identity of the series of vocal forms, which is a purely semiotic fact.

5.5.3 *Structural class defined*

We come up with the final definition of the concept of the structural class:

[D17] **STRUCTURAL CLASS**

A structural class is a series of structures such that: 1) all the series members are unified under a single structural meaning or a complex of homogeneous or heterogeneous meanings co-existing in each structure; 2) the given series of structures is distinct from every other structural series both as to its meaning and its member vocal forms, where the distinction in vocal form can be either complete or partial, whereby part of the structures of one class may have the same vocal forms as another class so long as the two classes differ by a least one vocal form.

One may ask: Why not assign the heterogeneous meanings of structures to different structural classes? Because, on the Principle of Differences, the semiotic identity of meanings — that is, the differential identity of meanings — has nothing to do with whether or not meanings are related to one another from a logical point of view. The semiotic identity or non-identity of meanings is based solely on the fact of whether or not meanings are represented by a single vocal form. From a semiotic point of view, meanings are identical if they are represented by one and the same vocal form and not identical if they are represented by different vocal forms. Semiotic identity or non-identity of meanings has no relation whatsoever to their logical identity or non-identity.

There is a complete parallelism between the semiotic identity of meanings and the semiotic identity of sounds. The semiotic identity of sounds has nothing to do with whether sounds are related to one another from a physical point

of view. What matters is whether or not two sounds have the same distinctive function. Thus, the two sounds *è* and *é* occur both in French and in Russian and are physically related. But in French these two vowels serve as different phonemes, whereas in Russian they are variants of one and the same phoneme. Why? Because in French these vowels serve to distinguish different words and so have different distinctive functions in French. But in Russian these vowels do not serve to distinguish different Russian words; they have the identical distinctive function in Russian. The semiotic identity or non-identity of sounds is based solely on the identity or non-identity of their distinctive function. From a semiotic point of view, sounds are identical if they have an identical distinctive function and they are not identical if they have different distinctive functions.

As mentioned above, a word structure may belong in different structural classes under its vocal and semantic characteristics. A Russian word like *knigi* represents a noun (the part of speech class), the accusative (the grammatical case class), and the plural (the number class).

Words can also be classified from the standpoint of their syntactic function in a sentence: as subject, direct object, indirect object, predicate, attribute, etc. Thus, *is wide* and *walks* belong in the predicate class, even though *wide* is an adjective and *walks* is a verb. In *it is wide* and *the table is wide* both pronouns *it* and the noun *table* belong to the subject class.

The concept of structural class applies both to words and word combinations, and by analogy extends to phonological entities: phonemes and syllables. Although 'meaningless,' phonological units like phonemes or syllables also form classes: we have front and back vowels, open and closed syllables, classification based on accentuation, quantity, etc. Phonological classes are formed in accordance with the Law of the Functional Identity of Phonemes.

The main difficulty the linguist faces with the word or part of speech classification in a language is that words that are candidates for assignment to different parts of speech may share some common properties. Quality is generally denoted by adjectives, but also by verbs; action is generally denoted by verbs, but also by nouns. Or different parts of speech may share a common syntactic behavior. A noun may be used as an adjective, as in *the stone wall*; and an adjective can be used as a noun, as in *out of the blue*. The way of solving this difficulty will be discussed later in this book (8.4).

The concept of sign series and the concept of structural class based on the concept of sign series provide a semiotic barrier against a monosemic tendency widespread in contemporary linguistics to reduce multiple meanings of a sign to a single general meaning allegedly underlying these multiple meanings.

5.5.4 Structural classes and the Proportionality Law

In addition to homonymy and meaning fusion discussed above, problems arise when structural signs have idiosyncratic vocal forms. In such cases to discover structural classification, it is essential to establish analogical proportionality. Saying that *less* (or *least*) is composed of two morphemes — the lexical one identical with *little* and the grammatical one identical with *-er* (or *-est*), as in *larger*, *quicker*, *lovelier*, etc. (or *largest*, *quickest*, *loveliest*, etc.) — is the same as saying that *less* (or *least*) differs in grammatical function from *little* the way that *larger*, *quicker*, and *lovelier*, etc. (or *largest*, *quickest*, *loveliest*, etc.) differ from *large*, *quick*, *lovely*, etc. In other words, we have the proportion:

$$(12) \text{ little:less:least} = \text{large:larger:largest}$$

This proportion shows that in spite of the lack of the vocal characteristics *-er* and *-est*, *less* and *least* have the same structure as *larger* and *largest*, etc.

Similarly:

$$(13) \text{ write:wrote} = \text{walk:walked}$$

This proportion shows that in spite of the lack of outer structural characteristics *write* and *wrote* have the same structure as *walk* and *walked*,

We formulate the Proportionality Law:

[D18] PROPORTIONALITY LAW

Given a class of basic structures, $A = \{a_1, a_2, a_3, \dots\}$ and a class of derived structures $B = \{b_1, b_2, b_3, \dots\}$ obtained by applying a derivational process D to the structures of A , the relation between the basic structure a_i and its derivative b_i is determined by the proportion:

$$a_1:b_1 = a_2:b_2 = a_3:b_3 = \dots = A:B,$$

regardless of whether or not the words having these structures can be segmented into constituent morphemes.

Furthermore, if on some criteria we establish that the following proportionality holds:

$$a_i:b_i = c:d,$$

we can conclude that c belongs to structural class A and d belongs to structural class B .

Proportionality is the mechanism implementing structural derivation. Alongside the hierarchy of the primary and secondary functions of words, it is a ubiquitous feature of the language system. Proportionality is a necessary condition for the defining relations between words.

The Proportionality Law is used to identify word structures. Consider:

- (14) *filia:filiam* =
homo:hominem =
lupus:lupum =
mare:mare =
 NOMINATIVE:ACCUSATIVE

This proportion establishes the identity of the NOMINATIVE:ACCUSATIVE of the above pairs of words although their structural morphemes differ in their vocal forms or have zero vocal forms in some instances.

To give another example, the words *dog-s*, *roof-s*, *book-s*, *student-s*, etc. represent the structural class of the plural number; (he) *walk-ed*, *dance-d*, *dragg-ed*, *insist-ed*, etc. represent the structural class of the past tense. Structures such as in *men*, *women*, etc., on the one hand, and *bought*, *wrote*, etc., on the other, also belong to the classes of the plural and the past, respectively, in spite of the lack of the characteristic vocal features *-(e)s* or *-(e)d*, since under the Proportionality Law they lean on the pattern of productive *-(e)s* and *-(e)d* structures in accordance with proportions like:

- (15) man:men = woman:women = dog:dog-s = SINGULAR:PLURAL
 write:wrote = buy:bought = walk:walk-ed = PRESENT:PAST

5.6 Extending the Principle of Differences to cover the structural sign series

5.6.1 *Generalized Principle of Differences*

The concept of the sign series calls for a revision of the Principle of Differences. The revision is called for because a sign series is an entity that is equivalent to a single sign.

Under the Principle of Differences, two meanings are different if they correspond to two different signs. We extend and generalize this principle to cover the differentiation of structural classes:

[D19] GENERALIZED PRINCIPLE OF DIFFERENCES

In language, differences and identities between meanings and between signs are subject to the following conditions: 1) Only those meanings are different which correspond to different signs or different sign series; and conversely, only those signs or sign series are different which correspond to different meanings. 2) If two different meanings correspond to one and the same sign or sign series and their differences are solely due to the contexts in which they occur, they are the variants of one and the same

meaning. And conversely, if two signs or sign series correspond to one and the same meaning, and their differences are solely due to the contexts in which they occur, they are variants of one and the same sign. 3) If two meanings correspond to one sign or sign series, but freely alternate in identical contexts, they are different meanings.

5.6.2 Extension of the diagnostic cases for homonymy

The Generalized Principle of Differences extends conditions for homonymy. We have to reconsider these conditions.

We have seen that homonymy is a consequence of the Principle of Differences. We have seen that under the Principle of Differences, a word or any other sign is homonymous if its different meanings alternate in the same context. If, on the other hand, the different meanings of the word are conditioned by different contexts, then the word is not homonymous even if its different meanings are heterogeneous. The sole diagnostic condition for the homonymy of the word is the alternation of its meanings in the same context.

Now, under the Generalized Principle of Differences, we formulate an additional diagnostic condition for the homonymy of a sign: if the different meanings of a sign alternate because the sign belongs in different sign series, then the sign is homonymous.

To illustrate homonymy of members of sign series, let us recall the Latin case ending classes considered above. The structural class of the nominative case is represented in Latin by the series *-a*, *-us*, *-us*, $-\emptyset$, *-ae*, *-i*, *-a*. And the class of the genitive case is represented in Latin by the series *-ae*, *-i*, *-is*, *-us*, *-arum*, *-orum*, *-um*. Comparing the series of structures that represent the nominative and the genitive classes we see that these series partially overlap: thus, the constituents *-ae*, *-us*, *-i*, *-um* are common to both series. Since the signs *-ae*, *-us*, *-i*, *-um* belong to the two different series, each of these signs is homonymous.

5.7 The lexicon

Text is the empirical data used for reconstruction of the system of a language. I use the word 'text' as a technical term to denote a sequence of discrete signs of any length.

Word is a minimal discrete sign in text. It is minimal in the sense that the word is the smallest sign that completely satisfies the condition of discreteness, or separability. For instance, in the word *unconsciously* its components *con-*

scious, *unconscious*, and *consciously* might be isolated, but as neither *un-* nor *-ly* is so separable, we are compelled to leave *unconsciously* as an integral discrete whole. As non-discrete parts of the word *unconsciously*, the signs *un-*, *conscious*, *-ly* are *morphemes*. The concept of morpheme is subordinated to the concept of word because morphemes are components of a word that are not discrete, that is, they do not completely satisfy the separability condition.

Word is the sign central to language because it is an atom from which all other more complex linguistic units are built: word combinations and sentences. Compound words are formally similar to affixed words and formally dissimilar to word combinations. Therefore, compounds must be strictly distinguished from word combinations.

The words of a language constitute a set called the *lexicon*.

As elements of the lexicon, words may be viewed from the point of view of either their structures or the lexical morphemes that instantiate these structures. From the point of view of their structures, words constitute the subject matter of the theory of morphology, which is concerned with the discovery of laws of construction of possible grammatical classes of words. Viewed from the perspective of the lexical morphemes that instantiate word structures, words constitute a long unstructured list of items of no interest to the theory of morphology. The theory of morphology is concerned with *possible words* in a language as characterized by their structure, regardless of how rich or poor the lexicon of the language is. The number and conceptual content of lexical morphemes depends on the level of the social culture of a language community. Whether a language has ten or a hundred thousand words has nothing to do with its potential to create new words when the need arises. And this potential is the only thing the theory of morphology is concerned with.

The word is both a morphological and a syntactic object. Both morphology and syntax are concerned with the word.

What is essential about words is that they are syntactic atoms defined by their primary and secondary syntactic functions. Morphological structure is not essential; it is only an external transposition of the syntactic functions of the word. A word may or may not have a morphological structure; the only essential fact about a word is its syntactic functions.

5.8 Grammar

The essence of language is in its grammar. Every language has an outstanding but commonly overlooked feature, which Sapir called *formal completeness* by analogy to mathematical systems such as number or geometrical systems. To

go from one language to another is psychologically parallel to passing from one geometrical system of reference to another. The important thing to note is that formal completeness of language has nothing to do with the lexicon viewed as a set of lexical entries. As the structural part of language, grammar differs sharply from the lexicon. As Sapir put it:

Formal completeness has nothing to do with the richness or the poverty of the vocabulary. It is sometimes convenient, or, for practical reasons, necessary for the speakers of a language to borrow words from foreign sources as the range of experience widens. They may extend the meanings of words which they already possess, create new words out of native resources on the analogy of existing terms, or take over from another people terms to apply to new conceptions which they are introducing. None of these processes affects the form of the language any more than enriching of a certain portion of space by the introduction of new objects affects the geometrical form of that region as defined by an accepted mode of reference. It would be absurd to say that Kant's *Critique of Pure Reason* could be rendered forthwith into the unfamiliar accents of Eskimo or Hottentot, and yet it would be absurd in but a second degree. What is really meant is that the culture of this primitive folk has not advanced to the point where it is of interest to them to form abstract conceptions of a philosophical order. But it is not absurd to say that there is nothing in the formal peculiarities of Hottentot or Eskimo which would obscure the clarity or hide the depth of Kant's thought — indeed, it may be suspected that the highly synthetic and periodic structure of Eskimo would more easily bear the weight of Kant's terminology than his native German. Further, to move to a more positive vantage point, it is not absurd to say that both Hottentot and Eskimo possess all the formal apparatus that is required to serve as matrix for the expression of Kant's thought. If these languages do not have the requisite Kantian vocabulary, it is not the languages that are to be blamed but the Eskimo and the Hottentots themselves. The languages as such are quite hospitable to the addition of a philosophic load to their lexical stock-in-trade. (Sapir 1949: 153-154)

The theory of grammar is central to linguistics as the study of the formal completeness of language. We must distinguish sharply between the facts of grammar and the facts of the lexicon. The necessity to distinguish between grammar and the lexicon was emphasized by Sapir:

In the sense that the vocabulary of a language more or less faithfully reflects the culture whose purposes it serves: it is perfectly true that the history of language and the history of culture move along parallel lines. But this superficial and extraneous 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 stu-

dent should never make a mistake of identifying a language with its dictionary. (Sapir 1949: 219)

5.9 Law of Autonomy of Grammar from the Lexicon

There is no necessary congruity between the structural and lexical meanings of a word. We can observe a congruity of these meanings, for example, in the word *cat*, where both structural and lexical meaning refer to an object. But often the structural and lexical meanings of a word act in different or even diametrically opposite directions. For example, the structural meaning of *protection* refers to an object, while its lexical meaning refers to a process; and conversely, the structural meaning of *(to) cage* refers to a process, while its lexical meaning refers to an object.

The tension between structural and lexical meanings I call *the antinomy between grammar and the lexicon*. The Russian linguist Alexander Peshkovskij, who was far ahead of his time, warned against confusing structural ('formal') and lexical ('material') meanings under the influence of the 'antigrammatical hypnotism' of the 'material' parts of words:

We must warn the reader against the antigrammatical hypnotism that comes from the material parts of words. For us, material and formal meanings are like forces applied to one and the same point (a word) but acting sometimes in the same direction, sometimes in intersecting directions, and sometimes in exactly opposite directions. And here we must be prepared to see that the force of the material meaning, just like the stream of a river carrying away an object, will be obvious, while the force of the formal meaning, just like the wind blowing against the stream and holding back the same object, will require special methods of analysis. (Peshkovskij 1931: 71)

We must not confuse structural meanings with lexical ones. The distinction between structural and lexical meanings is of paramount importance for Semiotic Linguistics. Structural meanings and the way they interrelate with lexical meanings is one of the most important concerns of Semiotic Linguistics. The essential aspect of the interrelation between structural and lexical meanings is that lexical meanings constrain grammatical rules. Yet, in stating the laws of grammar we must abstract from the lexical constraints on the rules of grammar of individual languages. The laws of grammar cannot be stated in terms of the lexical constraints on the rules of grammar of individual languages. These requirements are captured in the following law:

[D20] LAW OF AUTONOMY OF GRAMMAR FROM THE LEXICON

The meaning of the structure of a word or a sentence is independent of the meanings of the lexical signs that instantiate this structure.

The Law of Autonomy of Grammar from the Lexicon should not be confused with Chomsky's notion of autonomous syntax. Chomsky means the autonomy of syntax from meaning, whereas I mean the autonomy of grammar from the lexicon, that is, the autonomy of all structural meanings — syntactic and non-syntactic — from lexical meanings.

The Law of the Autonomy of Grammar from the Lexicon is an idealization. In the real world grammatical structure is constrained by the lexical meanings of words. Grammar independent from the lexicon is an essential ideal object — an essential theoretical construct.

Why do we need the idealization of grammar as autonomous from the lexicon? We need it as an instrument of explanation. Consider the process of passivization. To understand this grammatical process, we need to perform two kinds of abstraction: 1) the abstraction of the sentence structure from the words that instantiate it and 2) the abstraction of the sentence structure from its linear representation. In different languages the process of passivization is constrained in very different ways by the lexicon and the rules of word order, but the essence of passivization is the same in all languages where it occurs. The law of passivization must be stated in terms of syntactic relations, independently of the constraints of the lexicon and the rules of word order, which are different in different languages.

In the real world, grammar is not free from the lexicon. Grammar and the lexicon interrelate, and the constraints of the lexicon on the rules of grammar are part of this interrelation. But the method of idealization — the method of viewing grammar as an autonomous entity — is the only correct way to understand the interrelation of grammar and the lexicon in the real world. This is how laws are formulated in every mature science. So, in the real world, the motion of physical bodies is constrained by friction and other forces of the real world. But to understand these constraints, we must first conceive of motion as free of these constraints. This is what Galileo and Newton did: their laws of motion are idealizations that treat motion as an ideal phenomenon completely free from the constraints of the forces of the real world.

5.10 Semiotic Typology of Languages

After all that we have said about the opposition between structural and lexical signs we have to consider the implications of this opposition for linguistic typology.

I must emphasize that the opposition of structural and lexical signs is universal. We recognize that the distribution between structural and lexical signs is different in different languages: what in one language is expressed by structural signs is what in another language is expressed by lexical signs, and conversely, what in one language is expressed by lexical signs is what in another language is expressed by structural signs. But the opposition between structural and lexical signs itself is universal: no language exists or is imaginable without this opposition.

The opposition between structural and lexical signs is a phenomenon that must be taken into consideration by all classifications in linguistic typology. Without the recognition of the opposition of structural and lexical signs no conception of linguistic typology is imaginable.

5.10.1 Typology of signs

Having defined the concept of the sign, I propose a typology of signs based on the Principle of Differences. The proposed typology of signs is a linguistic alternative to Sapir's psychological classification. Sapir's outstanding merit is that he based his linguistic typology on the nature of concepts expressed by language, and so went farther and deeper than any linguist had before him. This is manifest in the fact that anyone who deals with linguistic typology necessarily refers to Sapir. Yet, for all its lucidity, Sapir's classification runs into difficulties because it is developed in terms of the psychological notion of the scale of abstraction from the concrete ('basic') to the most abstract ('pure relational') concepts rather than in terms of the linguistic notions of syntactic and paradigmatic relations between linguistic signs. Sapir's typology is flawed because, although he recognized the sign nature of language, he did not have the clue to the deeper understanding of the nature of meaning provided by the Principle of Differences.

Sapir suggests four types of concepts:

- (i) radical (lexical) concepts,
- (ii) derivational concepts,
- (iii) concrete relational concepts,
- (iv) pure relational concepts.

Sapir does not base this typology on the relation between sign and meaning. Therefore, his conceptual analysis in terms of the degree of abstraction reflects

the common myth that some grammatical words or morphemes (his ‘pure relational concepts’) have no meaning. Sapir’s approach to the typology of meanings based on the degree of abstraction rather than on sign-based distinctions is equally misleading: for one thing, lexical concepts can be no less abstract than grammatical concepts; for another, the distinction between concrete and pure relational concepts is not defined in semiotic terms. Overall, Sapir’s approach is psychological rather than linguistic.

The classic analysis of Sapir is used either as a starting point or as a frame of reference by every linguist doing research in language typology. To my knowledge, nobody has seriously questioned Sapir’s typology except for Martinet (1962). Martinet has questioned Sapir’s psychologism correctly, but his alternative proposal raises strong objections because, paradoxically, by banning psychologism, Martinet bans meaning from the sign and so violates the Principle of Differences — an example of using a remedy that is worse than the disease.

Sapir’s mistakes are instructive. Sapir has correctly established the fundamental distinction between the two fields of the study of language: the study of the system of meanings of language and the study of the system of the means of expression of the system of meanings of language. To consistently carry out this program, it was necessary to develop the instruments of investigation based on an analysis of the hidden properties of signs — an analysis that did not exist in Sapir’s time and required the efforts of many investigators. Hence, Sapir did not feel that his psychologism was an unjustified departure from his semiotic program of linguistic investigation. Nevertheless, due to his program of linguistic investigation Sapir succeeded in achieving uncanny results in the investigation of language typology that have served as inspiration to generations of linguists to come.

What is a linguistic solution to language typology? My distinction of lexical and structural signs corresponds to Sapir’s distinction of radical and grammatical signs, with further distinctions based on the arrangements of signs. Signs involve two modes of arrangement: into combinations and into classes. A combination is a sign that consists of two or more signs. A class implies a choice between alternatives, the possibility of substituting one sign for another, equivalent to it in some respect. Relations between signs forming a combination are called *syntactic*, or *syntagmatic relations*. Relations between signs forming a class of signs that can be substituted for one another in the same position in a sign combination are called *paradigmatic relations*. Under the distinction of classes and combinations, we must distinguish two kinds of structural signs: *relators* and *modifiers*. Relators are prepositions, conjunctions, inflectional affixes etc.; they serve to combine lexical signs to form combina-

tions. Modifiers are articles and various affixes (such as affixes of number, tense, modality, aspect, etc.) that establish various subclasses of parts of speech that can be substituted for one another.

I propose the following typology of signs:

- (I) *lexical signs* — an unlimited inventory of lexical signs for things such as objects, qualities, actions no matter how concrete or abstract.
- (II) *derivators* — a limited inventory of structural signs that derive lexical signs from lexical signs either as affixes applied to single signs, or as connecting vowels or other sign devices used for the composition of two signs into one, such as *-er* in *worker*, *-ish* in *bluish*; *-o-* in *lexicogrammatical*.
- (III) *modifiers* — a limited inventory of structural signs, such as tense affixes, that establish paradigmatic relations between lexical signs inside combinations of lexical signs.
- (IV) *relators* — a limited inventory of structural signs that establish syntactic relations between lexical signs inside combinations of lexical signs.

As we see, derivators, modifiers, and relators form a limited inventory of structural signs that contrasts with the unlimited inventory of lexical signs.

Lexical signs and relators are essential to all languages. We must know which meanings expressed by lexical signs are related to each other and how. If we wish to speak of things and actions, we must indicate which thing is the starting point of the action and which is the end point. It is impossible to speak of things without using signs indicating the relation between them. The fundamental syntactic relations must be unambiguously expressed. We can omit the time and place of action or a host of other features, but we cannot avoid mentioning the basic syntactic relations between the participants of the action. Derivators and modifiers, on the other hand, are common but not essential. In this respect, it is particularly significant that single-morpheme words belong in most cases to groups I and IV and less commonly to groups II or III.

We come up with a rigorous sign-based typology of meanings that radically differs from Sapir's psychological scale of degree of abstraction. The important thing to note is that we have converted Sapir's typology of meanings into a typology of signs in abstraction from vocal forms of signs. Only the typology of signs in abstraction from their vocal forms is sufficiently general because it is based on the universal principles of the arrangement of signs into combinations and classes. As for the typology of meanings, the distinction between structural and lexical meanings is both absolute and relative. It is absolute because in every language there are lexical and structural signs that represent lexical and structural meanings; it is relative because what in one language is represented by structural signs is represented by lexical ones in another, and vice versa.

5.10.2 Sign-based typology of languages

Using the typology of signs proposed above (5.10.1), we come up with our counterpart of Sapir's classification of languages.

We recognize that any language must necessarily have lexical signs and relators. This is a minimum no language can exist without. Of the other two groups of linguistic signs — derivators (group II) and modifiers (group III) — both may be absent, both may be present, or only one present. Hence, all languages of the world can be classified as follows:

- A. Languages that have signs of groups I and IV only. These languages have only lexical signs and relators, that is, signs expressing syntactic relations. These languages can be called *simple relator languages*.
- B. Languages that have signs of groups I, II, and IV, that is, lexical signs, syntactic relators, and derivators. These are languages that in addition to relators also have derivators — the means of modifying their lexical signs. These languages may be called *complex relator languages*.
- C. Languages that have signs of groups I, III, and IV. That is, in addition to lexical signs and relators, these languages also have modifiers. These languages may be called *simple modifier-relator languages*.
- D. Languages that have signs of groups I, II, III, and IV. That is, in addition to lexical and syntactic relators, these languages also have paradigmatic relators and derivators. These languages may be called *complex modifier-relator languages*.

We come up with the following scheme of language classification:

- I. Relator languages { A. Simple
 { B. Complex
- II. Modifier-relator languages { A. Simple
 { B. Complex

The contrast between the two groups of languages — relator languages and modifier-relator languages — is a semantic contrast that affords a deeper picture of the essential differences between languages than the contrast between isolating, agglutinative and fusional (inflectional) languages.

5.10.3 Law of the Syntactic Field as the foundation of linguistic typology

I will complement the semantic typology of languages presented above (5.10.2) with the syntactic typology of languages, which is an elaboration of the system proposed by V. M. Solncev (1995).

As the foundation of the syntactic typology of languages I propose the Law of the Syntactic Field:

[D21] LAW OF THE SYNTACTIC FIELD

Contentive autonomous words of every language are defined by their syntactic field — the hierarchy of the word's primary and secondary syntactic functions, which is represented either by the syntactic field structure of the contentive autonomous word or by the syntactic structure of the sentence.

The Law of the Syntactic Field implies the division of the languages of the world into two syntactic types: *isolating languages* and *non-isolating languages*. In contrast to Sapir's morphological concept of isolation, which treats isolation as a phenomenon of the same order as agglutination or inflection, the opposition ISOLATION:NON-ISOLATION is conceived as a purely syntactic concept characterized by the two contrasting markers of the syntactic field — morphological markers and prepositions. Under isolation and non-isolation, I mean the two contrasting ways of expressing the syntactic field of contentive autonomous words: either by morphological markers or by prepositions. In other words, isolation and non-isolation are two structural syntactic classes expressed either by morphological markers or by prepositions. Isolation and non-isolation are structural syntactic classes because they characterize the syntactic fields of contentive autonomous words.

The syntactic opposition ISOLATION:NON-ISOLATION, dividing the languages of the world into two syntactic groups, must be taken as the syntactic foundation of the hierarchical system of linguistic typology. On this syntactic basis, forming the first level of the hierarchy, we build the second level of morphological types that constitute the subtypes of the fundamental syntactic opposition of the languages of the world.

The facts of the modern Chinese, as well as facts of other isolating languages, show that agglutinative and inflectional morphology may exist inside the isolating syntactic system (Solncev 1995; Solnceva 1985). These facts are explained by the difference between the two kinds of structure of the contentive autonomous word: the structure of the syntactic field and the paradigmatic structure. Words of isolating languages lack the structure of the syntactic field, but they may have a paradigmatic structure formed by agglutination or inflection. In the framework of the syntactic opposition of isolation and non-isolation, both isolating and non-isolating languages may have agglutinative and inflectional morphological subtypes.

Non-isolating languages have three morphological subtypes: 1) inflectional, 2) agglutinative, and 3) incorporating.

Isolating languages mostly use agglutination, but may also have inflection and incorporation. We may distinguish the following morphological subgroups of isolating languages (Solncev 1995: 10):

- 1) agglutinative (modern Chinese),
- 2) agglutinative with the elements of inflection (Tibetan),
- 3) languages almost without morphology (classical Chinese, some languages of South-East Asia).

We have come up with the two complementary semiotic systems of linguistic typology: the semantic system and the syntactic system. The semantic system is based on the semantic types of signs, while the syntactic system is concerned with the contrast between isolation and non-isolation and syntactic classes. The syntactic system is integrated with the semantic system since on our view syntax is not an independent area of language but part of its semantic system.

5.11 Confusion of structural and lexical meanings in modern linguistics

The fundamental difference between Semiotic Linguistics and other theories that dominate the contemporary linguistics scene is that the latter fail to distinguish language from thought. To the extent that the need for this distinction is neither perceived nor recognized, these theories formulate no clear criteria for distinguishing language and thought. While Semiotic Linguistics pursues the semiotic research program, which claims that grammatical theory must be independent of logic, other theories of universal grammar explicitly or implicitly espouse the logical approach to the study of language that, in its essentials, can be traced back to the seventeenth-century research practice of the Port-Royal grammarians, who treated grammatical theory as part of logic, which was falsely identified with the study of the nature of the human mind.

5.11.1 Agentivity

The confusion of the structural and lexical meanings of words or word combinations leads to grave errors in grammatical analysis. As a result of these errors, innumerable quasi-grammatical meanings are ascribed to verbal tenses and aspects, noun cases, etc. An example of such confused analysis is offered by Marantz. Marantz (1984: 129) assigns different roles to the complement of the preposition *by* in the following sentences:

- (16) a. agent: *Hortense was passed by Elmer.*
 b. experiencer: *Elmer was seen by everyone who entered.*
 c. theme: *The intersection was approached by five cars at once.*
 d. recipient: *The porcupine crate was received by Elmer's firm.*

While Semiotic Linguistics treats all the complements of *by* in the above examples as grammatical agents, Marantz assigns roles to these terms because he lumps together structural and lexical meanings.

One must not confuse structural and lexical meanings and strictly distinguish them. Structural meanings are obligatory meanings that are imposed by the design of language, while lexical meanings are variables depending on the context. When a term is assigned the structural meaning 'agent,' this is a structural meaning that treats an object denoted by the term as an agent regardless of whether it is a real agent or not. Thus, the complements of *by* denoted by the terms in the above examples may not be real agents in the context of the lexical meaning of predicates (added to the lexical meaning of the noun stems), but linguistically they are treated as if they were real agents. Since lexical meanings are closer to reality, a conflict often arises between lexical and structural meanings of a term. We can observe this conflict in (16b-d), whereas in (16a) the lexical meaning of the term agrees with its structural meaning.

Every word has a number of meanings: some of them are lexical meanings and others are structural meanings. Although from the grammatical point of view structural meanings are the most important, they are the least conspicuous. To dispel any illusions, we must understand that the structural meanings of a word are not directly accessible; they are blended with the lexical meanings. The blend of lexical and structural meanings constitutes a heterogeneous object. Lexical meanings are more conspicuous. An insight into structural meanings requires special methods of analysis.

The structural meaning 'agent' can be separated from a lexical meaning by means of a thought experiment. If we replace the lexical morphemes of a word with dummy morphemes, we obtain the grammatical structure of a word in a pure form. Here is an example of such an experiment (Fries 1952: 71):

- (17) a. Woggles ugged diggles.
- b. Uggs woggled diggs.
- c. Woggs diggled uggles.
- d. A woggle ugged a diggle.
- e. An ugg woggles diggs.
- f. A diggled woggle ugged a woggled diggle.

Sentences in (17) are all clearly transitive constructions, owing to the specific word order and nominal and verbal morphemes. It is clear that the first terms in these constructions mean 'agent,' whereas the second terms mean 'patient.' We can relate passive constructions to all of these sentences:

- (18) a. Diggles were ugged by woggles.
 b. Diggs were wogged by uggs.

...

It is clear that the preposition *by* introduces a term meaning ‘agent’ in these sentences. Let us now substitute a lexical morpheme, like *hate*, for the dummy root of a verb:

- (19) Woggles hated diggles.

(19) can be related to a passive construction:

- (20) Diggles were hated by woggles.

From the viewpoint of the lexical meaning of *hate*, the first term in (19) and the oblique term in (20) mean ‘experiencer.’ But this meaning has nothing to do with the structural meaning of these terms (‘agent’), which remains invariant under various substitutions of the lexical part of the verb, whose meaning may often conflict with the structural meaning of its terms.

Lexical meanings are meanings of morphemes that constitute word stems, while structural meanings are meanings of inflectional morphemes, prepositions, conjunctions, and other devices such as word order. Most current work on the theory of grammar disregards the fundamental opposition STRUCTURAL MEANING : LEXICAL MEANING and confounds these notions. Foley and Van Valin (1984: 29) proposed the notions of *actor* and *undergoer*, which they define as ‘generalized semantic relations between predicate and its arguments.’ ‘Actor’ and ‘undergoer’ are abstract notions that roughly correspond to the semiotic notions of grammatical agent and grammatical patient. However, Foley and Van Valin present these abstract notions as purely empirical generalizations without defining the basis for their generalization. Their work lacks the distinction between structural and lexical meanings, which is the necessary basis for all abstractions in the theory of grammar. We arrive at grammatical notions by separating — by abstracting — structural meanings from lexical meanings.

5.11.2 Agentivity in ergative languages

Another example of analysis that confuses lexical and structural meanings has to do with ergative constructions. Apart from the controversy about what syntactic constructions must be recognized as ergative, the prevailing view has it that even for syntactic constructions commonly agreed to be ergative, the notion of agent is an informal concept. Thus, Comrie writes:

I explicitly reject the identification of ergativity and agentivity, [...] despite some similarities between ergativity and agentivity, evidence from the wide range of ergative languages points against this identification. (Comrie 1978: 356)

To support his view, Comrie (1978: 357) cites examples from Basque:

- (21) a. *Herra-k z-erabiltza.*
hatred-ERG you-move
'Hatred inspires you.'
b. *Ur-handia-k d-erabilka eihara.*
the-river-ERG it-move mill-ABS
'The river works the mill.'

Citing (21) to show that agentivity is denied a formal status in ergative languages betrays the confusion of lexical and structural meanings of nouns in the ergative case. From the grammatical point of view, any noun in ergative case means 'agent,' no matter what its lexical meaning is and no matter in what context it occurs. In Comrie's examples, the lexical meaning of *herrak* in (21a) and of *urhandiak* in (21b) conflict with the meaning of the ergative case, which is a structural meaning. The ergative case has nothing to do with the objects of reality that lexical meanings of nouns refer to. It has nothing to do with real agents. Rather it is a form of presentation of anything as an agent, no matter whether or not it is a real agent.

Chapter 6

The Theory of Superposition

6.1 Meaning and information

Under the Principle of Duality of Categorization, meaning has value and worth. Value is the properties of meaning in relation to its sign determined by the Principle of Differences. Worth is the properties of meaning outside its relation to its sign. The worth of meaning is meaning viewed simply as a concept, as information, as anything outside the relation of the meaning to its sign. The worth of meaning is what I call the *information* in meaning. Let me illustrate this with an example.

If by way of an experiment we compare sentences in different languages, we can establish that one and the same thought can be articulated into signs that differ both with respect to their meanings, their number and ways in which they combine. Consider sentences expressing an identical thought:

- (22) English: *I do not know*
French: *Je ne sais pas*
Russian: *Ja ne znaju*
Eskimo: *Naluvara*

The English sentence starts with 'I,' followed by a verbal concept that does not occur either in French, Russian or Eskimo, followed by negation, and finishing with the meaning 'know.' French begins with 'I,' followed by 'know' sandwiched in between two special signs that signify negation only in combination — *ne* and *pas*, the latter being used also as a word meaning 'step' if used separately. Russian has a simple structure starting with 'I,' followed by negation, and ending with 'know.' In Eskimo, we have a word that coincides

with the whole sentence: 'not-knowing-am-I-it' from *nalo* 'ignorance' with the suffixes for the first-person subject and third-person object.

We see that in different languages one and the same thought is analyzed in different ways by using different sets and sequences of signs having different meanings. These different analyses are various forms of a common content — the identical thought. Hence we must draw a clear distinction between thought and the form of thought consisting of different meanings of different signs. We say that different meanings of different signs are various forms of the same thought — the same thought is the *identical information* in various meanings.

One important consequence of the Principle of Differences and its corollary Principle of Duality of Categorization is the necessity to split the traditional concept of meaning into two concepts: meaning proper and information. The splitting of the concept 'meaning' into 'meaning proper' and 'information' is no less necessary than the splitting of 'sound' into 'sound proper' and 'phoneme.' This analogy is expressed by the proportion:

$$(23) \text{ PHONEME : SOUND = MEANING : INFORMATION}$$

The important thing to understand is that phoneme and sound, on the one hand, and meaning and information, on the other, constitute dualities. The phoneme is sound considered under its distinctive function, and sound is the phoneme considered under its vocal properties. Meaning is information considered in its relation to the sign that represents it, and information is meaning considered outside its relation to the sign that represents it. This splitting of concepts is no less important for the progress of the science of language than the splitting of 'heat' into 'heat proper' and 'temperature' was for the evolution of physics.

Recall the example given above:

- (24) *swim*: fish swim in water
float: the leaves float on the water
sail: the ship sails in the coastal waters

As we already observed, in English, *swim*, *float*, and *sail* correspond to three different concepts 'swim,' 'float,' and 'sail.' The distinction between these three concepts is relevant because they correlate with three different signs *swim*, *float*, and *sail*. We say that in English, these three different concepts — 'swim,' 'float,' and 'sail' — are three different thoughts, three different contents of the three different forms — the meanings of the signs *swim*, *float*, and *sail*. In contrast, in Russian these three different concepts correlate with the meaning of a single sign *plavat'*, so that the meaning of this one sign is the

common form of all these concepts. We say that the meaning of the Russian word *plavat* contains three different informations, 'swim,' 'float,' or 'sail,' depending on three different contexts. While in English these three concepts are distinguished both in thought and language, in Russian these concepts are distinguishable in thought but not in language. Since the linguist studies language as the form of thought and thus must take care to distinguish meaning and information, he must disregard the three contexts that change the information of the Russian *plavat*, which in fact has only one meaning with three different context-dependent informations.

The important thing to bear in mind is that language is the form of thought, and thought is the content of language. Phonemes constitute the communicative form of sounds, and meaning constitutes the communicative form of information. Neither sound nor information are part of language although, paradoxically, the *raison d'être* of language is to carry information and the *raison d'être* of sounds is to serve as signs. Many linguists understand the necessity of distinguishing between sound and phoneme (although the criteria for this distinction have not been established clearly), but a consistent and relentless distinction between meaning and information is new.

The confusion of meaning and information is characteristic of various schools of semantics which use paraphrase as their main tool of analysis. Paraphrase is a means of discovering the informational content of a word or sentence. If we paraphrase the verb *kill* as 'cause somebody not to be alive,' we present the informational content of the meaning of the verb; we present the information in the meaning, but not the meaning of the verb *kill* itself. As I explain elsewhere (4.10.1), neither causation nor negation are part of the meaning of *kill*. These are not features of the meaning of 'kill' because they do not correlate with any signs.

A precise characterization of language and thought — or, meaning and its information — as form and content can be given in terms of the concept of relevance which is part of the Principle of Differences. The form of thought is the totality of the relevant features of thought established in accordance with the Principle of Differences.

6.2 Worth- and value-changing contexts

The fundamental distinction of meaning and information — the cornerstone of linguistic research — has crucial implications for defining the notion of *context* for the study of the meaning of signs. The distinction between meaning and

information involves distinction between value-based and worth-based contexts. Let us consider this distinction.

The meaning of a word is the sum of the meanings of its independent elements plus elements attributed to it by the context. By analogy, we can compare words with musical notes: the length of a musical note is described by the form of the musical note from the very beginning, but its height is described by its position with respect to other notes constituting its environment. By context I do not mean just the environment consisting of words, but also the elements of the external situation that determine meaning.

The importance of the context for the meaning of signs is recognized by all linguists. Taking the notion of meaning in the widest sense of the term, we pose the question: Must the linguist be interested in all context-caused changes of meaning or only in some of them?

Having introduced the distinction between the form and content of thought, we face their fundamental consequence — the necessity to split the concept of semantic context into *meaning-changing context* and *information-changing context*, and to split the concept of *phonological context* into *phoneme-changing context* and *sound-changing context*.

To give examples of an information-changing context, I return to the English word *spill*. This word has different but related meanings in the different contexts of the expressions *He spilled the liquid* and *He spilled the powder*. The word *spilled* indicates two physically different but related actions in these two different contexts. Similarly, the word *open* indicates two physically different but related actions in the different contexts of expressions *open the book* and *open the door*. In these examples the meaning of the word remains the same; only its information changes in the different contexts.

As an example of a sound-changing context, consider the difference between the three /k/ in *cool*, *key*, and *cat*. The worth of /k/ depends on the vowels that follow it; the phoneme /k/ itself does not change.

Turning to the differential forms of meaning and sound, let us start with an example from phonology. In Russian and Polish, voiced consonants coincide with corresponding voiceless consonants at the end of words; for example, word-final /b/, /d/, /g/ coincide with /p/, /t/, /k/ as in Russian *kot* ‘cat’ = *kod* ‘code.’ The forms of /b/, /d/, /g/ at the end of the word are not phonetic variants, but autonomous phonemes identified by speakers with prevocalic /p/, /t/, /k/, as word-initial /t/ in Russian *to* ‘that.’ The phoneme-changing context produces an alternation of phonemes.

An analogical phenomenon happens in the semantic domain: an alternation between two words is produced when due to the action of the meaning-changing context the meaning of a word W coincides with the meaning of a

word W .' For example, in *bright child* the meaning of *bright* coincides with the meaning of *intelligent*. In this case, we observe not a variant of *bright*, but its secondary meaning, which alternates with *intelligent*. This kind of alternation throws light on mutual relation between *polysemy* and *synonymy*. The word *intelligent* has an expressive synonym *bright*. On the other hand, the word *bright* has two meanings: primary, as in *bright light*, and secondary, as when it coincides with *intelligent*.

Information-changing contexts and sound-changing contexts are *worth-changing contexts*, and meaning-changing and phoneme-changing contexts are *value-changing contexts*. We must distinguish between worth-changing contexts and value-changing contexts. We must disregard worth-changing contexts as having to do with extralinguistic phenomena and look for value-changing contexts.

6.3 Primary and secondary functions of a sign and the notion of the field

When do we have a genuine context-induced change of the meaning of a word? This happens when in a value-changing context word W_1 coincides with word W_2 , so that the meaning of W_2 is adjoined to the meaning of W_1 . This is the process I call *superposition of signs*: the word W_1 is superposed with the word W_2 , so that a relation of derivation is established between W_1 and W_2 — the word W_1 is then derived from W_2 . In this case we have a *non-syntactic derivation*, where W_1 and W_2 are related by meanings rather than forms of the signs.

The coincidence of W_1 with W_2 is expressed by special markers adjoined to W_1 . The function of W_1 is its primary function. W_1 plus special markers are the words derived from W_1 . All the words derived from W_1 are defined as secondary functions of W_1 . Thus, we come up with a related set of words derived from W_1 . All these words are defined as different secondary functions of W_1 . The primary function of W_1 is part of W_1 and is not expressed by special markers. For example, the primary syntactic function of *great* as an attribute of a noun is part of *great* and is not expressed by any marker. *Greatness* is a secondary function of *great* expressed by the marker *ness*. Another secondary function of *great* is *greatly*, expressed by the marker *ly*.

It is important to understand that not every word has a primary function. Primary syntactic function belongs only to a basic word. Words derived from a basic word do not have their own primary function but are defined as a secondary function of the basic word. Borrowing Lakoff's concept, but applying it to

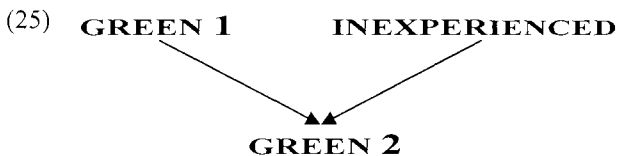
quite a different phenomenon, we can apply the term ‘prototype’ to basic words having the primary functions.

I use the term ‘superposition’ in the sense of two distinct things being in the same place at the same time. Two words or functions that coincide in the sense of being in the same place at the same time obviously form a *duplex* entity.

6.3.1 Synonymy and polysemy

Let us illustrate superposition with an example. When in certain contexts we replace the word *inexperienced* by *green* (as in *green recruits*), *green* is not a combinatory variant of *inexperienced*, but a contensive autonomous word, because *green* occurs in entirely different contexts (for example, in *green grass*) where *green* cannot be replaced by *inexperienced*. In the phrase *green recruits* we observe an alternation of the two words under the influence of a meaning-changing context.

This example illustrates the interdependent relations of synonymy and polysemy. The word *green* is an expressive synonym of *inexperienced*. (It must be noted that synonymy is not a symmetric relation: *inexperienced* is not a synonym of *green* because *inexperienced* cannot replace *green*.) On the other hand, the word *green* has two meanings: the primary (as in *green grass*) and the secondary one, involving the superposition of the word *green* with the word *inexperienced*, which means that the meaning of the word *inexperienced* is used as a secondary meaning of the word *green*. The process of superposition of the word *green* with the word *inexperienced* could be represented by the following diagram:



In diagram (25) number 1 after the word *green* indicates the position of this word in a context that does not change its primary meaning ‘green.’ Number 2 after *green* indicates the meaning-changing context in which the word *green* is superposed with the word *inexperienced*. As a result, the meaning ‘inexperienced’ becomes the secondary meaning of *green*, which is thus non-syntactically derived from the word *inexperienced*.

Similarly, compare the meaning of the word *hot* in the following two sentences:

- (26) a. All rooms have hot and cold water.
 b. They are one of this year's hot new bands on the rock scene.

In (26a) *hot* means 'having high temperature.' In (26b) *hot* has the primary meaning 'high temperature' and the secondary meaning 'popular' — the same as the meaning of the word *popular*. What happens here is this: *hot_b* is *hot_a* with its primary meaning plus the secondary meaning that coincides with the proper meaning of *popular*. *hot_b* is a word that functions as a non-syntactic derivative of the word *popular*; that is, *hot_b* functions as an expressive alternant of *popular*. The superposition of signs involves polysemy and synonymy as complementary concepts: the relation of *hot_b* to *hot_a* is polysemy; the relation of *hot_b* to *popular* is synonymy. Again, note that synonymy is asymmetric: *hot_b* is a synonym of *popular*, but *popular* is not a synonym of *hot_b*.

As another example, take the word *lion*. The primary meaning of *lion* is the name of an animal. But in some contexts it takes on the secondary meaning 'famous and important person,' as in a *literary lion*. This example, as well as the examples of *green* and *hot* in (25) and (26b) are instances of *metaphor*. Metaphor is a case of the superposition of meanings of signs. As metaphor, *lion* is synonymous with *famous and important person* and *green* is synonymous with *inexperienced*. Synonymy involves superposition. As metaphors, *lion*, *green* and *hot* do not lose their primary meanings. What happens is that the primary meaning of the metaphoric synonym coincides with the primary meaning of the word for which it is a synonym. Metaphors involve the superposition of signs.

It is important to note that synonymy and polysemy involved in superposition are special cases of more general phenomena of synonymy and polysemy.

6.3.2 Spurious polysemy

The complementarity of polysemy and synonymy involves superposition: every sign has its primary meaning but may get a secondary meaning on top of its primary meaning by coinciding with another sign.

The concept of superposition requires that we redefine the traditional concept of polysemy. Consider:

- (27) a. Mary baked a potato.
 b. Mary baked a cake.

From the traditional point of view, one may say that the verb *baked* has different meanings in these sentences. In (27a), *baked* denotes an action directed at an object, and in (27b) the object is not present initially but is created by the

action denoted by *bake*. On our view, the ambiguity of *bake* is spurious: the meaning of *bake* is the same in both sentences. What is different is the lexical meanings of the context *potato* in (27a) and *cake* in (27b). These different contexts do not change the meaning of *bake*, but add their own meaning to it, creating two different informational contents of the meaning of *bake*.

We must distinguish two kinds of context: 1) meaning-changing context, a context that causes a genuine polysemy of a sign by superposing it with another sign; and 2) information-changing context, a context that does not change the meaning of a sign but adds its own meaning to the meaning of the sign, changing its informational content. We must not confuse genuine polysemy with spurious polysemy. Spurious polysemy is parasitic on meanings added to the meaning of a sign by an informational context.

6.3.3 Syntactic superposition

We discover similar facts with structural meanings. Compare *the stone is black* and *the stone wall*. In the first phrase, the noun *stone* functions as a subject, which is its primary function. But in the second phrase the word *stone* functions as an attribute of a noun, i.e. as a structural synonym of an adjective. Here we discover the superposition of a noun with an adjective, so that the syntactic function of a noun coincides with the syntactic function of an adjective.

Similarly, consider verb tenses. If we hear someone say, *I was walking in the garden yesterday* and *I suddenly see John*, we understand the structural meaning of the word *see* as the past tense. Here the function of the present tense coincides with the function of the past.

Every class of words, both autonomous and non-autonomous, has a primary syntactic function and a number of secondary syntactic functions. The four classes of contensive autonomous words are characterized by their primary and secondary syntactic functions so: as for their primary syntactic functions, noun functions as a subject, adjective as attribute of a noun, verb as predicate, and adverb as attribute of a predicate, usually called 'circumstance.' The superposition of a word of one class with a word of another class produces secondary syntactic function of the word. The secondary syntactic functions of contensive autonomous words are derived from their primary syntactic functions by the addition of some markers. Thus, if a predicative marker is added to a noun, the noun gets a secondary syntactic function of a predicate, as in *John is a teacher*. Similarly, the direct object or an oblique is a secondary syntactic function of a noun produced by the addition of markers such as morphological case or syntactic position. In languages, like English, syntactic relations are often expressed by word order, as, for example, in *gold watch*, where the noun

gold has the secondary syntactic function of an attribute. In these languages, the role of the markers of the secondary syntactic functions are fulfilled by syntactic positions.

6.3.4 Syntactic and non-syntactic contexts

We must strictly distinguish between syntactic and non-syntactic contexts. A *syntactic context* reassigns a word of a given class to another class. Consider the sentence: *It is a resort for the rich and famous*. In this sentence the adjectives *rich* and *famous* are self-dependent; they are not supported by nouns. Although by their structure they remain adjectives, their syntactic self-dependence opens them up to the influence of syntactic factors, which attribute to them the structural meaning of nouns ('rich and famous people'). In *non-syntactic contexts*, the lexical meaning of the word, which is independent of context, is modulated by the non-syntactic environment. For example, the lexical meaning of the noun *iron* is the name of a metal, and this is independent of context. But in a sentence *She has a will of iron* we observe a semantic context that adjoins the meaning 'very strong' to the lexical meaning of *iron*.

6.3.5 Superposition in phonology

The concept of superposition applies to the phonological system, as well. To understand how superposition applies to the phonological system, we must see that there is an analogy between the alternation of phonemes and alternation of meanings. This analogy is represented by the following proportion (symbol SUP stands for 'superposes with'):

$$(28) \text{PHONEME}_1 : \langle \text{PHONEME}_1 \text{ SUP PHONEME}_2 \rangle = \text{SIGN}_1 : \langle \text{SIGN}_1 \text{ SUP SIGN}_2 \rangle$$

To distinguish between sounds and phonemes, I put phonemes in slash brackets. Thus, sounds *p*, *t*, *k* are viewed as phonemes /p/, /t/, /k/ when considered under their diacritic properties. As noted above, the difference in /k/ of *key*, *cat*, and *cool* resides with the adjacent vowels rather than with the phoneme /k/ itself. This is analogous with the difference in *spill* in *spill (liquid)* and *spill (powder)*, where the difference resides with the adjacent nouns rather than with *spill* itself. In the first case we have a sound-changing context, and in the second case a information-changing context.

Now consider the case of the alternation of phonemes, that is, when under certain conditions one phoneme is replaced by another as in our example from Russian. In Russian, word-final voiced *b*, *d*, *g* are replaced by their voiceless counterparts *p*, *t*, *k*, so that Russian *kot* 'cat' is pronounced the same as *kod*

'code.' The final shape of the word-final sounds *b*, *d*, *g* are not phonetic variants of phonemes /b/, /d/, /g/, but are autonomous phonemes identical with antevocalic /p/, /t/, /k/. The proper distinctive function of word-final sounds *p*, *t*, *k* are phonemes /p/, /t/, /k/. So that /b/, /d/, /g/ coincide with /p/, /t/, /k/ to produce dual phonemes /<b SUP p>/, /<d SUP t>/, /<g SUP k>/, consisting of proper phonemes /b/, /d/, /g/ and secondary phonemes /p/, /t/, /k/, respectively. In this example, word-final position is a phoneme-changing context for *b*, *d*, *g*.

6.3.6 Variants and alternants

We get the following proportion:

$$(29) \text{ PHONEME-CHANGING CONTEXT : SOUND-CHANGING CONTEXT = } \\ \text{ MEANING-CHANGING CONTEXT : INFORMATION-CHANGING CONTEXT = } \\ \text{ VALUE-CHANGING CONTEXT : WORTH-CHANGING CONTEXT}$$

In view of this proportion I propose to strictly distinguish between the concepts of *variant* and *alternant*. Under variants I understand variation of meaning in information-changing contexts or variation of the phonetic properties of the phoneme in sound-changing contexts. For example, the difference in the meaning of the word *spill* in the contexts of adjacent nouns like *liquid* and *powder*, or the difference of sound represented by the phoneme /k/ in the context of different vowels that follow it (*i*, *a*, *u* for *key*, *cat* and *cool*). The meaning of *spill* remains the same; what changes are its different informations, which are variants of one and the same meaning. Likewise, the phoneme /k/ remains the same; what changes are the different sounds representing it in the contexts of different vowels, which are variants of the phoneme /k/.

The notion of alternation involves superposition, which establishes the relation of functional derivation. Thus, when the word *hot* in (26b) coincides with the word *popular*, *hot* is perceived as an expressive alternant of *popular*. Similarly, if we look at the overall behavior of the phoneme /t/ in Russian, we find that in the Russian word *kod* /kot/ 'code' the phoneme /t/ alternates with the phoneme /d/ because /d/ is a secondary function of the phoneme /t/ due to the alternation of the /t/ in *kot* with /d/ in oblique cases of *kod*: *koda*, *kodu*, etc.

Accordingly we can term worth-changing contexts *variation contexts*, and value-changing contexts *alternation contexts*.

The freely alternating homonymous signs and phonemes we call *free alternants*.

6.3.7 *The notion of the field of a sign*

I define the concept of the field.

[D22] **FIELD**

Field is the totality of contexts characterizing the primary meaning or function and secondary meanings or functions of a sign or a phoneme.

In accordance with the distinction of syntactic and non-syntactic contexts (6.3.4) I distinguish *the syntactic field* and *the non-syntactic* or *paradigmatic field* of the word.

6.4 Principle of Superposition

We can now formulate the Principle of Superposition:

[D23] **PRINCIPLE OF SUPERPOSITION**

In a meaning- or function-changing context a sign or phoneme B is superposed with a sign or phoneme A, so that B is used in the capacity of A, as a duplex (B SUP A). As a result of the superposition, a relation of functional derivation is established, so that B becomes a functional derivative, or alternant, of A. Sign or phoneme B gets a secondary meaning or function on top of its context-independent primary meaning or function.

The Principle of Superposition produces a hierarchy of the alternations of the primary and secondary functions of signs and phonemes.

The Principle of Differences, Principle of Duality of Categorization, and Principle of Superposition underlie the mechanism of language.

The difference between the primary and secondary functions of a sign or a phoneme is analogous to the difference between the personality of an actor and the roles he plays. For example, say, we see an actor in the theater. He is Hamlet, but not Hamlet himself, but Laurence Olivier playing the role of Hamlet. Notice the duality: Laurence Olivier/Hamlet. Laurence Olivier is not identical with Hamlet, but simply represents a different personality — the fictitious man named Hamlet. The audience perceives the make-up on Laurence Olivier's face, his gestures and his actions as signs of the dramatic image of Hamlet. As Laurence Olivier plays different roles, say, of Hamlet, King Lear, or Richard III, we watch him undergo various changes, resulting from the 'superposition' of his personality with the personalities of Hamlet, King Lear, and Richard III. Laurence Olivier's own personality persists through all these stage transformations.

The term 'superposition' is borrowed from physics and mathematics where it is employed to refer to two distinct things being in the same place at the same

time. Two words or functions that coincide in the sense of mutual containment are obviously superposed.

Let us consider how duplexes may be generated. Consider a passive construction:

(30) Boris was deceived by Peter.

The predicate *was deceived* is intransitive and the phrase *by Peter* is an oblique construction, but by its logical meaning the passive sentence is the converse of the active one. We face an antinomy between the linguistic and logical meaning of the sentence. The linguistic meaning of the predicate of the passive is intransitive, but its logical meaning is transitive. The linguistic meaning of the phrase *by Peter* is an oblique construction, but its logical meaning is the subject argument of the predicate. We face a problem: Is what we perceive as logical meaning in fact logical meaning? Is this an extralinguistic fact which can be ignored or is it a linguistic fact that requires a linguistic explanation?

Scrutinizing the problem, we find a linguistic solution to it. To solve the antinomy between the linguistic and what seems to be the logical meaning of the sentence, we postulate *duplex functions*. We postulate that by its primary syntactic function *by Peter* is an oblique, but in the context of a passive sentence it coincides with the function of a subject. We similarly postulate that the primary syntactic function of *was deceived* is intransitive, but that in the context of the passive, which correlates with the active construction, it is superposed with the function of the transitive predicate. In this way a balance between what seems to be the logical and the linguistic meanings of the passive sentence is attained, and what appears to be the logical meaning is explained as the secondary linguistic meaning of the sentence. This is the way language operates: the role of secondary functions is to provide a balance between the linguistic and logical meaning of a sentence by explaining the logical meaning as the secondary linguistic meaning. Language operates through removing antinomies between the linguistic and logical meanings. The hierarchy of primary and secondary functions of signs constitutes the most essential aspect of language. Without investigating and understanding this hierarchy we cannot understand how language operates.

6.5 Stability and flexibility of language

As a semiotic mechanism underlying communication, language is subject to the action of two opposing needs: social and individual. On the one hand, language is a common possession of the members of a community. The signs of a language must have the same meaning for all members of the community. On the other hand, every individual needs to apply signs to concrete situations, where signs have to acquire new meanings that cannot be reduced to the meanings of signs common to all members of the community. If meanings of signs were fixed and unchangeable, then language would become a simple nomenclature: a list of terms corresponding to a list of things. It is equally impossible to conceive of a language whose signs were flexible so much that they would mean nothing outside concrete situations. Hence, meanings of signs must be both flexible and stable. The meaning of a sign must vary depending on the situation; but it must also have some stable, unchangeable part underlying all its variations. Language must meet conflicting needs: social needs require the stability of language, or else members of a community will be unable to communicate; individual needs require the flexibility of language, or else members of a community will be unable to apply signs to concrete situations.

The need to make language flexible causes the sign to express different meanings depending on different situations. That is, this need causes the polysemy of the sign. On the other hand, the need to maintain the stability of language restricts polysemy by the requirement that every alternant of a sign must be synonymous with some other sign. For example, the word *snake* is polysemous because it is synonymous with another expression. This word denotes an animal, but in the sentence *He is a snake* it is synonymous with 'deceitful person.' Similarly, with structural polysemy: a noun can have the structural meaning of adjective and an adjective can have the structural meaning of noun. This is possible only because in the first case the noun functions as a synonym of an adjective, and in the second case because the adjective functions as a synonym of a noun. For example, in *time bomb* the noun *time* functions as a structural synonym of an adjective, and in *Times are hard for rich and poor alike* the adjectives *rich* and *poor* function as grammatical synonyms of nouns.

6.6 Law of Sign-Function Correspondence

There is a strict correspondence between the vocal form of the sign and its primary and secondary syntactic functions. This correspondence constitutes an

objective basis for the distinction between the primary and secondary syntactic functions of the sign. This correspondence is defined by the following law:

[D24] LAW OF SIGN-FUNCTION CORRESPONDENCE

If the change of the syntactic function F of the sign X involves the change of the sign X into sign Y , with the non-syntactic meaning remaining the same, the primary syntactic function corresponds to the basic sign and a secondary function corresponds to a derived sign.

To illustrate, Latin *amo* 'I love' and *amans* 'loving' differ only in their basic and derived syntactic structures whereas their non-syntactic meaning remains the same in both cases. The basic sign *amo* corresponds to the primary syntactic function of the Latin word *amo* and the derived sign *amans* to one of the secondary syntactic functions of this word.

Similarly, the Russian finite verb form *begaet* 'runs' and the participle *begajushchij* 'running' have different meanings in that *begajushchij* is the result of the superposition of the predicative function of the verb *begaet* with the function of the attribute of a noun. This difference correlates with the difference between the vocal forms of the two words: the vocal form of *begajushchij* is derived from the vocal form of the basic word *begaet*.

To take another example, the word *stone* in *the stone is white* and the word *stone* in *the stone wall* have different meanings: *stone* in *the stone wall* is the result of the superposition of the function of subject, as in *the stone is white*, with the function of the attribute of a noun. This difference correlates with the vocal forms of the two words: the position of *stone* before another noun *wall* in *stone wall* is a meaning-changing context which plays the role of a derivational affix.

6.7 Hierarchy of sign functions and the Range-Content Law

The primary function of a sign is its inherent property. The superposition of sign B with sign A creates a duplex sign B' that is subordinated to sign A. There is an objective criterion for establishing the hierarchy of the primary and secondary functions of a sign. This criterion is based on the constraint formulated by the Range-Content Law:

[D25] RANGE-CONTENT LAW

The narrower the range of the sign, the richer its content; and inversely, the wider the range of the sign, the poorer its content.

The *range of a sign* is the sum of its functional positions in the sentence. The *content of a sign* is the degree of the complexity of the sign, that is, the

number of its secondary functions or meanings superadded to its primary function or meaning.

The superposition of functions produces signs with a narrower range and a richer content.

Different syntactic positions count as one syntactic position if they define an identical syntactic function. For example, any noun can occur in three syntactic positions: as subject, direct object, and indirect object. But in its secondary function of a noun attribute it occurs only in one position — before a noun. It is true that an attributive noun can modify all three kinds of predicate argument. But these three syntactic positions count as one because the attributive function of the attributive noun is identical in all these positions.

The Law of Sign-Function Correspondence is a special case of the Range-Content Law insofar as a derived sign has a narrower range of occurrence than the corresponding basic sign. The Range-Content Law of Semiotic Linguistics is a particular instance of the general semiotic law of the range and content of the sign that is valid in logic and other non-linguistic sign domains.

6.8 Basic and derived words as primary and secondary forms of the word

It is important to see that secondary meanings, or more generally, secondary functions of a given word, whether autonomous or non-contensive, are often represented by its derivatives. For example, the words *decision*, *deciding*, etc. are secondary functions of the verb *decide*, from which they are derived. Thus, although *decision* and *deciding* are different words, they are at the same time regarded as secondary functions of the verb *decide*. By the same token, the word *redness* is a secondary function of *red*.

From the standpoint of superposition, we divide all words into basic words having a primary function and functionally derived words which are interpreted as secondary functions of basic words.

In the case of derivation represented by morphological means, we have overt morphological markers. For example, *redness* is a secondary syntactic function of the basic word *red*, derived by the addition of the noun marker *-ness*. *Red* is the primary form representing the primary syntactic function of *red*, and *redness* is a secondary form representing a secondary function of *red*.

In languages like English, where syntactic relations between words are often represented by word order rather than morphology, we may have a syntactic derivation without an overt marker. In other words, the distinction between primary and secondary functions of the word is reflected not directly by the

form of the basic and derived words, but rather by the word's syntactic position. Thus, a syntactic opposition *I love:my love* must be interpreted on the analogy with the morphologically derived opposition *I decide:my decision*, where due to its syntactic position *love* in *my love* superposes with noun, which is the secondary function of the verb *love*.

We observe the same alternation of basic and derived words, respectively representing primary and secondary superposed functions, with the non-syntactic derivation of metaphoric synonyms.

Let us recall non-syntactic superposition. Consider the word *dough*. It means 'a mixture of flour and water ready to be baked.' The vocal expression of this word and its meaning can be represented as follows: /dou/ → 'flour+water.' Now consider the word *money*, whose vocal form and meaning may be represented thus: /mani/ → 'coins or bank notes.' The word *dough* can take on the meaning of the word *money*, so that the meaning of *money* becomes a secondary meaning of *dough*. We get a new sign with a more complicated structure: (/dou/ → 'flour+water') → 'coins or bank notes.' This is the process of superposition: the function or meaning of the word *dough* coincides with the function or meaning of the word *money*, so that the function or meaning of the word *money* becomes a secondary function or meaning of the word *dough*. Superposition produces antinomy: we perceive the meaning of *money* through the conflicting meaning of *dough*.

In fact, what we have with non-syntactic superposition is non-syntactic derivation of a metaphoric synonym, the superposed meaning of which is derived in special contexts. Hence, the asymmetry of synonymy: while we can replace *money* with *dough* in *money* contexts, we cannot replace *dough* with *money* in *dough* contexts. *Dough* is the non-syntactic derivative of *money*, and *money* is the basic word, with the *money* context being the marker of derivation.

Derived words like *redness* have no primary syntactic function. *Redness* functions as a noun, has syntactic function of a noun and is a noun. But noun is not the primary function of *redness*. *Redness* as a noun is a secondary function of the adjective *red* from which it is functionally derived.

Every contentive autonomous word has a syntactic function, which in itself is neither primary nor secondary. The distinction between primary and secondary functions arises only when we compare derived contentive autonomous words with basic ones. The syntactic functions of functionally derived words are always considered the secondary syntactic functions of the corresponding basic contentive autonomous words. In itself *redness* has neither primary nor secondary syntactic function. It has the syntactic function of a noun without any further qualifications. But in comparison with *red*, from which it is de-

rived, *redness* is considered a secondary function of *red*: that is, *redness* is regarded as adjective *red* functioning as a noun.

6.9 Antinomies of structural and logical meaning explained by superposition

Antinomies of meaning are important because we cannot understand the functioning of signs without recognizing and explaining these antinomies.

6.9.1 *Antinomies of word classification*

Let us look again at the antinomies of structural and lexical signs, inherent in words like *rotation* and *redness* (see 5.3), from the perspective of the universal process of superposition, whereby in every language any sign can take on a function of any other sign.

Turning to our examples of the antinomy of structural and lexical meanings, we see that in the process of the derivation of *rotation* from *rotate* the structural meaning ‘verb’ of *rotate* is superposed with the structural meaning ‘noun’ of *rotation*: hence the conflict between the lexical and structural meanings of *rotation*. Similarly, in the process of the derivation of *redness* from *red* the structural meaning ‘adjective’ of *red* is superposed with the structural meaning ‘noun’ of *redness*, resulting in the conflict between the lexical and structural meanings of *redness*. Superposition produces antinomies because in the process of derivation, the function of the structural sign ‘verb’ of *rotate* and the function of the structural sign ‘adjective’ of *red* are superposed with the function of the structural sign ‘noun’ of *rotation* and *redness*. Superposition produces hierarchies of signs with multilayered meanings.

The antinomy found in *rotation* and *redness* is the incongruity between the structure of a word and its function. The primary syntactic function of *rotate* is to be a predicate and the primary syntactic function of *red* is to be an attribute. The primary syntactic functions of *rotate* and *red* are congruent with their structure. But, as a result of nominalizing derivation, the congruity is violated by the superposition of their primary syntactic function of a predicate and noun attribute, respectively, with the secondary syntactic functions of a term: hence the antinomy of the structural and lexical parts of *rotation* and *redness*.

If we wish to understand the inherent properties of language and the relation of language to thought, it is crucial that we distinguish structural and lexical constituents of words and sentences in order to investigate the congruity or in-

congruity of syntactic and paradigmatic functions of words whenever basic structural antinomies arise.

6.9.2 *Antinomy of transitivity*

Many antinomies are raised by the notion of the transitivity of a verb, which is usually defined as an expression of an action whose starting point is subject and the end point is object.

Let us return to the example of the passive given in 6.4:

(31) Boris was deceived.

(31) is a simple passive. Comparing the meaning and the form of this sentence, we establish that the predicate *was deceived* is intransitive both in its structural and logical meaning. Expanding the predicate, we get:

(32) Boris is deceived by Peter.

We discover a contradiction between the structural and logical meaning of (32). By its logical meaning the predicate *is deceived* is transitive: the starting point of the action is *by Peter* and the end point is *Boris*. Furthermore, by its logical meaning *is deceived* is the converse of the transitive *deceived*. On the other hand, by its structural meaning *is deceived* is an intransitive predicate and *by Peter* is an oblique construction rather than subject.

Transitivity-related antinomies were described by Sapir (1922) on examples from Takelma (a now extinct language of Indians from southwestern Oregon) and by Sova (1969) on examples from Russian.

Sova points out that the linguistic, or as she calls it, formal transitivity does not necessarily coincide with the logical transitivity. A verb can be transitive from a formal point of view and intransitive from a logical one. As Sova puts it, a verb can be transitive by its form and intransitive by its sense. Conversely, a verb can be intransitive from a formal point of view and transitive from a logical one. This is what I call the *antinomy of meanings*.

The structural condition imposed by Russian grammarians on the transitivity of a verb is that its subject must be a noun in the nominative case and its object must be a noun in the accusative case, as in the following example:

(33) *Ja rublju drova.*
I-NOM hew firewood-ACC

The Russian verb *rublju* is transitive both in meaning and from the point of view of the word combination in which it occurs. Consider now:

- (34) *Ja narubil drov.*
I-NOM hewed firewood-GEN

The Russian verb *narubil* is transitive only according to its logical meaning but not according to its structural meaning because it combines with a noun in the genitive.

- (35) *Ja rabotal čas.*
I-NOM worked hour-ACC

In (35) *rabotal* is transitive by its structural meaning because it combines with a noun in the accusative case but intransitive by its logical meaning.

Russian descriptive grammarians recognize only the verb in (33) as transitive because they require that a transitive verb must be transitive both by its structure and meaning. The verb in (34) is considered intransitive because it is transitive only in its logical meaning. And the verb in (35) is considered intransitive because it is transitive only in its structure.

Similar contradictions between structural and logical meanings were discovered by Sapir in Takelma. Comparing causative forms of the verb with comitative ones, Sapir says:

While the action of a causative verb is logically transitive that of a comitative is really intransitive, and the verb is only formally transitive. In the former case the subject of the verb does not undergo the action that would be expressed by an intransitive stem...; in the latter it does. (Sapir 1922: 138)

In his Takelma paper Sapir describes comitatives under the heading of transitive verbs. Thus, unlike Russian grammarians, Sapir recognizes only structural transitivity as a necessary condition to consider a verb transitive no matter whether it is transitive or not in its logical meaning. So, unlike Russian grammarians, Sapir would grant transitivity to the verb in (35).

In (32), (34) and (35) we have an antinomy: one and the same verb is both transitive and intransitive depending on our point of view, semiotic or logical. How is this antinomy to be resolved?

Russian grammarians impose a strong condition of transitivity, postulating that transitive verbs must be transitive both from the structural and logical points of view, while Sapir holds a weak transitivity condition, postulating that structural transitivity overrides possible logical intransitivity. But both Russian grammarians and Sapir reject logical transitivity as a sole criterion for recognizing a verb as transitive. In other words, both the Russians and Sapir opt for a partial or complete disregard of logical meanings.

Sova proposes another solution to the problem. She proposes to distinguish two levels: the level of form and the level of sense. In our terms, Sova proposes to distinguish the level of linguistic meanings and the level of logical meanings. The distinction of these two levels Sova calls *linguistic dualism*.

Considering the solutions to the transitivity antinomy, we cannot ignore what is called logical meanings until we are sure that these are really logical. We must beware of being misled by the terminology: what is called 'linguistic' does not necessarily belong to linguistics, and what is called 'logical' does not necessarily belong to logic. Therefore we cannot accept solutions that partially or completely disregard logical meanings until we apply some objective criteria to establish whether the meanings in question are in fact logical. By arbitrarily disregarding the so-called logical meanings, we disregard the complexity of language and pursue a lopsided view of linguistic phenomena. Nor can we blindly accept the linguistic dualism solution, with its distinction of two levels of meaning — form and sense, as Sova calls them. If what Sova terms 'sense' is really part of thought rather than language, then to accept this distinction is to smuggle logical notions into linguistics. Logical notions have no place in linguistic research; their proper place is logic.

In our solution to the transitivity antinomies, we hypothesize that these antinomies between structure and meaning are a phenomenon inherent in the internal structure of words as signs. We hypothesize that these antinomies are purely linguistic antinomies. If our hypothesis is correct, then these antinomies have nothing to do with the relation of the sentence to its logical content — the relation between thought and language.

It is a banal fact that one and the same thought may be represented by various means in various languages or one and the same language. This is not an antinomy because language and thought are heterogeneous phenomena: language and thought relate to each other as form and content. In my terminology, 'meaning' belongs to language and 'information' belongs to thought. One and the same information can be expressed by different combinations of signs, and hence by different combination of signs in one and the same language or in different languages. On our hypothesis, the linguistic antinomies raised by (32), (34), (35) and Sapir's work on Takelma are true antinomies because they arise from the contradiction between the structure and the logical content of the sentence. Meaning as we defined it belongs to language as the form of thought, and information as we defined it belongs to the content of language and thus to thought. We strictly distinguish between linguistic antinomies as phenomena internal to language and the opposition between language and thought as form and content.

What might serve as objective criteria for establishing the status of the meaning that gives rise to the transitivity antinomies? Our hypothesis is that what Sapir calls ‘logical meanings’ and what Sova calls ‘senses’ are in reality structural meanings. We hypothesize that the above antinomies can be solved by looking into the process of alternation of primary and secondary functions of signs described by the Principle of Superposition. To solve the antinomy between structural and logical meaning, we must recognize the hierarchy of primary and secondary functions of signs and analyze the facts of the antinomy between linguistic structure and logical meaning from the standpoint of this hierarchy. Let us apply this to the antinomies in (32), (34), and (35).

In (33) the structure and function coincide. This is so because all words are used in their primary functions: the primary function of *rublju* is the transitive predicate and it is used in this function. The primary function of *drova* is its use as subject or object, and it is used as object. Antinomies never arise when all words in a sentence are used in their primary function. Antinomies arise only when some words in a sentence are used in their secondary functions. Thus, in (34) the intransitive *narubil* is used in its secondary function of a transitive verb, and the genitive *drov* is used in its secondary function of a direct object. In (35) *rabotal* is a verb used in its primary function of an intransitive verb, while *čas* is a noun in the accusative case used in its secondary function of an adverbial.

Before analyzing (32), I must point out that I do not regard passive as derived from active, but consider active and passive to be parallel, alternating constructions. Having said this, I assume that *is deceived* in (31) is a passive verb construction used in its primary function of an intransitive predicate oriented towards a subject, and *Boris* is a noun used in its primary function of a subject. Turning now to the expanded passive in (32), we discover that the adverbial *by Peter* is used in its secondary function of a predicate argument and *is deceived* is used in its secondary function of a transitive predicate, whose action is oriented from the second argument *by Peter* to the first one *Boris*. Given this description, we can establish a relation of conversion between the active and passive. The active and passive alternate as mutually converse forms both with respect to their meaning and structure (insofar as we recognize the alternation between primary and secondary functions as a structural phenomenon).

We solve antinomies of meaning by recognizing that the alternation between the primary and secondary functions of a word is a structural phenomenon. It really is a structural phenomenon because secondary meanings correlate with secondary forms of signs, which are changes in the primary form of a sign in accordance with the Range-Content Law. Thus, in (34) the genitive *drov* has the secondary function of the accusative because in its narrow range of occur-

rence it behaves like the accusative. This can be seen from the fact that from the active *Ja narubil drov* we get the passive *Drova byli narubleny mnoj*. In (35) the accusative *čas* has the secondary function of an adverbial. In its narrow range of occurrence it functions like an adverbial. Although, like a transitive construction, (35) contains a noun phrase in the accusative, we cannot get the passive from it. Finally, in (32) *by Peter* has the secondary function of a subject because in its narrow range it correlates with the subject in *Peter deceived Boris*.

The antinomies of meaning are resolved through the Principle of Superposition. We must recognize the tremendous importance of the hierarchy of primary and secondary functions for the understanding of the most intimate relations between sign and meaning in language.

6.10 Confusion of linguistic and logical analysis of meaning

The cornerstone of Semiotic Linguistics is a strict distinction between the linguistic and logical analysis of meaning. According to the definition of the structure of the word and word combination, language presents a *communicative interpretation of reality*, that is, a selective and conventionalized representation of reality geared to the purposes of communication. Logical analysis disregards the articulation of linguistic units into structural and lexical signs because logical analysis is solely interested in the logical content of the meanings of words and sentences, not in the communicative form of these meanings. Similarly, in accordance with the Principle of Superposition, meanings of words, as of every linguistic unit, articulate into primary and secondary meanings. This is part of the communicative form of thought. While linguistic analysis of meaning is based on the strict distinction between the primary and secondary meanings of linguistic units, logical analysis disregards this distinction, because it is irrelevant to the logical analysis of the content of meaning.

One such analysis, where the articulation of the linguistic unit into structural and lexical constituents is ignored and replaced by the logical interpretation of meaning, is offered by Jurij Apresjan. Consider the sentence:

(36) John almost killed him.

Following McCawley (4.10.1), Apresjan (Apresjan 1995-II: 21) recognizes three interpretations of (36):

- a) John was close to doing something to him. So that he could have killed him but he did not do it (for example, John was ready to strike him with a knife, but did not do it).
- b) John did something that could have killed him, but this did not happen (for example, John threw, on purpose or by chance, a stone from the mountain, and the stone fell dangerously close to the man who was standing below).
- c) John did something to him, so that he came close to dying (for example, John struck him with a knife).

Apresjan claims that the three different meanings of this sentence indicate that the sentence is homonymous. To explain the homonymy, he gives the following analysis of the components of the word *kill*:

(37) KILL = ‘cause to begin to be not alive’

Then, to discriminate between the different informations of (36), Apresjan suggests inserting the word *almost* alternately before *cause*, *begin*, and *be* (*not alive*).

From the standpoint of Semiotic Linguistics this is a logical analysis of (36) rather than a linguistic analysis. Under the Principle of Differences, the sentence *John almost killed him* is not homonymous. The different informations of this sentence are not different meanings, but rather contextual variants of one and the same meaning because these three different informations correlate with one and the same expression. Under the Principle of Duality of Categorization — the corollary of the Principle of Differences — we must distinguish strictly between two kinds of contexts: the linguistic context, called the value-changing context, and the logical context, called the worth-changing context. A logical context does not change the meaning of a linguistic unit; it only changes the information of a linguistic unit. A true linguistic context — a value-changing context — is subordinated to the Principle of Superposition. Semiotic Linguistics is concerned only with the action of value-changing contexts.

It is important to understand that all these semantic phenomena have counterparts in phonology. Just as semiotic semantics considers different logical informations of the linguistic unit to be variants of one and the same meaning, so phonology considers different physical forms of the phoneme to be variants of the phoneme. Different physical forms of the phoneme are like different logical informations of the linguistic unit: they are irrelevant to phonological analysis. Thus, the first *p* and the second *p* in *pipe* are regarded as two variants of one and the same phoneme /p/ because the physical difference between the two sounds is irrelevant for phonological analysis. Just as semiotic grammar distinguishes between linguistic and logical contexts of the word, so phonology

distinguishes between phonological and physical contexts of the phoneme. Just as semantic contexts, phonological contexts are subordinated to the Principle of Superposition. For example, we observe the superposition of voiced stops with voiceless stops at the end of Russian words (6.2, 6.3.5).

Apresjan's analysis of *kill* into its components is irrelevant under the Principle of Differences because these components do not correlate with different signs. Apresjan's analysis follows the regular practice of classical linguistics that does not distinguish between linguistic analysis proper and the logical analysis of language.

The investigation of language under the Principle of Differences, the Principle of Duality of Categorization, the Principle of Superposition, and other principles and concepts of Semiotic Linguistics, as opposed to the methods of classical linguistics, may be compared to the investigation of the phenomena of Brownian movement in physics. While Semiotic Linguistics concentrates on invariants, classical linguistics is concerned with endless variants of meanings and variants of sounds, completely unaware of the problem of the invariant. It is not clear, however, whether it is useful for the discovery of the essence of language to study all possible realizations of an invariant rather than confine oneself to the recognition of the fact. Does not the scrupulous concern with the investigation of the logical variants of meaning and physical variants of sound remind us of the hopeless and meaningless goal of defining the exact positions and velocities of all the molecules of air in a container — over a more reasonable goal of discovering what is happening to all the molecules on the average?

Semiotic Linguistics is a fundamental discipline. It is a theory of linguistic invariants whose fundamental goal is the discovery of the essence of language. As the theory of linguistic invariants, Semiotic Linguistics is concerned with the most essential features of language. Laws of language are laws of linguistic invariants.

As a theory of linguistic invariants, Semiotic Linguistics is concerned with the types of linguistic invariants across the languages of the world. In fact, the investigation of the laws of linguistic invariants of the languages of the world becomes closely related to and even coincides with the investigation of the laws of linguistic typology.

6.11 Superposition in diachrony: Principle of Diachronic Differentiation

So far I have considered the Principle of Superposition at the level of synchrony. But superposition is a global principle that is important for diachrony,

as well. Let us consider the action of the Principle of Superposition in diachrony, using examples from Kuryłowicz (1935).

To understand the nature of human language, it is important to investigate not only how people use it, but also how it changes in time, that is, to investigate it in diachrony. If the principles we have established for synchrony are properly general and universal, the consequences of these principles should also explain the facts of diachrony. Thus, diachrony becomes a testing ground for the synchronic principles. I am going to show that the Principle of Superposition explains some essential facts of language change over time, thereby lending crucial support to the integrity and universality of the semiotic approach.

I will consider diachronic explanations of facts of the semantic and phonological systems of language.

What constitutes an explanation in diachrony? What should we expect from it? First, let me say that diachronic explanations are not concerned with causes of diachronic changes. The form of language is subject to pressures of a multitude of extralinguistic factors, for which it is impossible to account because of their incidental nature with respect to the form of language. The study of the structure of language allows us to determine possible directions of linguistic changes, but whether these changes occur or not depends on external, incidental factors that cannot be predicted.

The question of the causes of linguistic changes is not essential for linguistics, just as the problem of causes is not essential for other theoretical sciences. In the words of Toulmin:

A subject which receives a good deal of attention in traditional treatment of 'induction and scientific method' is that of causes. ... Causes, causation, causality: these are the staple of much philosophical and logical writing about sciences.

If one turns from the logic-books and the spare-time philosophical writings of scientists, to the professional journals in which sciences really progress, one is in for a surprise. For in the papers there printed the word 'cause' and its derivatives hardly ever appear. In works on engineering, perhaps; in medical journals, certainly; wherever the sciences are applied to practical purposes, there one finds talk of causes and effects. But in the physical sciences themselves the word 'cause' is as notable an absentee as the word 'true.' (Toulmin 1953: 119)

Thus, we should not require that diachronic explanations point to the causes of linguistic changes. The goal of diachronic explanations is not the discovery of causes of linguistic changes but the discovery of the nature of the relation between the changes of the sign and the changes of meaning, or more generally, of the function, of the sign.

There is a correlation between the differentiation of signs and differentiation of meanings. What is the mechanism of this differentiation? This is the main problem of diachronic linguistics.

The principal fact underlying the correlation between the differentiation of signs and differentiation of meanings is the relation of *functional derivation* established by the Principle of Superposition.

Let us now formulate the Principle of Diachronic Differentiation. This principle is an extension of the Principle of Differences and the Principle of Superposition to diachrony.

[D26] PRINCIPLE OF DIACHRONIC DIFFERENTIATION

Any sign or phoneme B can coincide with a sign or phoneme A, so that B is used in the capacity of A, ousting A from a part of its domain. As a result of the superposition, a relation of functional derivation is established, so that B becomes a functional derivative, of A. Sign or phoneme B has two functions: its primary function and a secondary function it takes on when it ousts A from a part of its domain. When due to their superposition a relation of functional derivation of B from A is established, provided that B and A are related formally, B is replaced by B'. This results in a functional shift: the primary function of A becomes the primary function of B', and the primary function of B becomes the secondary function of B'.

Let us use the Principle of Diachronic Differentiation to explain some facts concerning the evolution of signs. When we consider changes of signs, we must distinguish between external and internal changes. By an external change I mean the change of the phonological form of the sign denoting a grammatical class. For example, in English the sign of plural *-(e)s* is the outcome of the evolution of many signs of the plural that have coalesced in a single sign. But the meaning of these signs — the structural concept of the plural — has not changed. Much more important and interesting is the opposite phenomenon, when the meaning of the sign changes without the attendant change of its phonological form. This is called a *semantic shift*, which is an internal change of the meaning of the grammatical class. Let us consider some examples of a semantic shift.

6.11.1 Structural meaning shift

Initially, where Indo-European distinguished between the perfect and the aorist, Latin had only the simple past form *scripsi*. In the course of the history of Romance languages the perfect of the type *habeo scriptum* was spreading more and more widely into the domain of *scripsi* so that at some point in the development, the difference between the meaning of the perfect and the meaning of

the aorist in Romance was expressed by the opposition *habeo scriptum* : *scripsi*. Before *habeo scriptum* coincided with *scripsi*, partially ousting it from its domain, *habeo scriptum* had been a structure derived from the verbal adjective *scriptus*. Following the superposition, *habeo scriptum* took on the primary function of *scripsi*, while *scriptus* took on the secondary function of *habeo scriptum*.

To take another example, Slavic verbs in *-ajō* were initially lexical verbs with iterative meaning. In Common Slavic verbs in *-ajō* coincided with present tense verbs having durative meaning. As a result, the primary function of present durative verbs became the secondary function of verbs in *-ajō*, and the relation of derivation of verbs in *-ajō* from present durative verbs was established. In this way the primary function of present durative verbs became the primary function of verbs in *-ajō*, and the primary function of ancient iterative verbs became the secondary function of verbs in *-ajō*.

6.11.2 Lexical meaning shift

Differentiation also holds for isolated lexical shifts, when the semantic domain of a word *W* is narrowed by another word *W'*, which might be a neologism or a word borrowed from another language. This happened, for example, with the native German word *Haupt*, which was ousted from a part of its domain by *Kopf*, borrowed from Latin (*cuppa*). This resulted in the differentiation of the domain of *Haupt* into two domains: the domain of *Kopf* and the narrowed domain of *Haupt*.

6.11.3 Phonological shift

Let us now consider analogous processes in the phonological system. Differentiation of phonemes can be described as follows. Let *B* be a phoneme that coincides with a phoneme *A* to replace a part of the domain of *A* under a context *C*. Hence *A* splits into *B'* under context *C*, whereas under all other contexts the difference between *A* and *B* is maintained.

To illustrate, in Old Iranian the opposition between the voiceless non-aspirated stops /p/, /t/, /k/ and the corresponding aspirated stops /p^h/, /t^h/, /k^h/ was suspended so that before consonants the members of the opposition coalesced into /fT/, /θT/, /xT/ (where *T* stands for any consonant). But before vowels the old opposition was maintained in the form /p/:/f/, /t/:/θ/, /k/:/x/. From the phonological standpoint, this change is the ousting of the non-aspirated stops by aspirated ones (whose phonetic form had been changed as aspirates changed into fricatives) before consonants, and the preservation of

/p/, /t/, /k/ before vowels. The old /p^h/, /t^h/, /k^h/ were replaced by /p/, /t/, /k/ after /s/.

Our investigation shows how differentiation and superposition are correlated, thereby reconfirming and strengthening our superposition hypothesis. An invasion of a part of the semantic domain of B by a sign B', — that is, the differentiation of B into B and B' — presupposes superposition, that is, a *semantic superposition* of B and B' in part of the domain that was initially occupied solely by B.

6.12 The theory of synonymy as part of the theory of superposition

In his work on synonymy and linguistic analysis, Roy Harris (1973) states the *synonymity postulate*, which defines *synonymity statements* of the form 'a and b are synonymous in L' or 'a and b are not synonymous in L.'

The synonymity postulate must be one of the fundamental assumptions of linguistics. It states what explicitly or implicitly is recognized by many linguists, namely that synonymy is an intrinsic property of natural languages.

There are linguists, Bloomfield among them, who do not recognize the phenomenon of synonymy in natural languages. Thus, according to Bloomfield (1933), 'each linguistic form has a constant and specific meaning. If the forms are phonemically different, we suppose that their meanings are also different. We suppose in short that there are no actual synonyms.' Bloomfield rejected the notion of synonymy because he understood synonymy as the identity of meaning between different expressions. If we understand synonymy as the identity of meaning, we cannot but agree with Bloomfield that no language has synonyms.

On the other hand we want to be able to use the term 'synonymous' to refer to expressions which have equivalent meanings, that is, different meanings that are identical only in a certain respect. For example, compare *black/deep/utter despair*. These adjectives clearly have different meanings but they are identical in one feature: 'in the high degree.' In this context, the words *black* and *deep* are metaphors. And all metaphors have syncretic meanings, that is, meanings consisting of two facets: a direct meaning and a figurative meaning. Similarly with active and passive constructions: these constructions have different meanings which are identical with respect to the relation between agent and patient. Synonymic equivalence is sameness in difference and difference in sameness.

Semiotic Linguistics recognizes synonymy as a notion characterizing expressions with different meanings which are same in a certain respects: two expressions are synonymous if their meanings are equivalent. I do not want to

quibble about words. We may choose to use the term 'synonymy' in one sense or another as long as we justify our choice. But the burden of proof of the appropriate choice lies with us.

No matter how we understand synonymy, we face the problem: Given two expressions A and B, how do we determine whether or not they are synonymous? Harris's work contains a clear presentation of different approaches to a solution to this problem. It turns out that no approach seems to be effective. Present-day linguistics does not have a coherent procedure for determining whether or not two given expressions A and B are synonymous.

The main trouble with the current conceptions of synonymy is that they want to define the statements '*a* and *b* are synonymous in *L*' and '*a* and *b* are not synonymous in *L*' in terms of some more primitive concepts and statements. This approach is doomed to failure because of the multiplicity of observable properties of concrete expressions in concrete languages as well as the multiplicity of individual perceptions of synonymy (two expressions A and B may be perceived as synonymous by one individual and not synonymous by another). The question of whether two given expressions A and B are synonymous is the same sort of question as the question of whether a given expression X is a grammatically correct expression. Due to the complexity of the observable data we are not able to discover features defining a class of synonymous expressions or a class of grammatically correct sentences. We only discover what Wittgenstein calls *family resemblances*.

According to Wittgenstein, family resemblances are 'a complicated network of similarities overlapping and crisscrossing: sometimes overall similarities, sometimes similarities in detail' (Wittgenstein 1953: 32). This is the way it is with all other concepts of linguistics. Later (10.2) I will define subject as a universal concept. In searching for a definition of subject, a cross-linguistic analysis of this concept cannot discover more than family resemblances between constructs denoted by the term 'subject.'

Paradoxically, rather than trying to answer the questions 'Are the expressions A and B synonymous?' or 'Is the sentence X grammatically correct?', we can get a deep insight into the nature of synonymy or grammaticality by simply ignoring these questions.

We must work on the assumption that we know how recognize synonymous expressions and how to recognize grammatically correct expressions. In other words, we must take the expressions '*a* and *b* are synonymous in *L*' and '*a* and *b* are not synonymous in *L*' as primitive, that is, not defined in terms of other concepts. The reason why we should take these expressions as primitive is that the laws of grammar are invariant of the multiplicity of variations of concrete expressions. Knowledge of family resemblances is an imperfect knowledge but

it is sufficient for the discovery of invariants. The discovery of invariants is discovery of constants amid variation.

We face two diametrically opposite research strategies: search for laws versus description of observable distinctions and variations — theory versus taxonomy.

The study of possible distinctions and variations of concrete meanings of concrete expressions in any language is the study of family resemblances and cannot lead us to the discovery of coherent classes of synonymous expressions. This type of research is comparable with a hopeless task of describing Brownian movement by concentrating on the movement of every individual particle or molecule. The description of Brownian movement is based on averages representing the movement of particles and molecules. We need not be concerned with the velocity and position of every individual particle and molecule to understand Brownian movement. Our description of the laws of synonymy is based on the averages of the perception of similarity of meanings by individuals. We disregard the complexity and irregularities of individual data due to perceptual fluctuations and marginal or accidental linguistic phenomena and concentrate on the averages of individual perceptions on the assumption that our disregard of any irregularities in individual data does not seriously affect averages. Paradoxically, to attain a deeper knowledge of reality, we must afford a partial ignorance of reality. This is what abstraction is all about.

Language belongs to what W. Ross Ashby (1956) calls *very large systems*. This term refers to a system with a large number of distinctions. The term ‘very large system’ implies that given some definite observer with definite resources and techniques, the system beats him by its richness and complexity, so that he cannot observe it completely, or control it completely, or carry out calculations completely. Language is a very large and heterogeneous system. It divides into the *nomological core* and *periphery*. Periphery refers to the individual facts of language as opposed to the nomological core, which refers to the facts governed by laws. It is wrong to set a goal of explaining everything in language. Linguistics must aim to explain facts covered by the nomological core. The taxonomic analysis of synonymy is doomed to failure because it confuses heterogeneous data — data that belong in the nomological core and data that belong in the periphery of language. Reality is a blend of irregular and regular. Science is partly the art of separating regular from irregular.

We consider synonymy as a phenomenon involving polysemy. We consider synonymy and polysemy as complementary notions. Further, we consider synonymy and polysemy as particular cases of more general phenomena we call superposition and differentiation as prescribed by the Principle of Differences.

6.13 A historical note

The distinction between primary and secondary functions of signs can be traced back to Slotty (1932) and Kuryłowicz (1935, 1964, 1973, 1975). Similar distinctions were practiced by Bally (1922, 1932), Martinet (1985), and other linguists. The most detailed treatment of this phenomenon was given by Tesnière (1966) in his *Éléments de syntaxe structurale*.

In spite of the wide recognition of the distinction of primary and secondary functions of the sign, the research into this phenomenon has remained on the periphery of grammatical theory and failed to yield any palpable results. The reason for this is that the true nature of this phenomenon and its implications have not been properly understood.

My theoretical innovation is a novel concept of the linguistic sign that includes the concept of the field as part of its definition. The concept of the field implies the process of superposition. Superposition combines the primary and a secondary function of a sign into a *duplex* — a complex, stratified function. The concepts of the field and superposition solve the antinomies of structural and lexical meanings. The field and superposition are central phenomena of natural language that pervade both the semantic and phonological systems, and are the most essential features that distinguish natural languages from artificial languages like languages of logic, chemistry, genetics, computer programming, etc. The central task of the linguist must be to study antinomies of meaning and other central phenomena explained by the Principle of Superposition. The concepts of the field and superposition move the hierarchy of primary and secondary functions of the sign from the periphery to the center, revealing its true nature as the pillar of the design of language.

Chapter 7

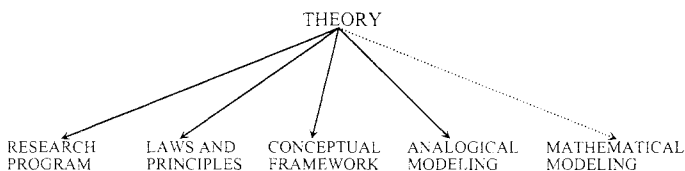
Methodological Interlude

Before we proceed any further with the investigation of the properties of the sign and their implications, I wish to present the methodological principles underlying this investigation. The reader must have a clear understanding of the structure of a theory: the distinction between principles, laws, and theoretical statements; the notions of semiotic abstraction, linguistic discovery, and other important methodological matters.

7.1 Dimensions of a theory

A theory has four basic dimensions: 1) research program, 2) conceptual framework, 3) principles and laws, 4) analogical modeling. In addition, we may construct a mathematical model of a theory. But a theory is complete in itself regardless of whether or not it is represented by a mathematical model, which is the representation of the theory in terms of a formal language. For a satisfactory representation of a theory it is enough to use ordinary language enriched by technical terms.

(38)



7.1.1 Research program

By research program I mean a set of ontological and methodological postulates guiding the development of a theory.

Ontological postulates define in a general way the entities in the domain of the research program. The function of specific theories that recognize the ontological postulates of a research program is to explain all empirical problems in the research domain by reducing them to these postulates. For example, behaviorism holds that the only legitimate entities that theories can postulate are directly observable physical and physiological facts. Less crude, more realistic versions of behaviorism claim something like this: we should not postulate any entities or mechanisms that are not rooted in the observable. The object of research of Chomsky's theory of grammar is language as physiologically based mentalist structures. The object of research of Semiotic Linguistics is language as a sign system — a phenomenon of the social mind. The object of research of Montague grammar is language as a logical system.

Methodological postulates define legitimate methods available to researchers who adopt a specific research program. These postulates define experimental techniques, modes of theoretical testing and evaluation, and the like.

To sum up, a research program is essentially a set of prescriptions, a set of dos and don'ts for developing theories.

The concept of what I call 'research program' and what is called 'paradigm' in works on the methodology of science has a long history.

The idea of analyzing a network of explanations in science as built around a certain fundamental patterns of explanation and discovery, or *paradeigmata*, was launched by Georg Christoph Lichtenberg, who was professor of the natural philosophy at Göttingen in the mid-eighteenth century. The term *paradeigma* was introduced by Lichtenberg just for this purpose. Lichtenberg argued that in physics we explain puzzling phenomena by relating them to some standard form of conceiving phenomena, or *paradigm*, which we are prepared to accept for the time being as self-explanatory.

Lichtenberg's work had a liberating influence on the following generations of physicists and philosophers of science. For example, Ernst Mach speaks of Lichtenberg as the major influence on his own empiricist theories of perception. The term 'paradigm' was picked up by Ludwig Wittgenstein, who applied it both in the philosophy of science and, more generally, as a clue to understanding how philosophical models or stereotypes act as molds or clamps, shaping and steering our thought in predetermined directions that may sometimes be quite inappropriate. Among the philosophers of science, the theory of paradigms was explored by Wittgenstein's student W. H. Watson (1938), by N.

R. Hanson (1958), by S. E. Toulmin (1961), by Imre Lakatos (1968), and by Larry Laudan (1977), who used different terms instead of ‘paradigm.’

The term ‘paradigm’ was also used by Thomas S. Kuhn in his widely known book *The Structure of Scientific Revolutions* (1962). Kuhn put a misguided twist to the concept of paradigm. None of the authors who made use of this term implied that a change of paradigm must come in an abrupt, discontinuous, or overthrowing manner. In fact, the history of science does not witness ‘revolutionary’ changes of paradigms. Paradigms change by evolution rather than revolution. Contrary to the testimony of the history of science, Kuhn combined the theory of paradigms with his ill-conceived theory of scientific revolution. The theory of paradigms as developed by Wittgenstein and other philosophers is quite independent of Kuhn’s theory of scientific revolution.

One cannot overstate the significance of the concept of paradigm for any science. It is time that linguists recognize the paradigms implicit in their research and make them explicit. An overt formulation and recognition of the paradigms underlying linguistic research will liberate linguists from molds and clamps that may steer their thought sometimes in quite a wrong direction.

7.1.2 *Principles and laws*

By law I mean a constraint on the range of possibilities. A constraint on the range of possibilities is a relation between two sets of theory-predicted outcomes, where the second set is obtained by applying the condition to the first set, such that the second set contains a reduced number of the outcomes. For example, Newton’s law formulates the conditions which restrict the possible positions and velocities of planets relative to the huge number of abstract possibilities. Crucially, Newton’s law rules out many positions and velocities of planets by predicting that they never occur. A restricted set of possibilities defined by a law is invariant of the abstract possibilities. Hence, a theory of invariants is part of a theory of constraints on the range of possibilities.

Similarly, laws of grammar formulate the conditions under which only a restricted set of structures is possible as against the abstract possibilities. Laws of grammar exclude many conceivable language structures by predicting that they never occur. Like any other law, a law of grammar is a falsifiable, empirical claim that concerns the entire universe of natural languages.

Laws of grammar may be thought of as universal well-formedness conditions on structures in all possible languages. Laws of grammar are universal, as opposed to language-specific conditions termed *rules*, which constrain struc-

tures in some languages, but not in others. Semiotic Linguistics seeks to discover universal laws of grammar.

Let us turn to the notion of *principles*. I distinguish between laws and principles, as does Toulmin (1953). Consider the Principle of the Rectilinear Propagation of Light in geometrical optics. One can imagine a geometrical optics in which the law of refraction were different. The formulation of a law of refraction different from Snell's Law would involve considerable changes. But geometrical optics could still exist as a well-defined area of research. By contrast, the Principle of the Rectilinear Propagation of Light cannot be abandoned. Questioning whether light travels in straight lines puts the whole research domain at stake. Of course, the Principle of the Rectilinear Propagation of Light is as empirical as Snell's Law. But physicists could abandon this principle only if they were ready to dispense with geometrical optics as a whole, or as Toulmin puts it, "if they were ready to *write off* geometrical optics as a whole" (Toulmin 1953: 83).

The Principle of Differences in Semiotic Linguistics is analogous to the Principle of the Rectilinear Propagation of Light in geometrical optics. The Principle of Differences defines Semiotic Linguistics as an independent discipline. Abandoning the Principle of Differences would mean abandoning Semiotic Linguistics as a well-defined area of research. We could abandon this principle if we were ready to write off Semiotic Linguistics as a whole.

Thus a theory consists of a hierarchy of empirical statements. Laws are mid-level statements between low-level statements — *observational statements* — and high-level statements — principles.

Accordingly, Semiotic Linguistics contains principles, laws and observational statements. Among the semiotic principles are the Principle of Differences and its corollaries: Principle of Duality of Categorization, Principle of the Arbitrariness of the Sign, Principle of Superposition. Semiotic laws are propositions defining the well-formedness of grammatical and phonological combinations. Observational statements are statements describing some observed properties of signs.

It is important to distinguish between *hypotheses* and *assumptions*. What is the difference between the two? The distinction between hypotheses and assumptions needs to be understood in terms of the distinction between the parts of a theory which are open to question, and those parts which have to be taken for granted in order to formulate relevant problems. This distinction has been widely misconceived. Some philosophers and scientists claim that all empirical statements are hypotheses. This is true enough, but the distinction we are making concerns the logical structure of a theory rather than the empirical content of hypotheses and assumptions. In any science, we cannot even state our cur-

rent problems unless we take the solution of some earlier problems for granted. One cannot question the validity of the law of inertia and the law of gravity, and at the same time continue to talk about the inertial or gravitational mass. The distinction between assumptions and hypotheses reflects the logical stratification of a theory into the established part and the current problems under discussion. The recognition of this stratification of a theory does not undermine the empirical nature of science.

The stratification of a theory into the established part and current problems under discussion is a methodological claim that can be called the Principle of Door Hinges, following Wittgenstein's profound deliberations in his *On Certainty*:

341. ... the *questions* that we raise and our *doubts* depend on the fact that some statements are exempt from doubt, are as it were like hinges on which those turn.

342. That is to say, it belongs to the logic of our scientific investigations that certain things are *in deed* not doubted.

343. But it isn't that the situation is like this: We just *can't* investigate everything, and for that reason we are forced to rest content with assumption. If I want the door to turn, the hinges must stay put. (Wittgenstein 1969; his italics)

It follows from the passage cited that in order to be able to doubt certain statements, we must leave some other statements exempt of doubt. Just as a door needs hinges to turn on, so our questions must revolve around statements exempt of doubt.

As was said above, the laws of Semiotic Linguistics correlate with language-specific regularities called *rules*. Grammar rules summarize regularities observed by studying various languages. One may also observe that similar cross-linguistic phenomena are characterized by different types of grammar rules. For example, the rule of passivization is expressed in terms of the linear word order and verbal morphology in English and in terms of case markings and verbal morphology in Russian and Latin. In addition, the means used to express the rules of passivization vary. For example, Russian uses the instrumental case in passive constructions whereas Latin uses the ablative. Now, we must assume that the various types of regularities in language-specific grammars provide the theory of grammar with a natural point of departure: the theory of grammar must ask, 'What are the *forms* of these regularities?' The forms of these regularities are to be *discovered*. The goal of the theory of grammar is the *discovery* of the forms of the grammatical patterns of individual languages. Laws of grammar correlate with the grammatical patterns of natural languages as characterizations of the forms of these rules. A law of grammar may also be

thought of as an *invariant* under the changes of grammatical patterns. I believe that this understanding of what laws of grammar are provides a reasonable explication of the notion of language universals. Language universals are redefined as laws of grammar inasmuch as they characterize the forms of the grammatical patterns of particular languages. Accordingly, the theory of grammar is *universal grammar*.

It is interesting to consider how the theory of grammar interacts with grammatical patterns. We start with the grammatical patterns of particular languages as something given prior to the theoretical analysis. The grammatical patterns of individual languages constitute our data bank. We formulate a hypothesis about the form of these rules. We test this hypothesis by searching for new facts which could serve as counterexamples to our hypothesis. We may modify or even abandon our hypothesis and replace it with a new one. Then, in the light of a modified or new hypothesis we return to our starting point — to the grammatical patterns of individual languages, and reformulate them in accordance with our hypothesis. As a result, we get new insights into individual languages; we get new presentations of grammars of individual languages in accordance with the laws of grammar.

An important thing to note is that laws of grammar, as I have characterized them, cannot be expressed in terms of the linear word order, case markings, or verbal morphology. Laws of grammar must be expressed independent of language-specific notions. These laws must capture relations characterizing the design of language in itself, independently of how this language design is represented by various coding devices in various individual languages. The study of the design of language in itself I call *genotype grammar*, which I oppose to *phenotype grammar* — the study of various means of encoding the design of language used by individual languages.

7.1.3 *Conceptual framework*

By conceptual framework I mean a system of general concepts that enter the formulation of principles and laws. The principle of the rectilinear propagation and Snell's law are formulated in terms of the concepts of light and refraction. The laws of motion are formulated in terms of motion, force, inertia, mass, velocity, and so on. The principles and laws of Semiotic Linguistics are expressed in terms of properties of the linguistic sign: the value and worth of sound and meaning, the superposition of signs, etc.

Conceptual framework has an important function in linking the three levels of a theory — the level of principles, the level of laws, and the observational level. It is wrong to think that these levels are deductively related to one an-

other. It is the concepts that appear in the statements on one level — not the statements themselves — that are logically linked to the statements below. There is a logical connection between the three levels, but it is not deduction. This logical connection I call *conceptual linkage*. Conceptual linkage is an inference, but not a deductive one. To illustrate, the present position or the velocity of a planet is not deduced from the laws of motion but is *inferred in accordance with them*. Rules of grammar are not deduced from the principles and laws of language but are inferred in accordance with them

It is useful to distinguish between the *vocabulary* and *concepts proper*. For example, the term ‘relation’ in Relational Grammar of Perlmutter and Postal (1974) and the term ‘function’ in some other linguistic theories express the same concept. In this respect the difference between the two conceptual frameworks is in vocabulary, not concepts. Still, the choice of terminology is important in at least two respects. First, terms often embody metaphors that may express a particular world view that can guide the direction of our research. Second, terms often have what may be called ‘semantic weight.’ By the *semantic weight* of a term I mean that the term may imply the centrality of the concept it denotes. Semantic weight may cause what is called conflict over words, that is, quarrels over the right definition of terms. In fact, these controversies are not simply about words. They are concerned with making one rather than the other aspect of the concept central so that appropriate consequences may be drawn from it. Consider the term ‘phoneme.’ This term denotes a concept that is central to phonology. Now, what is a phoneme? There are two diametrically opposite views of the phoneme: semiotic and physicalist. Both views agree that the phoneme is a class of sounds having the same distinctive function. But, under the physicalist view, this class must consist of acoustically related sounds, whereas under the semiotic view, the acoustic relatedness of sounds is irrelevant. These two concepts of phoneme are so different that two different terms could be used to denote them. But neither of the two parties in the dispute over the right definition of the phoneme is willing to pick another term. Why? Because each party believes that their notion of phoneme is central to phonology. The controversy is very important because the difference between the consequences of the two notions of phoneme is so vast that the whole character of phonological research is at stake (see Shaumyan 1987: 32-93; 1968).

7.1.4 Analogical modeling

The term ‘model’ has many and often very different senses, analyzed in (Shaumyan 1971: 52-68). An analogical model could be defined as follows:

[D27] ANALOGICAL MODEL

Given empirical objects A and B that resemble each other in their form but not content, empirical object A is an analogical model of empirical object B if a characterization of B in terms of an analogy with A is essential for understanding B.

Analogical models are not mere aids to theory construction. They are an essential part of theories. To develop an intellectually satisfying theory, we have to search for a proper analogical model of the object we study. This requirement was forcefully expressed by the English physicist N. R. Campbell in his book *Physics: the Elements*, published in 1920:

... analogies are not “aids” to the establishment of theories; they are an utterly essential part of theories, without which theories would be completely valueless and unworthy of the name. It is often suggested that the analogy leads to the formulation of the theory, but that once the theory is formulated the analogy has served its purpose and may be removed or forgotten. Such a suggestion is false, and perniciously misleading. (Campbell 1920: 129)

As an example of an analogical model, let us consider the textbook example of analogy between the flow of the electric current in a wire and flow of a fluid in a pipe. The analogy by which the flow of a fluid serves as a model of the flow of the current may be characterized as follows: a certain set of laws governing the flow of a fluid in a pipe has the same structure as the corresponding set of laws governing the flow of the electric current in a wire. Two sets of laws have the same structure when the empirical terms of the first set of laws can be matched one to one with the empirical terms of the second set of laws in such a way that if in one of the laws of one set each term is replaced by its counterpart, we get a corresponding law in the second set, and vice versa. Two sets of laws of this kind are said to be *isomorphic*. But in our example, as in other cases of analogical modeling, isomorphism has limits. Thus, not all laws for the flow of a fluid in a pipe have counterparts for the flow of the electric current in a wire. Usually, isomorphism between empirical object B and its analogical model A is only partial. Other examples of partial isomorphism between an object and its representation are the representation of the atom on the analogy with the solar system, and the representation of physical phenomena in terms of the field (magnetic field, electric field). Sometimes one analogical model is not sufficient to represent all the aspects of the modeled object. In these cases several models are chosen for the various aspects of the same object. Thus, Kelvin offered quite different mechanical models of molecules to represent the elasticity of crystals, the dispersion of light, and the rotation of the plane of polarization of the light beam (Thomson 1984).

Mary B. Hesse (1966: 8) distinguishes three kinds of analogy between model A and its object B: *negative analogy*, *positive analogy*, and *neutral analogy*. The negative analogy of the model is those properties known to belong to A but not to B. The positive analogy of the model is those properties we know to belong to A and want to ascribe to B. The neutral analogy of the model is those properties of the model which are yet unknown to be either positive or negative.

Why is the discovery of isomorphism between different sets of laws or theoretical principles important? First, the discovery of isomorphism between different sets of laws or theoretical principles makes for a flexibility of conceptualization: we free our theory from the irrelevancies necessarily involved in any concrete embodiment of structure. Second, the discovery of isomorphism makes for a greater systematization and unity in our conceptions, which is one of the functions of a theory.

Turning to the theory of grammar, we find ourselves in a special situation when two empirical objects A and B should be chosen as reciprocal analogical models. I contend that the phonological and grammatical systems of language must be chosen as proper analogical models of each other, although the isomorphism between the two systems is only partial. Semiotic Linguistics models the grammatical system on the phonological system and the phonological system on the grammatical system. The laws of Semiotic Linguistics are based on isomorphic sets of the laws of the phonological and semantic systems of language. They provide deep insights into the most intimate internal properties of language. The profound analogies between the conceptual and phonological systems are an absolutely essential part of Semiotic Linguistics. By discovering them we free our theory from irrelevancies necessarily involved in any concrete embodiment of grammatical and phonological structures and achieve a greater systematization and unity in our conception.

Essential analogies for understanding language as the sign system are the analogies of language with chess and the economic system with respect to the concept of value. These analogies are not aids to the establishment of the theory of Semiotic Linguistics but are essential part of the theory.

7.1.5 *Mathematical modeling*

By a formal framework I mean a formal language or a sign representation of reality, in the sense of the term of 'representation' proposed by Heinrich Hertz. In the introduction to his classic *Principles of Mechanics* Hertz characterized his notion of representation of reality as follows:

We form for ourselves images or symbols of external objects, in such a way that the logically necessary consequents of the images are always the images of the causally connected resultants in the nature of the things our images represent. (Hertz 1956: 1)

Hertz goes on to claim that this stipulation is the *sole indispensable* condition which our images (he also calls them ‘conceptions’) must satisfy:

It is not necessary that they [our images or conceptions] should be in conformity with the things in any other respect whatever. As a matter of fact we do not know, nor have we any means of knowing, whether our conceptions of things are in conformity with them in any other than this *one* fundamental respect. (Hertz 1956: 1)

The concept of representation proposed by Hertz is what is often called ‘mathematical model’ in the current literature. A relevant mathematical model constituting the formal framework of a theory helps us to achieve rigor and precision in defining concepts and formulating laws, and allows us to make calculations that go beyond the range of intuitive reasoning. Thus, the formal framework of Chomsky’s phrase structure grammar uses the formalism of Post’s production systems. Various versions of categorial grammar use Lambek calculus as their formal framework. The formal framework of Semiotic Linguistics is *genotype calculus* — a formal language related to the formal language of combinatory logic. The terms ‘formal representation,’ ‘formal model,’ ‘formal framework,’ ‘mathematical model’ are all alternative names characterizing the same concept — a mathematical system that serves as an analogical model of a certain empirical object.

In any science that uses a formal language of a mathematical model, this language is embedded in the everyday language extended by a set of proper technical terms. This concerns mathematics, as well. Here are insightful thoughts of Haskell B. Curry on the role of everyday language in mathematics:

The construction of a formal system has to be explained in a communicative language understood by both the speaker and the listener. We call this language the U-language (the language being used). It is language in a habitual use of the word. It is well determined but not rigidly fixed; new locutions may be introduced in it by way of definition, old locutions may be made more precise, etc. Everything we do depends on the U-language; we can never transcend it. Whatever we study we study by means of it. Of course, there is always a vagueness inherent in the U-language; but we can, by skillful use, obtain any degree of precision by a process of successive approximation. (Curry and Feys 1958: 25)

(Curry uses the term ‘A-language,’ or artificial language, for the formal language embedded in a U-language, or usual language.)

7.2 The nature of abstraction

The term ‘abstraction’ has two basic meanings: firstly, it means a certain cognitive process; and secondly, it means the result of this process. I will consider abstraction in the sense of a cognitive process. In this sense, abstraction is a mental analysis of an object or of a group of objects from a single point of view in order to single out one property of the object which is regarded as especially important.

For linguistics, abstraction is the main method of the analysis of an object under investigation in contrast to other sciences, which may use technical facilities for this purpose. Neither a microscope nor chemical reagents can help in linguistics. Both must be replaced by the power of abstraction.

There are various kinds of abstraction. Two of these are generalization abstraction and abstraction of *the rational structure of an object*. I call them *generalizing abstraction* and *rational abstraction*. The two kinds of abstraction differ sharply. From the point of view of generalization, an abstract concept is understood as follows. Let’s say we consider cows. What is a cow? The term (or the concept) ‘cow’ refers to the common properties of individual cows. This term is a generalization of the properties of individual cows. Generalizing abstraction starts with the observation of individual objects so as to subsequently create words and terms referring to individual objects.

Abstraction of the rational structure of an object, on the other hand, has nothing to do with the problem of extracting common properties from individual objects. By abstracting the rational structure of an object, we single out an object as a limit object.

What is a *limit object*? It is an abstract object which is used to describe the essential properties of a real object or objects. A limit object is the form or an idea of a real object or real objects. How is the notion of a limit object introduced into a science? It is introduced through a law or a group of laws defining its essence. Definitions through laws basically differ from generalizations.

The notion of *limit* arises in the following way. Let us say, we observe moving bodies. What are the essential properties of the movement of bodies? There is a directly proportional dependence between friction and change of velocity: the less friction the lower change in velocity within a given unit of time. This allows us to define the limit case: when all friction is eliminated every body persists either in the state of rest or uniform motion in a straight line, unless compelled to change that state by forces impressed thereon — the law of inertia. A body free of the action of friction thereon is a limit object, which represents a rational form of the movement of bodies in the real world.

As another example of a limit object consider phoneme. What is phoneme? It is a limit object representing the essential features of the sounds of language. The essential features of the sounds of language are the functional identities and differences between the sounds of language which are independent of their physical identities and differences. In real languages, however, functional identities and differences between sounds coincide to a greater or lesser extent with physical identities and differences between them. This situation muddles the functional essence of language sounds. However, we can define a limit case when functional identities and differences are not accompanied by physical identities and differences: sounds totally different physically are identical functionally; and conversely, sounds identical physically are different functionally. Hence, the laws defining the phoneme as a limit object: Principle of Phonological Duality of Categorization, Law of the Functional Identity of Phonemes, Law of the Duality of Phonemes (for more detail see Shaumyan 1962, 1968, 1987: 35).

The examples of limit objects show that they cannot be derived directly from observation or experiment but only by speculative thinking consistent with observation.

Generalizing abstraction singles out common properties of individual objects, but it cannot be used to separate essential properties from inessential ones. This creates a serious problem, for the goal of a science is the discovery of the essential properties of objects under investigation. In order to judge objectively about real, empirical objects — such as movements of bodies or sounds and meanings of language, we must consider them from the point of view of their form, of their essence. Hence, it is clear that since rational abstraction, that is, the abstraction of the rational structure of an object separates the essential properties of an object from inessential ones, it must be central to science, whereas generalizing abstraction must play a secondary role.

Definitions of concepts through laws are antithetical not only to generalizations, but to any kind of *naturalistic abstraction*. By naturalistic abstraction I mean abstraction representing the external features of an object. True, the external features of an object do exist. But science is concerned not with the plain existence of facts, but with the existence of the internal features of objects that constitute their essence. Naturalistic abstraction is concerned not with reality understood as an essential existence but with plain existence without discrimination between what is and what is not essential. This is why naturalistic abstraction belongs to a *vulgar kind of science*. There is science and there is vulgar science. Science is concerned with the discovery of essential properties of facts of reality. Vulgar science is interested in the plain existence of external facts without concern for the essential reality underlying the external facts.

As an example of naturalistic abstraction that is different from plain generalization, let me mention Keenan's analysis of the notion of subject (Keenan 1976). Keenan aims to give a universal definition of subject by using the empirical notion 'degree of subjectness.' The degree of subjectness is defined by the number of factors or properties that, according to Keenan, characterize grammatical subject. As a result, instead of essential features characterizing grammatical subject as a grammatical concept we get a continuum of descriptive notions, beginning with a minimal degree of subjectness (and even with a zero subjectness) and ending with a maximal subject, with intermediary characteristics such as 'more of a subject' and 'less of a subject,' and so on.

7.3 Examples of semiotic abstraction

7.3.1 *Communicative and informational dimensions of language*

The notions of generalization and abstraction of the rational structure of an object are notions that give only a general description of the methods of science without going into details of application to particular sciences. The question of modifications of general methods in accordance with the content of particular sciences concerns methodologies of particular sciences. We are interested in the question: What are the particular methods of abstraction of the rational structure of an object in linguistics? The answer to this question follows from the Principle of Differences and its corollary the Principle of Duality of Categorization.

One consequence of the Principle of Differences and the Principle of Duality of Categorization is that we must not confuse but strictly distinguish the two dimensions of meaning: the *communicative form* of meaning, that is, the value of meaning, and its *informational content*. The informational dimension is the dimension of thought. The communicative dimension is the dimension of the conventionalized form of thought — a necessary condition of communication. Thus, thought distinguishes colors regardless of how this or that language distinguishes them. What is distinguished by thought is not necessarily distinguished by language, and conversely, what is distinguished by language is not necessarily distinguished by thought. Identities and differences in language are conventionalized identities and differences lying at the base of communication. Identities and differences of the communicative dimension of meaning are totally independent of those of its informational dimension.

Language is a communicative form of thought and together with thought constitutes a single object: the *language-thought continuum*. The unity of language and thought is to be understood in the following way: thought is insepa-

rable from language and depends on language, because language is the necessary form of thought — to think is to operate with the units of language. But at the same time thought is a dynamic power which is dependent on language only as a necessary form of expression, without being dependent on a concrete form of language: thought operates everywhere in a similar way regardless of which language it is expressed in. Hence one must not confound the standpoint of linguistics with that of logic. The subject matter of linguistics is the dimension of conventionalized meaning while logic is concerned with the various aspects of its informational dimension.

7.3.2 *Abstraction from sound to phoneme*

What I call *semiotic abstraction* is abstraction that singles out the essential features of sound and meaning as instruments of communication. Values of sign and meaning constitute the essential features of sound and meaning. In order to show on a concrete example how semiotic abstraction extracts value from the underlying substance of language, I will consider the process of transition from the notion of sound to the notion of phoneme. My treatment radically differs from anything hitherto proposed. A detailed presentation of the new theory of the phoneme is given in (Shaumyan 1987: 32-66).

In order to develop a system of concepts defining the transition from sound to phoneme, let's begin with the question: What is the basis for defining two given sounds as identical in a given language?

Consider the following groups of sounds (the superscript ^h denotes aspiration):

$$(39) \quad \begin{array}{ll} p^h & p \\ t^h & t \\ k^h & k \end{array}$$

The speakers of English classify these sounds as three sound types: *p*, *t*, *k*, while the speakers of Eastern Armenian classify all these sounds as different. Similarly, the speakers of Old Greek would distinguish six sounds here. These different ways of classification are reflected in the alphabets of these languages: while English has only three letters for this set of sounds, Eastern Armenian and Old Greek have six letters corresponding to the distinction of aspirated and non-aspirated stops.

The phenomenon that sounds belonging to similar sound sets may be classified differently by speakers of different languages I call *vocal relativity*. To explain the phenomenon of vocal relativity, we must answer the question: What are the conditions of identities and differences between sounds in lan-

guage? In search of these conditions we advance a hypothesis that in every language only those sounds must be considered different, which serve to distinguish different signs, and only those must be considered identical, which do not serve to distinguish different signs. We further introduce the concept of *phonetic context*: the quality of sound is affected by what sounds precede or follow it.

To show that two sounds serve to distinguish signs, we look for words that differ only in the sounds in question. Applying this to set (39), we get two sets of words, for aspirated and unaspirated versions of sounds each:

- (40) pool lip
 tool lit
 cool lick

The sets of words in (40) show that sounds p^h , t^h , k^h before the vowel u and p , t , k after the vowel i are used to distinguish words. We observe two positions for stops: before the vowel u in the first set and after the vowel i in the second one. We rewrite (39), noting the two different phonetic contexts:

- (41) I II
 p^h p
 t^h t
 k^h k

We get two ordered sets of sounds p^h , t^h , k^h and p , t , k , which we call *distinctive oppositions*. Sounds as terms of distinctive oppositions we call *phonemes*. Various properties of distinctive oppositions we call distinctive features, which we describe in terms of articulation by organs of speech. Thus, our distinctive oppositions may be characterized as follows:

- (42) I II
 L_I L_{II}
 A_I A_{II}
 V_I V_{II}

In (42) L stands for 'labial,' A stands for 'alveolar,' and V stands for 'velar.' Subscripts indicate that the distinctive features are physically different in each position because their physical forms depend on different phonetic contexts.

Any set of phonemes ordered in accordance with their distinctive features in a given position I call a *semantic class* of phonemes.

Since sounds as terms of distinctive oppositions are functional units, this means that the problem of the identity of sounds amounts to the problem of the

functional identity of sounds as phonemes, the conditions of which are specified by the Law of the Functional Identity of Phonemes:

[D28] LAW OF THE FUNCTIONAL IDENTITY OF PHONEMES

Two semantic classes of phonemes K_i and K_j are identical if their relational structures can be put into a one-to-one correspondence, so that to each concrete phoneme X of K_i there corresponds a concrete phoneme Y of K_j , and to each concrete distinctive opposition R of K_i there corresponds a concrete distinctive opposition S of K_j , and vice versa. There is a one-to-one correspondence between concrete distinctive features X and Y and between concrete distinctive oppositions R and S if the difference between X and Y and between R and S is reducible solely to the effect of positional variation.

Let us now use the Law of the Functional Identity of Phonemes to explain the phenomenon of vocal relativity. Consider our initial diagram. Why is the set of six sounds classified as three sounds in English but six sounds in Eastern Armenian and Old Greek? This is because in English p^h , t^h , k^h and p , t , k are sounds that belong in different semantic classes, and the differences between these terms of distinctive oppositions are conditioned by positional variation: the stops have aspiration at the beginning of a syllable and do not have it in all other positions. That is, the difference between the aspirated and non-aspirated stops is not relevant from the standpoint of their distinctive function. By contrast, in Eastern Armenian and Old Greek all the six sounds occur in the same positions; that is, they belong in the same semantic class, and therefore the difference between aspirated and non-aspirated stops is relevant in these languages. We illustrate this with an example from the Eastern Armenian:

(43) p^hajt 'stick' : $pajt$ 'horseshoe'
 $t^ho\gamma$ 'let' : $to\gamma$ 'line'
 k^hujr 'sister' : $kujr$ 'blind'

From the Law of the Functional Identity of Phonemes we can deduce the Law of the Duality of Phonemes:

[D29] LAW OF THE DUALITY OF PHONEMES

Functional and physical identities of phonemes are logically independent of each other.

The Law of the Functional Identity of Phonemes predicts that two phonemes that are functionally identical may differ physically, and two phonemes that are physically identical may differ functionally. For example, assume concrete phonemes A, B, and C in position i and concrete phonemes B, C, and D in position j so that the difference between A_i and B_j , B_i and C_j , and C_i and D_j is

conditioned solely by the differences in phonetic contexts. Then in accordance with the Law of the Functional Identity of Phonemes we get one-to-one correspondences shown in the following table:

(44)

I	↔	J
A _i	↔	B _j
B _i	↔	C _j
C _i	↔	D _j

The symbol ↔ indicates a one-to-one correspondence. This hypothetical situation is an extremal form of presentation of the essential properties of distinctive oppositions and phonemes, that is, sounds of language as terms of these oppositions. We see that two functionally different phonemes — B_i and B_j or C_i and C_j — are physically identical, and conversely, that two functionally identical phonemes — A_i and B_j, B_i and C_j, or C_i and D_j — are physically different. Similarly, two different distinctive oppositions — B_i:C_i and B_j:C_j — are physically identical, and conversely, two identical distinctive functions — A_i:B_i and B_j:C_j or B_i:C_i and C_j:D_j — are physically different.

This hypothetical extremal situation predicts analogical extremal situations in real languages. A real case of such extremal situations is a contextual shift of the degree of openness of vowels in Danish as shown in the following table:

(45)

	default	↔	before r
	i	↔	e
	e	↔	ε
	ε	↔	a
	a	↔	α

There are four contrastive degrees of openness in Danish. The four front unrounded vowels are normally realized as *i*, *e*, *ε*, *a*. However, before *r* there occurs a uniform shift by one degree of openness, yielding the semantic class *e*, *ε*, *a*, *α*. While this change modifies the physical characteristic of each vowel, the relations between vowels remain constant. Vowel *i* in the default position and vowel *e* in the position ‘before *r*’ are functionally identical because they are the highest vowels in their respective positions. Vowel *e* in the default position and vowel *ε* ‘before *r*’ are functionally distinct because the first *e* has the second degree of openness while the second *e* has the first degree of openness. We arrive at the conclusion that the differences between the phonemes in one-to-one correspondence are reducible solely to the effects of the physical variations of these phonemes in the positions of default and ‘before *r*.’

This situation in Danish and similar situations in other languages confirms the Law of the Duality of Phonemes: the functional identity of phonemes is logically independent of their physical identity.

7.3.3 *The concept of phoneme*

A class of identical phonemes is often viewed as various occurrences of one and the same phoneme in various positions, or in traditional terminology, as variants of one and the same phoneme. To this end, we apply a special type of abstraction, which may be called *class-as-one reduction*, or simply, *reduction abstraction*. Rather than think of the phonological system of language as a system of classes of functionally identical phonemes we view it as a system of phonemes, each of them consisting of contextual variants.

There is a cardinal difference between our understanding of the term ‘variants of a phoneme’ and the traditional understanding of this term. From the traditional standpoint, variants of a phoneme are different sounds to which a phoneme relates as a generic notion. But in fact, the distinction between the phoneme and sound has nothing to do with the distinction between genus and species. The conceptual shift from sound to phoneme is a conceptual shift from an entity of the first order — a physical entity — to an entity of the second order — a communicative entity, which is characteristic of language as an instrument of communication. The transition from sound to phoneme is not a transition from the individual to the general; it is a transition from the individual to the individual — from individual sounds to individual phonemes, which are individual entities of a higher order. In fact, variants of a phoneme are context-conditioned occurrences of one and the same phoneme.

The transition from the individual to the individual happens neither by induction nor by deduction, but by the construction of complex elements from simple ones. We start with simple elements — individual sounds. As a next step, we construct distinctive oppositions from the individual sounds. The distinctive oppositions serve to distinguish signs. Phonemes are defined as members of distinctive oppositions. Thus, phonemes are individual constructs. They are produced by transition from individual sounds to individual members of distinctive oppositions.

We must strictly distinguish between *text* and the *system*. Text is a sequence of signs — morphemes, words, word combinations — and hence, a sequence of phonemes. At the text level we discover classes of identical signs, identical meanings, and identical phonemes. At the system level, using class-as-one reduction, we reduce classes to single objects, so that every class is viewed as various occurrences of one and the same single object. The distinction between

text and the system is of paramount importance. The phoneme has a dual character: it is a functional unit and it is a systemic unit — it is a duality. The important thing is that we can observe the sound properties of the phoneme only at the text level. At the system level we get only the pure distinctive function, which is the essence of the phoneme. The distinctive function of the phoneme relates to its physical properties as form to content. Similar considerations apply to meaning. Meaning has a dual character: it is a functional unit as a term of a semantic opposition and it has an informational content — meaning is a duality. In fact, variants of a meaning are text-conditioned occurrences of one and the same meaning. The important thing is that we get the informational content of meaning only at the text level. At the system level we get only the pure form of information, which is the essence of the meaning. Language is a semantic system and a phonological system. Text is only a realization of these systems. Hence, although text is the direct empirical object of linguistics, the goal of linguistics is the discovery of the semantic system and the phonological system in text.

Let us now consider the phoneme from the epistemological standpoint. The phoneme is a unity of contradictory properties — the distinctive function and physical substance. The distinctive function is what Saussure has called the *value of sound*. Saussure compared linguistic values with economic values. Pursuing Saussure's comparison, we discover an uncanny analogy between the phoneme and commodity. The functional identity of phonemes is comparable to the identity of commodities with respect to their exchange value. Like commodity, the phoneme has a dual character: just as commodity is a unity of its exchange value and its use properties, so the phoneme is a unity of its functional value and its physical properties. The functional value of the phoneme is logically independent of its physical properties, just as the exchange value of the commodity is logically independent of its use value, that is, its physical properties. Here is how Marx characterizes the relation between the exchange value of commodity and its physical properties:

The objectivity of commodities as values differs from *Dame Quickly* in a sense that "a man knows not where to have it." Not an atom of matter enters into the objectivity of commodities as values; in this it is the direct opposite of the coarsely sensuous objectivity of commodities as physical objects. We may twist and turn a single commodity as we wish; it remains impossible to grasp it as a thing possessing value. (Marx 1977: 138)

Comparing phonemes with commodities, we can say that just as not an atom of matter enters into commodities as economic values, so nothing physical enters into phonemes as linguistic values. By this we mean that just as the iden-

tity of commodities with respect to their economic values is logically independent of their physical properties, so the identity of phonemes with respect to their linguistic values is logically independent of their physical properties. Of course, economic values and linguistic values are something represented by commodities and phonemes, and in this respect, values are part of both commodities and phonemes.

7.3.4 *Are segmental phonemes a fiction?*

The misunderstanding of the nature of phonological abstraction is comes to the fore in the controversy about segmental phonemes (the term ‘segmental phoneme’ is used by some authors to call ordinary phonemes in contrast to distinctive features regarded as real phonemes by these authors).

Some linguists, among them André Martinet and William Sullivan, an author of important publications (Sullivan 1998, in press; Sullivan & Bogdan 2001), contend that segmental phonemes are just fictitious entities. Thus, according to Martinet:

It is not the phoneme, but rather the distinctive feature which is the basic unit of phonology: this is the basic unit that has a real existence. (Martinet, 1965: 69)

The discussion is summarized in Sullivan’s “The persistence of a fiction: the segmental phoneme” (in press), where the reader can find references to the relevant literature, and where Sullivan also advances his own arguments in support of the contention about the fictitious nature of the segmental phoneme.

Let us start, as Sullivan does, with a quotation from Yngve:

The founders of modern linguistics often started with an assumption that speech is segmented into phonemes, phones, features ... or equivalently they transcribed it by symbols such as the International Phonetic Alphabet (IPA). It was generally realized, however, that such an assumption is actually false, but it was accepted tentatively anyway following Bloomfield (1933: 78). Even though Twaddell 1935 soon pointed out that the phoneme was in reality only a convenient fiction, what was tentative became permanent... (Sullivan, in press)

What did Twaddell mean, when he said that the phoneme was a fiction? Following the fashionable in his time trend in philosophy represented by logical positivists and Quine, Twaddell called the phoneme a fiction in the same sense as he would have called any general term like ‘horse’ or ‘house’ a fiction. General terms are abstractions that do not correspond to existing particular objects: there are no horse in general or house in general; there are only concrete horses — this or that horse — or concrete houses — this or that

house. Yet to apply the term 'fiction' to general terms is misleading: although a general term does not correspond to an existing particular object, it describes the essential features of a class of concrete objects and so describes a real unit of a deeper order. It is wrong to think about reality as something uniform. Reality is stratified. The stratification of reality is what science all about.

Twaddell distinguished between concrete phonemes, he called 'microphonemes,' and a class of concrete phonemes conceived as a unit, the phoneme, he called 'macrophoneme.' Both the microphoneme and the macrophoneme are real, but they belong to different levels of reality. Twaddell called macrophonemes fictions not in the sense that macrophonemes are actually fictitious but in the sense that macrophonemes do not belong to the lower lever of reality: the macrophoneme is real, but not in the same sense as microphonemes are real.

The use of the term 'fiction' with respect to higher level of reality practiced by logical positivists was misleading and has been abandoned by modern philosophers.

Sullivan goes on with an example of a description in terms of segmental phonemes to show that this approach is an error. He reasons as follows. Consider the notion of contrast — the fundamental concept of phonology. In an example from Russian, it is the contrast between /b/ and /p/ that communicates the difference between *byl* 'he was' and *pyl* 'passion, ardor' in a segmental phonology. Sullivan contends that the real contrast is not between segmental phonemes /b/ and /p/ but between the distinctive features VOICED:VOICELESS because all other distinctive features are shared between /b/ and /p/.

Is the choice of characterizing the /b/:/p/ contrast in terms of distinctive features a correct alternative to characterizing this contrast in terms of segmental phonemes? This question is not simple. To answer this question, one must have a clear idea about the nature of the linguistic fact. Therefore, let us start by defining the concept of the linguistic fact.

What is the linguistic fact?

The linguistic fact is a phenomenon discovered by linguistic analysis. The basic concept underlying linguistic analysis is the concept of level. Only the concept of level allows us to discover the discrete character of linguistic signs and their hierarchy.

The procedure of analysis consists of two complementary operations: 1) segmentation and 2) substitution.

A text is segmented into shortest elements, in the first place. And the segmentation is supplemented by admissible substitutions. Every element is identified by segmentations and admissible substitutions. For example, the word *cat* is segmented into /k/, /æ/, /t/, where /m/, /b/, /r/, /s/ can be substituted for /k/ (= *mat*, *bat*, *rat*, *sat*), and /ǒ/, /ǎ/ can be substituted for /æ/ (= *cot*, *cut*), and /b/, /n/,

/p/ can be substituted for /t/ (= *cab, can, cap*). Going from one sign to another, we discover the totality of all elements and the totality of all possible substitutions for each of them.

This is the method of the distributional analysis. This method defines each element by two sets of environments where it occurs and by two kinds of relationships: relationships to other elements that co-occur in the same segment of the text (syntagmatic relations) and relationships to other elements that can be substituted for one another (paradigmatic relations).

There is an important difference between segmentation and substitution with respect to the range of their application: while segmentation applies only to segmentable elements, substitution can apply to non-segmentable elements. While the minimal elements obtained by segmentations are *phonemes*, we can continue segmentation deeper and find *distinctive features* inside the phonemes. But the distinctive features are not segments although substitution applies to them. For example, in /b/ we find occlusion, dentality, sonority. None of these distinctive features occur by themselves, and there is no syntagmatic relationship between them. Nevertheless substitution is possible with respect to each of them. Thus, labiality may be substituted for dentality, or non-sonority for sonority. Since distinctive features are not segments, they do not form classes of segments; yet since substitution does apply to distinctive features, they do form paradigmatic classes. Hence, we must distinguish two levels: the *phoneme level*, where two operations — segmentation and substitution — are possible, and the *subphonemic level*, where only substitution is possible. We come up with two lower levels of linguistic analysis: the phoneme level and the level of distinctive features. Among higher levels of linguistic analysis are the level of words and the level of sentences, which are presented in separate chapters (Chapter 8, Chapter 9, Chapter 10).

Let us turn to the arguments Sullivan adduces against the concept of the phoneme, or ‘segmental phoneme’ as he calls it:

The error. To see why such a segmental approach is wrong, it is necessary to consider a wider picture. Consider the basic description of the two phonemes, /b/ and /p/, presented in Table 1 in articulatory terms but without allophonic distribution statements.

/b/	voiced	bilabial	stop	formed with slightly protruded lips
/p/	unvoiced	bilabial	stop	formed with slightly protruded lips

Table 1: The /b/-/p/ contrast in Russian

So far, no problem: /b/ and /p/, properly distributed, contrast. But just apply elementary logical analysis to the descriptions of the two segmental phonemes. A contrast of any sort can only be communicated consistently by a difference. Apply this elementary principle to the materials in Table

1. The contrast inferred from an observation of the reaction of native speakers to the phonetic signal is given as /b/ vs. /p/. The difference between them must be located in the differences in their formation. This means that neither the articulator nor the place of articulation can do the job: both phonemes exhibit the characteristic bilabial. Full oral closure can't do the job: both exhibit stop articulation. Slight lip protrusion can't do the job: both exhibit this characteristic. The only thing that distinguishes /p/ from /b/ is the voice characteristic: in /b/ the oral closure does not interrupt the vocal fold vibration we hear as voicing. Voicing appears as a thick, dark line at the bottom of a sonogram and never ceases during the entire syllable *byl*. So why wasn't the voice (and its lack) identified as the phonemic contrast between voiced and unvoiced stops? Why was the difference ascribed to alphabetical segments instead of where it clearly belongs? I asked these questions of several linguists, both faculty and advanced graduate students, during my first semester of graduate study. The only responsive answer came from Alexander Schenker, who said, "Jakobson says the contrast is between \pm voice." Lack of response aside, logical analysis told me I was correct.

In short, segmental phonemes were always logically fallacious on their face.

If we consider this long quotation from the standpoint of the levels of linguistic analysis, it becomes clear why Sullivan rejects what he calls segmental phonemes. He considers the contrast between /b/ and /p/ as a single linguistic fact, and it is true that at the level of distinctive features the only contrast between /b/ and /p/ is +VOICE versus -VOICE. But in reality the contrast between /b/ and /p/ is two different linguistic facts presented in one notation. The level of distinctive features is limited to paradigmatic relationships. But there is a higher level of the interaction of syntagmatic and paradigmatic relationships. At this higher level the contrast between /b/ and /p/ is not just +VOICE versus -VOICE but is global — between the whole /b/ and the whole /p/.

The fact that two objects differ only in a single feature does not mean that we cannot regard these two objects as different objects.

We must distinguish strictly between two different levels: 1) the level of interaction between syntagmatic and paradigmatic relationships and 2) the level of paradigmatic relationships. When considering the /b/:/p/ contrast, we must ask: 'contrast at what level?'

By rejecting segmental phonemes Sullivan rejects the levels of proper linguistic analysis. We must never forget that language is a hierarchy of distinct levels whose presentation is sometimes confused due to a notation that covers two levels.

As a matter of fact the basic unit of phonology is the phoneme. Distinctive features are not units of phonology. They are merely the functional characteristics of classes of sounds that are phonemes.

Phonological investigations only in terms of distinctive features are interesting and worth pursuing. But it does not follow that the value of this line of research is enhanced if segmental phonemes are regarded as fictitious.

7.4 Dialectics and Complementarity Principle

The key to the understanding of the dual character of the phoneme is the concept of the unity of opposites. This concept, which goes back to the 15th century, to Nicolaus Cusanus, who called it *coincidentia oppositorum*, represents a way of reasoning that lies at the heart of Johann Sebastian Bach's art of counterpoint in the fugue and Hegel's dialectics. Hegel, in turn, exerted a major influence on all modern philosophy, and particularly on Karl Marx. Hegel's notion of dialectics can be seen, essentially, as an ongoing conflict between the opposites that constitute a unity.

A striking example of 'the unity of opposites' in modern physics is the dual character of light — or more generally, of the electromagnetic radiation. Radiation produces a lot of paradoxical situations that can be explained only by the assumption that radiation is simultaneously a wave and a stream of electrons, constituting a unity of opposites.

The discovery of the duality of electromagnetic radiation raised serious conceptual difficulties in classical physics. To solve these difficulties, Niels Bohr formulated the Complementarity Principle, which he initially conceived as a purely physical principle. Later he extended its validity to other areas of knowledge — above all, to biology, psychology, and sociology. At present, the Complementarity Principle is thought of as a general principle of epistemology and methodology of sciences that characterizes the unity of opposites.

The essence of the Complementarity Principle is described by Bohr as follows:

In order to characterize the relation between phenomena observed under different experimental situations, one has introduced the term "complementarity" to emphasize that such phenomena together exhaust all definable information about atomic objects. Far from containing any arbitrary renunciation of customary physical explanation, the notion of complementarity refers directly to our position as observers in a domain of experience where unambiguous explanation of the concept used in the de-

scription of phenomena depends essentially on the conditions of observation. (Bohr 1958: 99)

The Complementarity Principle was discovered independently by Bohr, but there is a striking similarity between this principle and the principle of the unity of opposites, which constitutes the heart of the dialectical method proposed by Hegel and which was widely practiced by Marx. Bohr was aware of the similarity of the two principles and used the term *dialectics* to characterize the general methodological and epistemological significance of the Complementarity Principle. Thus, he wrote:

The complementarity mode of description does indeed not involve any arbitrary renunciation of customary demands of explanation but, on the contrary, aims at an appropriate dialectic expression for the actual conditions of analysis and synthesis in atomic physics.... The epistemological lesson we have received from the new development in physical science, where the problems enable a comparatively concise formulation of principles, may also suggest lines of approach in other domains of knowledge where the situation is essentially of less accessible character. An example is offered in biology where mechanistic and vitalistic arguments are used in typically complementary manner. In sociology, too, such dialectics may often be useful, particularly in problems confronting us in the study and comparison of human cultures, where we have to cope with the element of complacency inherent in every national culture and manifesting itself in prejudices which obviously cannot be appreciated from the standpoint of other nations.

Recognition of the complementarity relationship is not least required in psychology, where the conditions for analysis and synthesis of experience exhibit a striking analogy with the situation in atomic physics. (Bohr 1948: 317-18)

7.5 Empirical and conceptual problems in linguistics

Like any science, linguistics is essentially a problem-solving activity. The goal of linguistic methodology is to classify and evaluate linguistic problems and methods of their solution.

The first step in classifying linguistic problems is to distinguish between empirical and conceptual linguistic problems. *Empirical linguistic problems* are first-order questions about the substantive entities of language. *Conceptual linguistic problems* are higher-order questions about the well-foundedness of the conceptual structures that have been devised to answer the first-order ques-

tions. To illustrate the difference between the two types of problems, I will consider an example from phonology.

A phonological description of language must start with setting up a list of its phonemes. The setting up of a list of phonemes of a given language is an empirical problem of phonology. Although linguists describing a given language may have different notions of the phoneme and belong to different schools of linguistic thought, they come up with results that are, for practical purposes, the same: lists of phonemes arrived at by linguists of different linguistic schools are the same, or at any rate, they do not differ very much.

Why do linguists who espouse very different, even opposing, phonological theories come to the same results when they try to determine the number of phonemes in a given language?

The answer is this: because all phonological theories have the same or nearly the same predictive power.

The radical differences between different theories of the phoneme result not from the above empirical problem but from problems of an essentially different type: problems that are generated by conceptual difficulties in phonology.

The basic fact about language sounds is that they are used to distinguish different words; that is, they are *diacritics*. As diacritics, language sounds are members of distinctive oppositions. An analysis of the semiotic properties of distinctive oppositions results in the discovery of the Law of the Functional Identity of Phonemes (7.3.2), from which the following consequence can be deduced: no matter how much sounds change in different positions in the speech flow, the phonological oppositions whose members they are remain intact as long as the sounds do not merge.

Recall the thought experiment (44) in 7.3.2, which we repeat here:

$$(46) \quad \begin{array}{ccc} & i & j \\ \hline A_i & \leftrightarrow & B_j \\ B_i & \leftrightarrow & C_j \\ C_i & \leftrightarrow & D_j \end{array}$$

As a result of this thought experiment, we discover that same sounds, say C_i and C_j , must be considered different phonemes; and conversely, completely different sounds, such as A_i and B_j , must be considered variants of the same phoneme. This discovery generates a problem for available phonological theories, which hesitate to separate completely the functional aspect of sounds from their physical aspect. In view of (46), the phonological theories that claim that physical properties of speech sounds are somehow relevant for defining their functional identity have to answer this question: If physical properties of sounds are relevant for determining their functional identity, how can the same

sounds be considered as different phonemes, and conversely, how can completely different sounds be considered as one and the same phoneme?

This problem, which arose as a result of deduction, can be called a conceptual problem. In 7.3.2 this conceptual problem was resolved as follows: an assumption was made that language sounds have a dual nature — physical and functional - and that the identity of concrete phonemes is logically independent of their physical properties. On the basis of this assumption, a dual classification was proposed: we must construct two types of classes: 1) classes of physically equivalent sounds and 2) classes of functionally equivalent sounds as concrete phonemes.

The solution to the above conceptual problem is a significant step towards a deeper understanding of phonological phenomena. It leads to a radically new phonological theory, which views language sounds from the angle of their dual nature. But the new phonological theory does not differ very much in its predictive power even from the most primitive phonological theories, which view the phoneme as a class of physically related sounds.

Why is this so? Because the function — the semiotic essence — of language sounds is disguised by their nearly permanent but extraneous properties. A nearly permanent property of functionally equivalent sounds is their physical equivalence. The coincidence of functional and physical equivalences of sounds suggests the notion of the phoneme as a class of physically related sounds. But linguists who espouse this notion of the phoneme do not see that the coincidence of the physical and functional equivalences is a phenomenon extraneous to the semiotic essence of sounds. They simply do not suspect the existence of the conceptual problem outlined above. True, our deductive thought experiment predicts the possibility of real situations in real languages, when the same sounds must be interpreted as different phonemes, and different sounds must be interpreted as variants of the same phoneme. This possibility is sometimes realized in concrete languages and is known in the current phonological literature under the name of *phonemic overlapping*. The linguists who think of the phoneme as a class of physically related sounds discard phonemic overlapping as a marginal phenomenon, because they do not see any serious problem in it.

To illustrate how extraneous but permanent, or quasi-permanent, features of an object can be confounded with its essential features, consider an example from zoology. For a long time zoology was dominated by the view that mammae were an essential property of any mammal. This view was based not on theoretical considerations but on the empirical fact that all known mammals have mammae. This view, well supported by empirical observation, broke down when platypuses — small duck-billed egg-laying animals — were dis-

covered in Australia. Platypuses are mammals that have no mammae. It became clear that, although almost all mammals have them, mammae are an accidental, rather than essential, property of mammals. The history of science abounds with vivid examples of when absolutely permanent properties of an object that cannot be separated from it by an experiment turn out to be extraneous to its essence and veil its essence from the eye of the mind.

The foregoing discussion leads to the following conclusions: 1) there are two types of linguistic problems: empirical linguistic problems and conceptual linguistic problems; 2) solving conceptual linguistic problems may lead to radically new very abstract linguistic theories; and 3) new linguistic theories do not necessarily have a stronger predictive power than the old theories; the predictive power of new theories may be the same or nearly the same.

In comparing and evaluating different linguistic theories, the current linguistic literature attaches a lot of importance to comparing their predictive powers. It seems that the significance of the predictive power of a grammatical theory is overstated. True, the evaluation of the predictive power of a new grammatical theory is important. Thus, in our example the duality theory of the phoneme has a stronger predictive power than the theory of the phoneme as a class of physically related sounds. The duality theory does predict the phenomenon of phonemic overlapping, while the theory of the phoneme as a class of physically related sounds does not. Still, what is crucial in evaluating the two theories is not their predictive power but their capacity for discovering and solving conceptual problems generated by the consequences logically following from the facts concerning basic semiotic properties of language sounds.

The fact that major scientific debates about theories have focused on conceptual matters rather than predictive powers of theories can be viewed as a methodological lapse and sign of methodological immaturity. Such was the view of the founding fathers of philosophy of science — Carnap (1962), Popper (1959), Kuhn (1962) — and other proponents of empiricist philosophies of science who imagined that choosing a scientific theory should be guided exclusively by empirical considerations. The younger generation of the philosophers of science sharply criticized this view. Thus, Laudan writes that philosophers of science holding the extreme empiricist view

— simply fail to come to terms with the role of conceptual problems in science, and accordingly find themselves too impoverished to explain or reconstruct much of the actual course of science. Such empiricist theories of science exhibit particularly awkward limitations in explaining those historical situations in which the empirical problem-solving abilities of competing theories have been virtually *equivalent*. Cases of this kind are far more common in science than people generally realize. The debates

between Copernican and Ptolemaic astronomers (1540-1600), between Newtonians and Cartesians (1720-1750), between wave and particle optics (1810-1850), between atomists and anti-atomists (1815 to about 1880) are all examples of important scientific controversies where the empirical support for rival theories was essentially the same. Positivist-inspired accounts of these historical encounters have shed very little light on these important cases: this is scarcely surprising since the positivist holds empirical support to be the only legitimate arbiter of theoretical belief. These controversies must, by the strict empiricist, be viewed as mere *querelles de mots*, hollow and irrational debates about issues which experience cannot settle.

A broader view concerning the nature of problem solving — one which recognizes the existence of conceptual problems — puts us in a position to understand and to describe the kind of intellectual interaction that can take place between defenders of theories which are equally supported by the data. Because the assessment of theories is a multi-factorial affair, parity with respect to one factor in no way precludes a rational choice based on disparities at other levels. (Laudan 1977: 47-48)

There is an attendant widely held fallacy that the ability to predict is a necessary consequence of having a good explanation, and that a better explanation must *ipse facto* predict better. But the well-known fact that both Ptolemaic and Copernican astronomies were able to predict correctly the same facts and similar examples from other sciences shows that we can make correct predictions without being able to understand.

Why can we make correct predictions without being able to understand? A reasonable answer to this question is given by Abraham Kaplan in his book *The Conduct of Inquiry*:

An explanation rests on a nomological or theoretical generalization, or on an intelligible pattern, but a prediction need not have such a basis. I am not speaking of guesses, even of those that rest on knowledge of which the guesser is unaware. A prediction, as distinct from a guess, is reasoned — a basis is put forward, some premise from which what is predicted is being inferred. The point is that the basis may be a merely empirical generalization. We may give a reason for making some specific prediction rather than another, but we may be able to give no reason other than past successes for expecting the prediction to come true. Analyses of voting behavior, for example, may have identified certain counties or states as barometers of the political weather, thereby allowing the computer to make early predictions; but making predictions from them is very different from having an explanation of the vote.

In short, explanations provide understandings, but we can predict

without being able to understand, and we can understand without necessarily being able to predict. (Kaplan 1964: 350)

There are different kinds of conceptual problems. The most important is when a theory T1, conflicts with another theory or doctrine T2. In our example, the statement that the same sounds can belong to different phonemes, and conversely, that different sounds can be variants of the same phoneme, is in conflict with the well-founded assumption of phonetics that the same sounds belong to the same class of sounds, and different sounds belong to different classes of sounds. This has generated tension — a conflict between doctrine T1 and doctrine T2. To resolve this conceptual problem, it became necessary to modify the phonological theory by introducing into it the Law of the Duality of Phonemes, which meant dual classification of sounds into classes of functionally equivalent and physically equivalent sounds.

Conceptual problems could arise from the unclarity, ambiguity or circularity of theoretical concepts. The increase of the conceptual clarity of a theory through a careful analysis of the meanings of its concepts is an important condition of the progress of any science and linguistics in particular.

A striking example of circularity in linguistics is Chomsky's explanation of his once central notion of deep structure. Chomsky explains deep structure through the notion of competence. But because we know nothing about competence, the notion of competence is supported only by the notion of deep structure. Therefore, an explanation of deep structure in terms of competence is entirely circular.

Another glaring example of circularity is Chomsky's *ad hoc* notion of psychological reality. Every *ad hoc* hypothesis creates circularity in explanation and that is why they are unacceptable. Chomsky needs the concept of 'psychological reality' to give independent evidence for the theoretical constructs of his Generative Transformational Grammar. Since we know no more about psychological reality than we know about the linguistic evidence for it, the notion of psychological reality cannot be used to give independent, psychological evidence for the validity of linguistic constructs. As a matter of fact, Chomsky uses the term psychological reality to license 'truth in the linguistic domain.' Therefore, the notion of psychological reality, as Chomsky understands it, is vacuous.

7.6 What must count as discovery in theoretical linguistics

When we engage in theoretical linguistics, it is vital to know what sorts of questions to ask about language. To know this, we must be clear about what counts as a discovery in theoretical linguistics.

It is commonly held that the progress of linguistic theories depends on accumulating large corpora of data for particular and especially exotic languages. Is this view valid? Can we expect that accumulating linguistic facts into large corpora will lead to new discoveries and serious progress in theoretical linguistics?

What must count as a discovery in theoretical linguistics? If someone claims to have discovered something in theoretical linguistics, what sort of demonstration is needed for us to agree that whereas that something was not previously known, it can now be regarded as known? Is it like a demonstration required for when an explorer discovers a new river, or a botanist discovers a new variety of flower, or an engineer discovers a way of building more powerful computers?

When a linguist discovers a completely new language, or a new dialect of a known language, or any new facts concerning the use of any language or its dialects, it is a discovery like a discovery of a new river or a new variety of a flower. At this level of discoveries linguistics can be compared with geography or botany. But the goal of the study of language is to discover its laws, like the goal of the study of living organisms is to discover the laws of life. At this level linguistics must be compared with biology rather than with geography or botany. The proper business of theoretical linguistics is not data accumulation but conceptual analysis — looking for new ways of regarding well-known phenomena.

Consider the sign. To many linguists the sign is an obvious, trivial, uninteresting thing. A sign is a sign, is a sign... Who will argue against the obvious that language relates sound and meaning? Every linguist recognizes this fact. However, to recognize and state the obvious is one thing, and to discover the unexpected implications of the obvious is another. To recognize that language relates sound and meaning is one thing, and to discover the crucial aspects of this relationship is another. The Principle of Differences is a discovery of this crucial relationship. Let's recall it:

PRINCIPLE OF DIFFERENCES

In language differences and identities between meanings and between signs are subject to the following conditions: 1) Only those meanings are different which correspond to different signs; and conversely, only those signs are different which correspond to different meanings. 2) If two dif-

ferent meanings correspond to one and the same sign and their differences are solely due to the contexts in which they occur, they are variants of one and the same meaning. And conversely, if two signs correspond to one and the same meaning, and their differences are solely due to the contexts in which they occur, they are variants of one and the same sign.

3) *If two meanings correspond to one sign, but freely alternate in identical contexts, they are different meanings.*

The Principle of Differences is the key to understanding the essence of language. It presents a new way of regarding the old, recognized by every linguist phenomenon that language relates sound and meaning. New viewpoints bring new inference techniques.

Why do we attach such a great significance to the Principle of Differences? To answer this question, we must examine how it enters linguistic explanation. As was shown above, the Principle of Differences together with the Principle of Superposition bring out the distinction between meaning-changing and information-changing contexts. Meaning-changing contexts are signs that change the meanings of linguistic units through the superposition of signs. Information-changing contexts add to or subtract from the meanings of linguistic units they act on without changing them. The distinction between meaning- and information-changing contexts in the analysis of meaning of linguistic units has a counterpart in phonology, where we must similarly distinguish *phoneme-changing* and *sound-changing* contexts. The general terms for meaning- and phoneme-changing contexts as opposed to information- and sound-changing contexts are *systemic* and *subsystemic contexts*.

The distinction of systemic and subsystemic contexts leads to a new technique of linguistic analysis. Using the new technique, we establish classes of meanings and classes of signs by researching how distinctions between meanings and distinctions between signs correlate with each other.

If we accept the Principle of Differences as a true characterization of linguistic reality, then we must accept that any linguistic inquiry incompatible with this law is an activity producing a distorted representation of linguistic reality. The generative enterprise fails to duly understand the semiotic nature of language and so distorts linguistic reality.

We see that the Principle of Differences implies a novel method of drawing linguistic inferences. A new way of regarding the widely acknowledged fact that language relates sound and meaning brings with it a fresh way of drawing inferences about linguistic phenomena.

Inference techniques are at the core of discovery. The important thing to notice is that the Principle of Differences is not a result of generalization from a wide variety of linguistic facts drawn from a wide variety of languages. Rather

it is a result of a conceptual analysis of a simple and widely recognized fact. Theoretical linguistics is not concerned with generalizations from the large amounts of data from a wide variety of languages. Nor is it concerned with hunting down the exotic data from exotic languages. The proper business of theoretical linguistics is conceptual analysis of common, well-established facts. Simple things harbor mysteries. Common and well-established facts lead the way to language universals. The art of theoretical inquiry is to see complexity in simplicity, and conversely, to see simplicity in complexity. It often turns out that things that seemed complex are really simple, and things that seemed simple are really complex.

I do not mean to imply that theoretical linguistics is ‘nothing but’ new ways of regarding well-known phenomena. It is not my intention to deny the value of cross-linguistic research and importance of problems raised by the discovery of new empirical data. On the contrary, any new hypothesis calls for a search for new facts as potential counterexamples to the hypothesis. However, the focus of theoretical inquiry into language universals must be on common, well-established facts.

7.7 The pitfalls of formal models of language

For the last half a century linguistic science was dominated by formalist linguistics, that is, by generative grammar and its many offshoots. True, there has been serious linguistic research outside formalist linguistics, but it has been largely marginalized by the mainstream. The influence of generative grammar has been so strong, that the notion of modern linguistics has become identified with the notion of formalist linguistics. It should be noted, however, that ‘formalist linguistics’ as practiced by generative grammar and related theories, merely involves imposing mathematical models on linguistic data presented at the same taxonomic level as in the works of Bloomfield, Harris, and other American structuralists. Generativist formalist linguistics has nothing in common with Saussure’s notion of linguistic form.

As formalist linguistics ran its course, it has become clear to most linguists that the idea of natural languages as a set of mathematically specifiable empirical objects is ill-conceived. By March 1981, speaking at the Royal Society in London, Chomsky himself acknowledged that in the light of his recent work,

... most of the results of mathematical linguistics, which in any event have been seriously misinterpreted, have become empirically virtually or completely empty. (Chomsky 1981: 233)

The crisis of formalist linguistics was colorfully described by Pullum (1991), whose testimony is especially valuable as he co-authored a major offshoot framework known as Generalized Phrase Structure Grammar (Gazdar et al. 1985).

According to Robert R. Stoll (1961), a formal theory must meet the following conditions:

(1) The concept “structural representation” must be effective. That is, the theory must have an algorithm for determining whether some arbitrary string, graph, or diagram counts as a structural representation in terms of the theory.

(2) The concepts of the rule, principle, law, constraint, or whatever must be effective. That is, the theory must have an algorithm for determining whether some arbitrary string, graph, or diagram is a rule, principle, law, constraint, or whatever in terms of the theory.

(3) The concept “generates” (or “admits,” or “licenses,” or “enumerates” or whatever) must be effective. That is, the theory must have an algorithm for determining whether some arbitrary structural representation is generated (or admitted, or licensed, etc.) by a given set of rules (or principles, etc.).

These conditions define the concept of a formal theory of grammar as understood by Chomsky in his *Syntactic Structures*, published in 1957. It is not difficult to understand why this program failed. Natural languages are tremendously complex: they contain regular and irregular facts mixed up. Regular facts are governed by the laws of grammar, whereas irregular facts are individual phenomena. Due to their tremendous complexity natural languages are mathematically intractable in terms of the requirements set by generativist. The later Chomsky rejected his earlier position. The rather late but now superseded Government and Binding syntax no longer met the criteria enumerated by Stoll. As Pullum puts it:

It [theory of government and binding] is set to develop into a gentle, vague, cuddly sort of linguistics that will sit very well with the opponents of generative grammar if they compromise just enough to learn a little easy descriptive vocabulary and some casually deployed and loosely understood labelled bracketing for which no one will be accountable. (Pullum 1991: 53)

Formalist linguistics is bankrupt. The cause of its bankruptcy is clear: the computational intractability of tremendously complex systems of natural languages. In the initial stages of mathematical linguistics, Chomsky and his followers did not anticipate the insurmountable difficulties they would face in de-

veloping mathematical theories and efficient algorithms. When these difficulties arose, the enterprise had to be quietly abandoned.

However, there are deeper considerations for saying that the generativist-style linguistics failed. Supposing one could construct a formal theory of grammar which would provide an efficient algorithm for sentence generation, would such a formal theory of grammar provide insights into the nature of human language?

Formalist linguistics suffers from much more serious shortcomings. One of them is that it confounds empirical necessity with logical necessity. Generative grammar aims at constructing a mathematically consistent system of formal rules. But mathematical consistency does not guarantee a correct description of reality. Suppose we could posit a consistent system of rules for deriving sentences from certain initial linguistic objects. Even if these rules worked, does it mean that they would present a reasonable model of the rules of a language we are describing? It certainly does not. From the fact that a mathematical design works, one cannot conclude that language works in a similar way.

Real rules of real languages are empirical dependencies between truly basic linguistic objects and structures derived from them. Under the laws of logic, true statements can follow as logical and necessary consequences from both true and false statements. To illustrate, suppose we construct a calculus in which we posit some false initial statements such as $2=5$, $3=7$, and so on. Suppose, further, that the calculus has the following derivation rule: If $X=Y$, then X can be substituted for Y , and Y can be substituted for X . By applying this rule we can derive true statements from the initial false statements, for example, $2=2$, $3=3$, $5=5$, $7=7$, and so on. The connection of logical necessity between these true statements and the false statements from which they are derived conflicts with the empirical necessity.

If a linguist wants to claim that his mathematical design is a model of the grammar of a real language, it is not enough for him to show that grammatically correct sentences can be derived by applying formal rules to certain initial objects. He also bears the burden of proving, by a careful analysis of linguistic data, that initial objects of his model reflect the essence of language. If he fails to do this, the arguments for the mathematical design are nothing but a trivial case of the *fallacy of affirming the consequent*.

The mistaken generativist notion that a language is a set of sentences, such that the principal goal of linguistics is to determine what are and what are not possible sentences in that language, has its roots in the mechanistic approach propounded by Bloomfield. As defined by the generativist program, language is a collection of linguistic data rather than an object of theoretical investigation. Had generative grammar succeeded, it would only have achieved the abil-

ity to generate linguistic data. But the ability to generate linguistic data is not a proof that we understand language.

The attitude of formalist linguistics with its mechanistic analysis of linguistic data and its quasi-mathematical garb shares much in common with the methodological doctrine known as *logical positivism*, or *logical empiricism*. On logical empiricism, a theory or hypothesis is developed as follows:

First, from the hypothesis under test, suitable other statements are inferred which describe certain directly observable phenomena that should hypothesize is true; then those inferred statements are tested directly, i.e., by checking whether the specified phenomena do in fact occur; finally, the proposed hypothesis is accepted in the light of outcomes of those tests. (Hempel 1965: 83)

This view holds that a hypothesis is to be tested exclusively by exploring the truth status of those empirically decidable statements about the data the hypothesis entails. Larry Laudan aptly calls this view *consequentialism*. Consequentialism judges a theory to be valid or not solely on the basis of whether or not it entails observational statements or their negations. The key evaluative concept of empiricism is the so-called empirical adequacy:

... a theory is empirically adequate exactly if what it says about the observable things and events in this world is true — exactly if it “saves the phenomena.” (Van Fraassen 1980: 12)

Consequentialism is essentially the fallacy of affirming the consequent. In linguistics, if we define a corpus of directly observable data and then succeed in constructing a formal model which entails the data that belong in this corpus, the resulting formal model will satisfy the requirement of empirical adequacy and so, on logical empiricism, must be accepted as a valid linguistic model. Yes, we have to agree that this would be a valid formal model. But what does this formal model solve? It does nothing but entail the directly observable data. What limits the usefulness of this formal model is not the inadequacy of mathematics or logic employed (this formal model may be very sophisticated from these standpoints), but rather the inadequacy of our knowledge of the subject matter purported to be modeled.

As understood by logical empiricists and Chomsky, the requirement of empirical adequacy imposes a premature closure of our ideas. We tinker with the formal model rather than explore the possibilities of conceptualization. We waste our time on barren formalism when we might be better occupied with the subject matter itself. The maturity of our ideas and our concepts is a matter of slow growth, which cannot be forced. The models of formal linguistics are meant to serve as a means for a better understanding of language. But what

happens is that the means usurps the significance of the end it was meant to serve: the formal model itself becomes the object of interest. This precludes the progress of linguistics.

Another example of a formalism, where formal machinery became more important than the subject matter to be modeled, is Generalized Categorial Grammar based on the associative Lambek calculus (Moortgat 1988, 1991). The associativity of categorial calculus means that a sentence can be bracketed in every possible way. Moortgat motivates the use of the associative Lambek calculus as follows:

The application analysis for *John loves Mary* is strongly equivalent to the conventional phrase-structure representation for a sequence subject-transitive verb-direct object, with the transitive verb and the direct object grouped into a VP constituent. Suppose now that we are not so much interested in constituent structure, as commonly understood, but rather in the notion of derivability, that is, in the question: Given a sequence of input types (viewed as sets of expressions), what type(s) can be derived from the concatenation of the input sentences? It will be clear that the *result* type S would also be derivable if the transitive verb had been assigned the type $NP \backslash (S / NP)$ instead of $(NP \backslash S) / NP$. (Moortgat 1991: 148)

As a mathematical model, the associative Lambek calculus is impeccable. But what does this sophisticated formalism offer to a linguist? It teaches us nothing about the constituent or dependency structure of the sentence. It is not clear how a linguist can use this calculus unless he or she enjoys tinkering with mathematical symbols, but one need not to be a linguist for that.

The motivation for postulating associativity as an essential property of the Lambek calculus has nothing to do with the theoretical goals of linguistics. Postulating associativity is motivated solely by the consideration of convenience: an associative calculus is much more convenient for parsing a string of words in a purely mechanical fashion. The trouble is that the sentences of a natural language have a non-associative structure. And if we want to reflect this fact in our model, we have no choice but construct a non-associative calculus. This may be a much more difficult task, but we must have the courage not to compromise the truth.

The crucial question about a mathematical model of language does not concern the intrinsic formal virtues of the model itself, but its usefulness in illuminating the understanding of language. In connection with the Lambek calculus, an old story about a drunk comes to mind. According to the story, on his way home, the drunk dropped his house key and went over to the nearest street light

to look for it. When asked why he was not looking for it where he had dropped it, the drunk replied, 'It's much brighter over here.'

7.8 Critique of Hjelmslev's notion of linguistic reality

To explain better the principles and concepts of Semiotic Linguistics and its research program, I must compare its notion of linguistic reality with the notion of linguistic reality of *glossematics*, a theory advanced by Louis Hjelmslev (1943/1961, 1954). The notion of linguistic reality in Semiotic Linguistics is directly opposed to the notion of linguistic reality in *glossematics*, which makes a comparison of both notions especially important. Our comparison will throw a new light on the most important aspects of Semiotic Linguistics.

The principles and concepts of both Semiotic Linguistics and *glossematics* are rooted in epistemology. It is important to understand that epistemology is not a uniform domain of philosophy of knowledge. It is a domain of conflicting views, principles, and concepts, and the choice of one or another epistemological perspective may be a decisive factor in determining the character of a trend in science.

Let us start with the epistemological perspective of *glossematics*. Here is Hjelmslev's contention characterizing his perspective:

The recognition of this fact, that a totality does not consist of things but of relationships, and that not substance but only its internal and external relationships have scientific existence, is not of course new in science, but may be new in linguistic science. The postulation of objects as something different from the terms of relationships is a superfluous axiom and consequently a metaphysical hypothesis from which linguistic science has to be freed. (Hjelmslev 1961: 23)

This is an important epistemological statement that has been decisive in determining Hjelmslev's research program.

Hjelmslev's claim is dead wrong. Although the view that "not substance but only its internal or external relationships have scientific existence" was popular in some quarters, actually this is a perverse view most scientists do not share. Nor did Saussure.

There are no such phenomena as relationships existing independent of things, except for relationships conceived as mathematical entities. But as we apply mathematics to reality, mathematical relations are no longer pure relations but relations between things. The existence of pure relationships is a myth. Relationships are connections between things and connections determine things. Things and relationships are one: things are members of relationships;

neither things can be separated from relations they contract with one another nor relations can be separated from things. By things we mean any entity: a table, a kangaroo, sky, love, atom, even imaginary entities like centaurs — yes, imaginary entities are also members of some relations. We understand things through relations they contract with one another and we understand relations through things that are members of relations. Relations define properties of things, but things define the properties of relations, as well. The same set of relations defining different things produces different entities.

Hjelmslev's adoption of the myth of the existence of pure relationships has drastically distorted his vision of linguistic reality. To see that neither relations nor things can be separated from each other, let us, for example, consider the concept of commodity in economics. A commodity, in the first place, is a thing that by its qualities satisfies human needs. Commodities stand in certain relations to human needs and these relations constitute properties of every commodity, in the first place. A set of the relations of a commodity to human needs is what classic English economists called *the worth of a commodity*. Now, we see clearly that the relation of a commodity to human needs is not something that exists independently of the commodity. Nor does the commodity exist independently of its relations to human needs — a commodity separated from its relations to human needs is something else than a commodity. We see that the commodity and its relations to human needs constitute a unity: the commodity is bonded to its relations to the human needs, which, in their turn, are bonded to the commodity.

The worth of a commodity is not the only set of relations constituting the properties of the commodity. There is another set of relations of a different nature constituting the properties of a commodity called *the value of a commodity* by classic English economists. The value of commodities is their equality with their exchange relations, which can be expressed by equalities such as:

$$(47) 2 \text{ books} = 1 \text{ pound coffee} = 5 \text{ pounds sugar}$$

We see that the value of a commodity is a set of quite different relations than the relations of commodities to human needs. Hence, we discover the dual nature of commodities as to the two sets of essential relations characterizing them: we distinguish between the relations characterizing the worth of a commodity and the relations characterizing the value of a commodity. Both sets of relations are bonded to the commodity and cannot be separated from it. Nor can the commodity be separated from its worth relations and value relations: without these relations a commodity is not a commodity at all.

It is important to notice that the dual nature of commodities leads to two totally different ways of the formation of the classes of commodities. Thus, turning to our example in (47), we see that 2 books, 1 pound of coffee, and 5 pounds of sugar belong to the same class of things as to their value. But these things belong to three different classes of things as to their worth.

We see that the dual nature of commodities is reflected in two quite different classes of commodities: worth classes of commodities and value classes of commodities.

There is a striking analogy between the formation of commodity classes and the formation of classes of sounds and classes of meanings in language: we distinguish worth classes of sounds and worth classes of meanings, on the one hand, and the value classes of sounds and value classes of meanings, on the other hand. It is paradoxical that although worth classes and value classes are rooted in the same thing — the sound or the meaning — these classes are heterogeneous.

Our analysis of commodity, and sound and meaning shows that things and relations are bonded to each other, so that relations can no more be separated from things, than things from relations.

Hjelmslev experiments with the separation of things from relations are instructive. As an example, consider his treatment of sounds. Sounds have a dual nature, which is reflected in the two ways of the formation of heterogeneous classes of sounds: worth classes of sounds and value classes of sounds. What is usually called ‘phoneme’ is a name for a value class of sounds. To separate the distinctive function of sound from its physical content, Hjelmslev replaced the concept of the phoneme with the concept of the *ceneme* (from the Greek *kenos* ‘empty’) and replaced phonology with a new discipline *cenematics*. *Glossematics* was the extension of *cenematics* to the domain of grammar and the lexicon. Both *cenematics* and *glossematics* were still-born, empty concepts that failed to define linguistic reality.

The source of Hjelmslev’s error is the confusion of the concept of the levels of reality with the concept of relationships. The object of a science is stratified into levels, and although the existence of the higher levels depends on the existence of the lower ones, the laws of a higher level are independent of the lower level. In this sense we may conceive of each lower level as substance for the higher level and each higher level as the form of the lower level. However, each level has its own relationships and things. Relations are not external to things, but with them constitute two aspects of the same phenomenon. From this perspective, thought is the substance of language and language is the form of thought, that is, a network of relationships independent of thought.

Chapter 8

The Word and Word Classes

8.1 Difficulties with defining the word

It is difficult to define what the word is, even though intuitively we feel that the word is a unit central to language. This sentiment was expressed by Saussure:

...the word, in spite being so difficult to define, is a unit that compels recognition by the mind. It has a central role in the linguistic mechanism.
(Saussure 1972: 109)

Some curious considerations on intuitive understanding of what word is are also offered in Makkai 2000.

What is the word? Is our intuition a reliable guide? Is the word really a unit central to language? Or has its significance been overrated? Does theoretical linguistics need this concept at all?

These questions are important. We need a clear answer to them. Theoretical work is the investigation of the relation of concepts to reality. There is no progress in a theoretical science without the increase in the clarity of its theoretical apparatus through a careful reanalysis of the meaning of its concepts. This process is called the *explication of concepts*. Let us hope that the careful clarification and specification of the meaning of the concept of the word and other linguistic concepts will be as important for theoretical linguistics, as this process has been for other theoretical sciences where important scientific revolutions, such as the emergence of the theory of special relativity, depended largely on the recognition and subsequent reduction of the conceptual ambiguity within particular theoretical domains.

Why is the word difficult to define? To see the difficulties, let us consider Bloomfield's classic definition of the word. Bloomfield (1933) based his definition of the word on the concept of the linguistic form, defined as follows: a

linguistic form is any phonetic form that has a meaning, where a phonetic form is one or any combination of phonemes. Bloomfield distinguished two kinds of linguistic form: a *bound form* and a *free form*. Forms such as *-ess* /es/ in *countess*, *lioness*, *duchess*, etc.; *-ish* in *boyish*, *childish*, and *greenish*; and *-s* /s/ in *hats*, *books*, and *cups*, are bound forms, because they can appear only as part of a larger form or larger sequence of morphemes. A free form that consists of two or more free forms is called a *phrase*. Thus, *poor John* or *John ran away* are phrases, because they can be divided into smaller free forms. Thus, *poor John* can be divided into *poor* and *John*; and *John ran away* can be divided into *John* and *ran away*; further *ran away* can be divided into *ran* and *away*. Bloomfield defines the word as a free form that cannot be divided into smaller free forms. The word is a minimal free form. Thus, in our example *John*, *ran*, and *away* are words because they are minimal free forms (Bloomfield 1933: 178).

Bloomfield's definition of the word runs into various difficulties. First, Bloomfield thinks of his definition as an explication of what modern linguists normally call the word. But this definition conflicts with the normal use of the term 'word.' For example, the pronoun *my* and the articles *a* and *the* are normally called words, but they cannot appear on their own.

Second, Bloomfield's definition disregards the essential hierarchy between minimal free forms. Thus, under his definition, prepositions and conjunctions are considered words. Yet they function like morphemes, that is, as bound forms.

Third, it follows from Bloomfield's definition that *table* and *tables* are different words rather than two forms of the same word. By the same token, he considers *do*, *does*, *did*, and *done* as four different words rather than four forms of the same word. Like many other modern linguists, Bloomfield condemns making an abstract notion of the word:

In our school tradition we sometimes speak of forms like *book*, *books*, or *do*, *does*, *did*, *done* as 'different forms of the same word.' Of course, this is inaccurate, since there are differences of form and meaning between the terms of these sets: the forms just cited are different linguistic forms, and, accordingly, different words. (Bloomfield 1933: 178)

Bloomfield speaks disparagingly about the school tradition, yet it reflects speakers' intuition about linguistic phenomena. Bloomfield insists that the definition of the word must be based on the distinction between items of linguistic data. There is no question that the linguist must base his investigation on linguistic data, but linguistic data do not necessarily determine the object of investigation. What an object is at the level of data is not necessarily what it is at the level of scientific theory. Science relies on data, but it goes beyond data

to get insights into the essence of things. The traditional notion of the word needs more scrutiny. Rather than reject this notion, we must see whether by careful analysis we can discover a satisfactory explication for it.

8.2 Defining the word

8.2.1 *Word defined*

The above and other difficulties, discussed by Martinet (1965), have prompted some linguists to give up the word as a theoretical concept and base their research on the morpheme as a primitive concept, instead. For instance, Martinet (1985) rejected the concept of the word and took the primitive concept of the moneme (the concept essentially identical with the morpheme) as central to his grammatical theory.

In spite of the difficulties with defining it, the word is a fruitful concept, which must be recognized as central to grammatical theory. In order to resolve the difficulties and reveal the power of the concept of the word, I propose the following definition of the word, which does not depend on the notion of the morpheme and characterizes the word as a syntactic entity:

[D30] **WORD**

Word is a minimal discrete sign that serves as a component of a sentence.

By 'minimal' we mean that the word is the smallest sign that completely satisfies the discreteness condition. For instance, in the word *unrepeatable*, we can isolate its components *repeat* or *repeatable*, which meet the conditions of discreteness, but as neither *un-* nor *-able* meet these conditions, we are compelled to leave *unrepeatable* as an integral discrete whole.

8.2.2 *Lexeme*

If we consider all inflectional forms of the word, that is, its syntactic and paradigmatic functions, then we come up with the concept of the *lexeme*. Let us look at some examples. *Run*, *runs*, *ran*, *run*, and *running* are different forms of the lexeme RUN, because they signify different syntactic functions, and RUN is invariant of changes in its syntactic and paradigmatic functions and forms. (I use capitals for lexemes; RUN means that it is the lexeme RUN, that is, a class of different forms of the word *run*.) On the other hand, *runner* and *runners* are forms of another lexeme RUNNER rather than forms of the lexeme RUN, because RUN and RUNNER have different meanings. Since RUNNER is derived from RUN, these different lexemes are related derivationally. *Book* and *books* are different forms of the lexeme BOOK, whose lexical meaning is invariant of these forms

signifying its different paradigmatic functions. The Russian lexeme KNIGA ‘book’ has the following case forms: *kniga* (nominative singular), *knigi* (genitive singular), *knige* (dative singular), *knigu* (accusative singular), *knigoj* (instrumental singular), *knige* (prepositional singular), *knigi* (nominative plural), *knig* (genitive plural), *knigam* (dative plural), *knigi* (accusative:plural), *knigami* (instrumental plural), and *knigax* (prepositional plural). The different forms of the Russian lexeme KNIGA indicate different syntactic functions of this word.

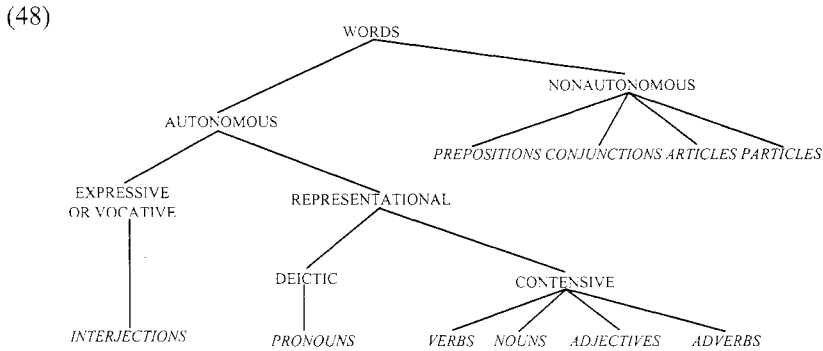
8.2.3 *Autonomous and non-autonomous words*

Words are classified into *autonomous* and *non-autonomous* words. Autonomous words are classified into words having a *representational* function — like verbs, nouns, adjectives, adverbs, and pronouns — and words having an *expressive* or *vocative* function — interjections such as *oh*, *wow*, *hey*, etc. Autonomous words with a representational function are classified into words having a *contensive* function (verbs, nouns, adjectives, and adverbs) and words having a *deictic* function (pronouns). The contensive function is the direct representation of elements of reality, whereas the deictic function is pointing out these elements. The term ‘contensive’ was coined by Curry, who intended it as a translation for the German word *inhaltlich* ‘contentual’ and meant to use it in contradistinction of ‘formal.’

I take the expression ‘parts of speech’ as a convenient technical term, in addition to ‘contensive autonomous word,’ to cover the four classes of words — namely, nouns, verbs, adjectives, adverbs — to distinguish them from all of the other classes of words.

Non-autonomous words include prepositions, conjunctions, articles, and particles. Hierarchically, non-autonomous words occupy an intermediate place between autonomous words and morphemes: they function like morphemes, but are discrete like autonomous words.

The following tree diagram summarizes our word classification:



Discreteness is the characteristic feature of both autonomous and non-autonomous words. All words are *syntactic atoms* that combine to form sentences. This is why words are units central to language.

8.2.4 Independent and dependent contensive autonomous words

According to the way they function in a sentence, contensive autonomous words divide into independent and dependent ones. An *independent contensive autonomous word* indicates its syntactic relations to other words in a sentence either by its lexical content or by syntactic morphemes it contains. *Dependent contensive autonomous words*, on the other hand, do not carry any indicators as to their function in the sentence, say, *house* or *sky*. A dependent contensive autonomous word does not contain syntactic morphemes, nor does its lexical content indicate its syntactic function. To function in a sentence, a dependent word needs a support from a preposition or a particle; or its syntactic relations to other sentence words may be indicated by the position it occupies in the sentence. The English word *today* is an example of an independent word that indicates its syntactic function by its lexical content; and the English word *John's* is an example of an independent word which indicates its syntactic function by the syntactic morpheme *-s*. This is an exceptional morphological form in English. Regular morphological markers of the syntactic functions of words are found in languages with rich morphology, such as Latin or Russian.

Simple dependent contensive autonomous words, like *cat*, *wolf*, *walk*, *swim*, etc, look like lexical morphemes, but they are words, not morphemes, owing to their ability to function as parts of a sentence while morphemes do not have this ability.

8.2.5 *Modifiers and relators*

In accordance with the typology of signs presented in 5.10.1, I distinguish two classes of non-autonomous words: 1) *modifiers*: words such as articles *the* or *a*, that modify the content of autonomous words, and 2) *relators*: words such as *with* or *for* that are meant to indicate syntactic functions of autonomous words.

8.2.6 *Functional definition of the word*

The proposed definition of the word is an explication of the traditional notion of the word: that is, it clarifies, specifies, and makes precise the content of this notion. Since this definition of the word is based on the notion of its syntactic function, I call it a *functional definition of the word*. Our definition accomplishes the following:

- 1) We establish the essential hierarchy by drawing a distinction between autonomous words which have representational or expressive functions, and non-autonomous words, whose functions are identical with the functions of inflectional morphemes.
- 2) We define the contensive autonomous word as an abstract unit with all its syntactic and paradigmatic functions expressed by its different forms. For example, *walk*, *walks*, *walking*, and *walked* are not four different words but four different forms of one lexeme, WALK.
- 3) We provide an independent characterization of the word in terms of its syntactic relations regardless of whether or not they have morphological markers.
- 4) Since the word is a discrete entity defined independently of the notion of the morpheme, it is the central unit of language. Morphemes are not sequentially organized primitive units, forming the word, but are properties of the word and are subordinate to it.

8.3 Word and morpheme

To fully understand that the word is the central unit of language, we need to clarify all aspects of its relation to the morpheme.

A *morpheme* is a part of a word. But a word may coincide with its constituent morpheme, as in the words *dog* or *work*. When this happens, we still must distinguish between the morpheme and the word: the word *dog* is a minimal unit of any sentence it appears in, while the morpheme *dog-* is only part of the word *dog*. Saying that the morpheme *dog-* is part the word *dog* is another way

of saying that the word *dog* is part of itself, since we assume that every word must consist of morphemes.

The assumption of simple single-morpheme words is an extrapolation from the fact that English has words consisting of morphemes, like the word *rebuilding*, which consists of three morphemes *re-*, *build-*, and *-ing*. This extrapolation makes sense even for isolating languages like Chinese, where in spite of the fact that the majority of words coincide with their single constituent morphemes, some words do consist of more than one morpheme. The extrapolation makes sense because words and morphemes belong to different levels of language: words are minimal components of a sentence while morphemes are minimal components of a word. If, however, we imagine a hypothetical language consisting only of simple words, not further divisible into smaller parts, we must recognize that such language has no morphemes. It would only have words and sentences. Although isolating languages come close to the hypothetical morpheme-free language, they still have morphemes.

8.4 Theory of word classes

8.4.1 *Difficulties with the word classification*

Given that every language abounds in the classification-challenging facts, some linguists are skeptical as to whether we can have a coherent notion of word classes. They question whether the traditional notion of parts of speech corresponds to anything real in language. These concerns were raised by Sapir:

The observant reader has probably been surprised that all this time we have had so little to say of the time-honored “parts of speech.” The reason for this is not far to seek. Our conventional classification of words into parts of speech is only a vague, wavering approximation to a consistently worked out inventory of experience. We imagine, to begin with, that all “verbs” are inherently concerned with action as such, that a “noun” is the name of some definite object or personality that can be pictured by the mind, that all qualities are necessarily expressed by a definite group of words to which we may appropriately apply the term “adjective.” As soon as we test our vocabulary, we discover that the parts of speech are far from corresponding to so simple an analysis of reality. We say “it is red” and define “red” as a quality-word or adjective. We should consider it strange to think of an equivalent of “is red” in which the whole predication (adjective and verb of being) is conceived of as a verb in precisely the same way in which we think of “extends” or “lies” or “sleeps” as a verb. Yet as soon as we give the “durative” notion of being red an inceptive or transitional turn, we can avoid the parallel form “it

becomes red, it turns red” and say “it reddens.” No one denies that “reddens” is as good a verb as “sleeps” or even “walks.” Yet “it is red” is related to “it reddens” very much as is “he stands” to “he stands up” or “he rises.” It is merely a matter of English or of general Indo-European idiom that we cannot say “it reds” in the sense of “it is red.” There are hundreds of languages that can. Indeed there are many that can express what we should call an adjective only by making a participle out of a verb. “Red” in such languages is merely a derivative “being red,” as our “sleeping” or “walking” are derivatives of primary verbs.

Just as we can verbify the idea of a quality in such cases as “reddens,” so we can represent a quality or an action to ourselves as a thing. We speak of “the height of a building” or “the fall of an apple” quite as though these ideas were parallel to “the roof of a building” or “the skin of an apple,” forgetting that the nouns (*height, fall*) have not ceased to indicate a quality and an act when we have made them speak with the accent of mere objects. And just as there are languages that make verbs of the great mass of adjectives, so there are others that make nouns of them. In Chinook, as we have seen, “the big table” is “the-table its-bigness”; in Tibetan the same idea may be expressed by “the table of bigness,” very much as we may say “a man of wealth” instead of “a rich man.” (Sapir 1921: 116-118)

Sapir does not stop at the semantic equivalence of the major parts of speech. He goes on to give examples showing that what is represented by prepositions in English may equally well be represented by nouns in other languages, so that the English *He came to the house* may be expressed as *He reached the house-locality*, etc., etc. Having presented all these examples, Sapir concludes:

The upshot of such an examination would be to feel convinced that the “part of speech” reflects not so much our intuitive analysis of reality as our ability to compose that reality into a variety of formal patterns. A part of speech outside of the limitations of syntactic form is but a will o’ the wisp. For this reason no logical scheme of the parts of speech—their number, nature, and necessary confines—is of the slightest interest to the linguist. Each language has its own scheme. Everything depends on the formal demarcations which it recognizes. (Sapir 1921: 118-119)

The facts and ideas presented in this long passage from Sapir’s *Language* deserve a careful scrutiny. Sapir’s claims may be summarized as follows: 1) in combinations of a lexical meaning (object, quality, action, etc.) and a formal pattern, the two are independent from each other; 2) since lexical meanings are independent from formal patterns, there are no objective formal criteria for categorizing lexical meanings into formal lexical classes; 3) the formal patterns that lexical meanings combine with are syntactic formal patterns, which can be

classified with respect to their syntactic functions (subject, predicate, etc.); 4) each language has its own scheme of formal demarcation.

If my summary of Sapir's claims is correct, then Sapir's rejection of the reality of parts of speech follows from his claim that lexical meanings and formal syntactic patterns are independent from each other. Because in order to divide lexical meanings into different formal classes, we must establish that every class of meanings combines with a certain formal pattern. But this is impossible if lexical meanings and formal syntactic patterns are completely independent from each other.

The facts adduced by Sapir and hundreds of other facts we can find in linguistic literature seem to support Sapir's claim that lexical meanings and the formal syntactic patterns that lexical meanings combine with are independent from each other. Yet, there appears to be something wrong with this claim. Since we think of language as a system of dependencies, it is difficult to accept the idea that lexical meanings are completely independent from the formal patterns in which they occur. The clue to debunking Sapir's claim must lie in discovering dependencies between lexical meanings and the formal patterns in which they occur.

8.4.2 *Law of Contensive Autonomous Word Classes*

Does the fact that a given lexical meaning can combine with any formal syntactic pattern mean that all formal syntactic patterns are equally essential for the formal characterization of the lexical meaning? For example, does the fact that *red* also occurs in *is red*, *reddens*, and *redness* mean that all these formal patterns are equally essential for the formal characterization of *red* as belonging to the lexical class of adjectives, that is, to the lexical class of words denoting quality? The answer to these questions is no. We must distinguish the primary and secondary syntactic functions of a word. Only the primary syntactic function of a word is essential for its formal characterization.

What are objective formal criteria for a distinction between primary and secondary syntactic functions of a word? The answer to this question is formulated by the Law of Contensive Autonomous Word Classes:

[D31] **LAW OF CONTENSIVE AUTONOMOUS WORD CLASSES**

Every contensive autonomous word class is defined by its paradigmatic meaning and its primary syntactic function as follows:

- 1) *NOUN: SUBJECT,*
- 2) *ADJECTIVE: ATTRIBUTE,*
- 3) *VERB: PREDICATE,*
- 4) *ADVERB: ADVERBIAL*

The primary syntactic function of the words of a given word class may be a secondary syntactic function of the words of another class.

To illustrate, consider the noun *gold* in the following phrases:

- (49) a. Gold is yellow.
b. a gold watch

In (49a) the noun *gold* functions as a subject and in (49b) it functions as attribute of a noun. Now consider the adjective *brave* in the phrases:

- (50) a. a brave man
b. The brave do not flinch in the face of danger.

In (50a) the adjective *brave* functions as an attribute of a term and in (50b) it functions as a subject. Nouns and adjectives seem to behave in a similar way: in some contexts they play the role of a subject, and in others, the role of an attribute of a noun. If we classify nouns and adjectives as polysemous, then we must accept that their polysemy is identical, and that nouns and adjectives are identical at the level of their functions in the sentence.

An analysis of the syntactic behavior of the four classes of contentive autonomous words shows that their syntactic behavior seems to be identical. If we classify contentive autonomous words as polysemous, then nouns, adjectives, verbs, and adverbs belong in the same class with respect to their syntactic behavior. This model of the ambiguity of lexical classes conflicts with the generally accepted notion of lexical classes as morphologically and syntactically distinct entities. In search of a plausible explanation, we arrive at a hypothesis of the hierarchy of syntactic functions assigned to each lexical class. This hierarchy is explained by the Principle of Superposition. Under the Principle of Superposition, the revised assignment of the syntactic functions in (49) and (50):

- (51) a. *gold* : proper syntactic function 'subject'
b. *gold* : secondary syntactic function 'attribute of a term'

- (52) a. *brave* : proper syntactic function 'attribute of a term'
b. *brave* : secondary syntactic function 'subject'

By comparing (51) and (52), we see that the differences between word classes are characterized by different hierarchies of primary and secondary functions of words. In our case, what is the difference between the noun and the adjective? While they may have same syntactic functions, what is crucial for determining the difference between the noun and the adjective is the hierar-

chy of their primary and secondary functions: the primary function of the noun is the secondary function of the adjective, and conversely, the primary function of the adjective is the secondary function of the noun.

Our analysis reveals the opposition between the noun and the adjective: the primary function of the noun is the secondary function of the adjective, and conversely, the primary function of the adjective is the secondary function of the noun. A word with a secondary syntactic function on top of its primary syntactic function displays duality: it takes on the properties of the secondary syntactic function on top of its primary syntactic function, but retains at least part of the properties of its primary syntactic function. No syntactic classes of words can be established without recognizing the hierarchy of primary and secondary syntactic functions of words.

8.4.3 *Principal phoneme classes*

As is briefly noted in 6.3.5, the distinction of primary and secondary syntactic functions is valid for phonology, as well. Using the term ‘syntax’ in the widest sense as a theory of combinations, we have to distinguish between primary and secondary functions of phonemes. Just as in the communicative plane of language we use hierarchies of syntactic functions to establish the word classes, so in the phonemic plane we use them to establish the classes of phonemes — namely, the vowel and the consonant classes.

A vowel constitutes the center, or the nucleus, of a syllable, while consonants occupy marginal positions — consonants are satellites of vowels. This phonological definition of vowels and consonants contrasts with the phonetic definition of vowels as sounds characterized by voice modified by various shapes of the oral cavity, and consonants as sounds produced by the closure of air passages.

The proposed phonological definition of vowels and consonants is not generally accepted in the current phonological literature. While some linguists recognize that in many cases the roles played by phonemes in the syllable may serve as a useful basis for the functional distinction between vowels and consonants, they deny that phonemic functioning in the syllable can be used for a universal phonological definition of vowels and consonants. For example, Martinet admits the expediency of the vowel-consonant distinction:

What is expected of consonants and vowels is not that they should appear in the same contexts, that is, that they should be in opposition, but that they should follow one another in the chain of speech; in other words we expect them to be in contrast. (Martinet 1960: 72)

But at the same time he makes the following reservation:

This does not mean that certain sounds cannot, according to this context, function as the syllabic peak, which is normal for a vowel, or as the flanking unit of this peak, which is normal for a consonant. [ɪ] in many languages is a syllabic peak before a consonant and the adjunct of such a peak before a vowel: e.g. French *vite* and *viens*. [ɪ] is a syllabic peak, i.e. a vowel, in the English *battle* or Czech *vlk* 'wolf,' but a consonant in English *lake* or Czech *leto* 'year.' In these circumstances there is no point in distinguishing two phonemes, one vocalic and the other consonantal. (Martinet 1960: 72-73)

The fact that consonants can sometimes be used as syllabic nuclei and vowels as satellites of syllabic nuclei seems to supply evidence that the phonological definition of vowels and consonants based on their function in the syllable does not hold universally. And yet, if correctly interpreted and understood, it does not undermine the universal validity of this definition. It is true that one and the same phoneme may function sometimes as a syllable nucleus and sometimes as a nonsyllabic phoneme in the same language. But we must distinguish between the primary and secondary functions of a phoneme. Thus, the primary function of the vowel is to serve as a syllable nucleus and its secondary function is to serve as a syllable margin. Conversely, the primary function of the consonant is to serve as a satellite of a syllable nucleus and its secondary function is to serve as a syllable nucleus.

The distinction between primary and secondary functions of vowels and consonants is based on their occurrence ranges. The occurrence range of vowels and consonants is their distribution in a syllable. If the occurrence range of a phoneme is greater when it serves as a syllable nucleus than when it serves as a syllable satellite, then the primary function of the phoneme is to be a syllable nucleus and its secondary function is to be a syllable margin. Conversely, if the occurrence range of a phoneme is greater when it serves as a syllable satellite than when it serves as a syllable nucleus, then the primary function of the phoneme is to be a satellite and its secondary function is to be a syllable nucleus.

It is to be noted that the notion of the occurrence range of the phoneme has nothing to do with the notion of statistical frequency. The range of a phoneme is defined solely by its distributional possibilities. For example, the Czech /r/ and /l/ occur as satellites anywhere in the onset and anywhere in the coda, while as syllable nuclei they occur only between non-zero onsets and non-zero codas. Therefore, their primary function is to be satellites and their secondary function is to be syllable nuclei. The French /r/ occurs as syllable nucleus between a non-zero onset and non-zero coda, between zero onset and non-zero coda, between non-zero onset and zero coda, and between a zero onset and zero coda; as a satellite, on the other hand, /r/ occurs only in the onset-final po-

sition. Therefore, the primary function of the French /i/ is to be a syllable nucleus and its secondary function is to be a syllable margin.

8.5 Word and its syntactic field

The content of every sign depends on its syntactic field (3.1.3, 6.7). Signs do not have inherent characteristics independent of their syntactic function. The syntactic functions of a sign defined by its syntactic field precede all other characteristics of the sign.

The concept of the syntactic field obviates the widely held view that word classes have certain intrinsic properties apart from their syntactic function. On the syntactic field view, a word class is defined by the primary and secondary syntactic functions of the words belonging to this class. A word class is a bundle of the primary and secondary syntactic functions of the words belonging to this class.

Mutatis mutandis, the concept of the syntactic field is analogous to the term 'field' in physics. Just as in physics there is no principled difference between matter and energy, so in linguistics we have to recognize that there is no principled difference between sign and function. As in physics we have the dualistic concept of matter-energy, so in linguistics we have to recognize the dualistic concept of *sign-function*. As in physics matter is identical to a high concentration of field energy, so in linguistics word classes are identical to the unions of syntactic functions.

We see that differences between signs are characterized by different hierarchies of the primary and secondary syntactic functions of signs. Referring to our examples in (49) and (50) (and (51) and (52)), nouns differ from adjectives not in that they necessarily have different syntactic functions, but in that nouns and adjectives are characterized by different hierarchies of primary and secondary functions: the primary function of the noun is the secondary function of the adjective, and conversely, the primary function of the adjective is the secondary function of the noun.

The Principle of Superposition explains Sapir's *red*-based examples. The base form *red* is an adjective, with the primary adjectival syntactic function. The derived noun *redness* is the secondary function of the basic form *red*. Similarly, verbal derivations *is red* and *reddens* are the secondary syntactic functions of *red*.

Sapir rejected the notion of word classes because he did not see that the different syntactic functions of a linguistic sign constitute a hierarchy; he did not see that each word class is characterized by the primary syntactic function and

a number of secondary syntactic functions of words that belong in this class. How can we explain Sapir's failure to arrive at a satisfactory solution concerning word classes? The view that word classes are arbitrary notions with no or little connection to linguistic reality stems from a kind of descriptive test whereby one classifies various grammatical properties of words as 'noun properties,' 'verb properties,' etc., and then proceeds to see whether different words can be assigned this or that set of properties. This type of descriptive test led Sapir to the conclusion that each part of speech had the properties of every other part of speech so that objective linguistic criteria for the distinction of parts of speech could not be found. Sapir arrived at his conclusion because he lacked the objective criterion for the reality of word classes. This objective criterion is provided by the notion of superposition.

8.6 Principle of Maximal Distinction

The distinction between the syntactic function of contensive autonomous words, no matter whether basic or functionally derived, is founded on the Principle of Maximal Distinction, which determines the syntactic functions of the signs of language:

[D32] PRINCIPLE OF MAXIMAL DISTINCTION

The syntactic function of a sign is determined by the context where this sign is maximally distinct from related signs.

For example, the syntactic function of a contensive autonomous word — that is, of noun, verb, adjective, or adverb — is determined as follows: primarily, a sentence consists of a noun (or its deictic substitute, a pronoun) plus a finite verb form. The maximal distinction between a noun and a verb is given in the context NOUN + FINITE VERB. In this context, the noun (or pronoun) functions unequivocally as subject and the verb as predicate. On the other hand, the maximal distinction between a noun and an adjective and between a verb and an adverb is given in contexts ADJECTIVE + NOUN and ADVERB + FINITE VERB, respectively. In these contexts, the adjective functions unequivocally as an attribute of a noun and the adverb as an attribute of a verb.

8.7 Opposition of independent and dependent words as basis for language typology

The opposition of dependent and independent contentive autonomous words (8.2.4) points to a revision of the foundations of language typology.

On the traditional language typology, all the languages of the world divide into isolating, agglutinative, inflectional, and incorporating ones. A seminal attempt to provide a justified language typology was made by Sapir, who proposed a classification of languages based on the character of concepts they express. Still, Sapir retained the traditional classification of languages as part of his new language typology.

In accordance with the traditional approach, Sapir viewed isolation as a morphological concept of the same order as agglutination, inflection, and incorporation. The opposition between independent and dependent contentive autonomous words points a way towards revising the view, on which isolation is seen as a largely morphological phenomenon. It seems promising to reinterpret isolation as a syntactic concept, and accordingly to treat the opposition between the independent and dependent words as the opposition between syntactic non-isolation and isolation underlying the major syntactic division of the world languages into non-isolating and isolating. In support of our approach we may point out that the phenomena of isolation and non-isolation are quite independent of morphological concepts. Thus, regardless of whether a given language is isolating or not, it may at same time use agglutination, inflection, or incorporation. The opposition of isolating and non-isolating languages forms the fundamental, purely syntactic level of language typology, while the opposition of agglutination, inflection, and incorporation is a morphological, second level that builds on the fundamental level of the syntactic opposition of isolation and non-isolation. The syntactic opposition of isolating and non-isolating languages is of much deeper significance for understanding the nature of language than the morphological division of languages into agglutinative, inflectional, and incorporating ones. We obtain the two-level stratification of language typology into the fundamental level of the opposition of languages into isolating and non-isolating ones, and the second independent morphological level of the classification of languages into agglutinative, inflectional, and incorporating ones.

The two-level stratification of language typology and the hierarchy of syntactic functions of the word provide a basis for the question: How, in different languages of the world, are secondary syntactic functions of linguistic signs of a given word class derived from their primary syntactic functions? The answer to this question must contain: 1) a description of forms corresponding to pri-

mary syntactic functions of the word and 2) a description of formal processes, internal or external to the word, that assign secondary syntactic functions to it. The essential difference between languages of the world must be in the degree of independence of the word from the external markers of its secondary syntactic functions. Exploring this phenomenon across different languages, we find languages with overt morphological markers of secondary syntactic functions, like Latin or Russian, at one pole, and languages with covert markers, like Chinese or Vietnamese, at the other. (For further discussion see 5.10, 5.10.3.)

8.8 Problems with the notion of word classes in contemporary linguistics

Unaware that the fundamental properties of the word are characterized by its syntactic field, contemporary linguists concerned with language typology run into problems similar to the ones Sapir encountered when he considered the question of dividing words into word classes. There are two mainstream approaches to solving these difficulties.

The first approach may be called *lumping*. Lumping is the denial of distinction between word classes. Thus, we find claims of an alleged absence of the distinction between adjectives and verbs. Words denoting qualities are described as stative verbs. Some languages, among them Nootkan, Salishan (Kuipers 1968; Kinkade 1983), and Iroquoian (Sasse 1988, 1991), or Philippine and Polynesian languages, are said to lack the distinction between nouns and verbs. Tongan is said to have one class NOUN/VERB/ADJECTIVE (Hengeveld 1992: 66). Linguists come to lump word classes because they fail to distinguish between the primary and secondary syntactic functions of words. The distinction between the primary and secondary functions is a pillar of any adequate theory of word classes and of any adequate theory of language. The linguists who deny the distinction between word classes betray their inadequate functional approach to language. They correctly recognize the difference between syntactic functions of words and the fact that almost every word of one word class can have the same syntactic functions as another word of a different word class. All words coincide in their capacity to be used in every syntactic function. What these linguists miss is the hierarchy of the functional capacities of words. True, every word can be used in the syntactic function of every other word, and from this perspective we cannot establish word classes. We come up with the distinction of word classes when we distinguish between primary and secondary syntactic functions of words. What is the primary syntactic function for nouns is the secondary syntactic function for adjectives, verbs, and adverbs;

what is the primary syntactic function for verbs is the secondary syntactic function for nouns, adjectives, and adverbs; and so on. This has been stated in the Law of Contensive Autonomous Word Classes (8.4.2).

As an example of lumping, we could look at the work of Apresjan. Apresjan claims that the main characteristic of the meanings of structural classes is that they lack semantic invariants. Thus, discussing the meanings of the structural classes of present, past and future, he says that in Russian any of these structural classes can be used in the meaning of another class: present can be used in the meaning of past and future, past can be used in the meaning of present and future, and future can be used in the meaning of past and present. He cites examples in support of his claim (Apresjan 1995-II: 32-33).

It is true that any tense in Russian can be used in the meaning of another tense. Similar examples can also be found in other languages. Generally, all related structural classes can be used so that one class can have the meaning of other classes. For example, we have analyzed examples of nouns used in the meaning of adjectives and adjectives used in the meaning of nouns ((49) and (50) in 8.4.2; (60) in 9.6). But this is a logical analysis of meaning. From the logical point of view there is no difference between the meanings of parts of speech. What is important from a linguistic point of view is the articulation of the meaning of linguistic units into primary and secondary meanings. And the primary meaning of a linguistic unit is invariant of its superpositions with secondary meanings.

In the case of Apresjan's examples, we can claim that the primary meaning of the structural class of present is the present tense, with the past tense and future being its secondary meanings. And the present tense is the invariant of the structural class of present and the superposition of present with past or future. Similar considerations apply to the structural classes of past and future. The past tense is the invariant of the structural class of past and its superpositions with present and future. The future tense is the invariant of the structural class of future and its superpositions with present and past.

An approach opposite to lumping is *splitting*, based on distributional analysis. The empirical facts supported by distributional analysis seem to favor the splitters. Yet they face their own problem: distribution does not offer clear guidelines as to when the splitting has to stop.

We conclude that to establish adequate word classes in any language one must be acquainted with the concept of the syntactic field defining the hierarchy of primary and secondary syntactic functions. Being unaware of the concept of the syntactic field, contemporary linguists have not made any progress over Sapir in understanding the nature of word classes.

Chapter 9

Syntax as the Theory of Word Combinations

9.1 Word combination as a linguistic gestalt

The centrality of the word in language calls for a redefinition of the goals of syntactic theory and this is of utmost importance for the progress of theoretical linguistics. All influential contemporary syntactic theories base their linguistic analysis on the sentence, which is taken over from logic. It is wrong to base linguistic analysis on the sentence as the basic unit of language. True, language has many aspects, but what is relevant for a psychologist, sociologist, or logician, is irrelevant for the linguist. The linguist must study language as a system of signs, and hence the functioning of signs is the only thing of concern to the linguist. Is the sentence a sign? No, it is not. The sentence is a combination of signs, without itself being a sign proper because the sentence does not have a field.

The fundamental signs of language are words. Words are syntactic atoms from which larger units are constructed. The sentence is a privileged combination of words. Yet it is only one of the possible combinations of words. The Law of Contensive Autonomous Word Classes (8.4.2) defines word classes through their primary syntactic function in the sentence. In turn, primary syntactic functions must be defined not in logical terms but in specifically linguistic terms. Syntactic theory must become a theory of word combinations.

I distinguish two main kinds of word combinations: 1) the sentence, 2) the member of a sentence, which is any meaningful word combination inside the sentence. I use the term 'combination' in the sense of 'gestalt' — a whole thing that is different from its parts and has qualities that are not present in any of its parts. The concept of gestalt, first introduced in *gestalt psychology* (Koffka

1935, Köhler 1947), must become as fruitful in linguistics as it is in psychology.

The word combination is a gestalt of language: the structural meaning of a word cannot be deduced from the word taken in isolation. The structural meaning of a word can be defined only in terms of its linkage with other words forming a combination with it. The definition of the meaning of words in terms of their linking abilities is deducible from the properties of the word combination as a gestalt.

Before proceeding any further, it must be noted that the notion of word combination is independent of the morphological structure of the words.

9.2 The structure of the word combination

9.2.1 Complete and incomplete word combinations

Let us turn to the fundamental problem of syntax: How do words form word combinations? To formulate the Word Combination Law, we need a general term covering both the word and word combination. It is convenient to generalize the notion of word combination to cover single words. This generalization is possible because in its syntactic behavior any single word relates to any other word or to any other word combination as combinations relate to one another.

[D33] WORD

For the purpose of the uniform formulation of the Word Combination Law a word is by convention a word combination.

Now I introduce a preliminary formulation of the Word Combination Law, which states the fundamental constraint on word combinations:

[D34] WORD COMBINATION LAW (PRELIMINARY DEFINITION)

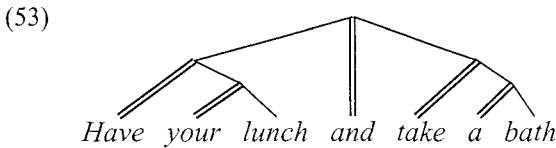
If the meaning of a word combination is incomplete and needs to be supplemented by meanings of other word combinations, this word combination, called operator, combines with one or more word combinations, called its operands, to form a new word combination, called its resultant.

To illustrate, verbs and adjectives are operators with respect to nouns because the meanings of verbs and adjectives are incomplete and need to be supplemented by the meanings of nouns. Consider nouns *boy* or *paper*. The meanings of these nouns are complete. Take now *walks* and *yellow*. We ask: 'Who walks?' 'What is yellow?' The meanings of these words are incomplete because they denote properties of things: *walks* is a verb, and verbs denote properties assigned to things within an explicit or implicit time frame; *yellow* is an

adjective, and adjectives denote properties assigned to things outside a time frame. Properties need to be supplemented by the meanings of nouns such as *boy* or *paper*: in *the boy walks* the verb *walks* is an operator and *the boy* is its operand; in *yellow paper* the adjective *yellow* is an operator and *paper* is its operand. Similarly, the meaning of prepositions is incomplete until supplemented by a noun meaning. Therefore, prepositions are operators with respect to nouns; in *on the table*, *on* is an operator and *the table*, its operand. The meaning of a conjunction is incomplete and needs to be supplemented by meanings of words belonging to basic word classes, — noun, adjective, verb, adverb — or sentences. Therefore, a conjunction is an operator with respect to expressions of all these classes: for example, in *black and white*, *and* is an operator with respect to *black* and *white*. The conjunction *and* as other conjunctions is an operator with two operands.

9.2.2 Representing word combinations

Relations between words in a word combination are represented by a word combination tree. Thus, *Have your lunch and take a bath* is represented by the word combination tree:



In the word combination tree (53), operators are represented by double lines and operands, by single lines.

The word combination tree has an equivalent bracket notation. In the bracket notation, by convention the operator is placed before the operand. To convert a tree diagram into a bracket notation, we link each operator with its operand or operands, proceeding bottom up and from left to right. We start with the first word *A* at left and examine whether it is linked to the word *B* to its right. If it is, we consider *A* and *B* to be the constituents of the combination (*AB*) and examine whether (*AB*) is linked to the next word to the right *C*, and so on. If, on the other hand, *A* is not linked to *B*, then we examine whether *B* is linked to *C*. If it is, we consider *B* and *C* to be the constituents of the combination (*BC*). Then we return to *A* and examine whether *A* is linked to (*BC*). If it is, we consider *A* and (*BC*) to be constituents of (*A(BC)*). The next step is to consider whether (*A(BC)*) is linked to the next word to the right *D*. And so on. Establishing links between words is effected by repeated analysis from left to right until possible links between words are exhausted.

The important thing is that we establish not only syntactic links between words, but also their characteristics as operators and operands. Our notation reflects this by placing operators before operands. Thus, we distinguish between (AB) and (BA) , depending whether A is operator and B is operand or, vice versa, B is operator and A is operand.

Let us now present the conversion of the above tree diagram into the bracket notation as steps of the iterative analysis of the sentence from left to right.

- (54) 1. (your lunch)
 2. (have (your lunch))
 3. (a bath)
 4. (take (a bath))
 5. (and (have (your lunch)) (take (a bath)))

9.2.3 *Applicative Principle*

In its preliminary formulation, the Word Combination Law states that the operands of an n -place operator are symmetrical. As a general statement, this assumption is questionable. True, relations between conjunctions such as *and* or *or* and their operands are symmetrical. But we can observe various facts showing that a many-place operator has asymmetrical relations to its operands, i.e., that it is more closely connected with one operand than with another. In particular, we observe an asymmetry in the relation of the transitive predicate to its subject: the transitive predicate is connected more closely with its object than with subject.

To represent the asymmetry in the closeness of connection between operators and operands, we can use a formal device proposed by the Russian mathematician Schönfinkel which constitutes an essential feature of combinatory logic: reduction of an n -place operator to a one-place operator of a special type. We incorporate reduction in the Applicative Principle:

[D35] APPLICATIVE PRINCIPLE

An n -place operator can always be presented as a one-place operator that yields an $(n-1)$ -place operator as its resultant.

The binary operation of combining a one-place operator with its operand is called the *application operation*, or, simply, *application*.

Using application, we can represent the syntactic asymmetry as follows: the first application represents the closest connection between the operator and its operand, the second application, a less close connection, and so on. Thus the sentence *John loves music* must be represented as follows: $((loves\ music)\ John)$. This notation shows that the connection of *loves* with its object *music* is

closer than with its subject *John*. Both *music* and *John* are operands of *loves*, but they are different as to the degree of their closeness to *loves*. The sentence *John sent her apples* must be represented as follows: (((*sent her*) *apples*) *John*). If we have a ditransitive verb, like *send*, that controls a direct and an indirect object, the closest connection is between the verb and the indirect object, the less close connection is between the verb and the direct object, and the least close connection is between the verb and subject; which is reflected in our bracket representation.

9.2.4 Word Combination Law

We are now ready to redefine the Word combination Law so that it reflects the syntactic asymmetry:

[D36] WORD COMBINATION LAW (FINAL DEFINITION)

If the meaning of a word combination is incomplete and needs to be supplemented by meanings of other word combinations, this word combination, called operator, combines with one or more word combinations, called its operands, to form a new word combination, called its resultant. If the operator has more than one operand, then it combines with them in accordance with the Applicative Principle.

The Word Combination Law defines the *structure* of word combinations. The genotype structure of word combinations is the way words are linked up by operator-operand relations independently of their representation by linear order or morphology.

9.3 Constituency as a relational concept

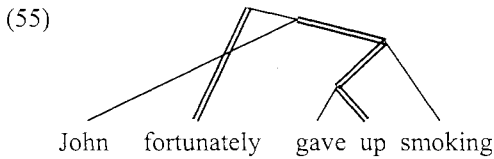
The structure of word combinations has two facets: part-whole relations, called *meronymic*, or constituency, relations, and dependency relations. Operators and operands are interconnected by constituency and dependency relations. I will first consider constituency.

Constituency is a part-whole, or meronymic relation that is defined in two steps. We first define immediate constituents and then give definition of constituents based on the definition of immediate constituents:

[D37] IMMEDIATE CONSTITUENT

If expression A is an operator, expression B its operand, and expression C, the resultant of the application of A to B, then expressions A and B are immediate constituents of expression C.

As an example of an immediate constituent hierarchy let us consider the following tree:



In tree diagram (55), operators are represented by double lines and operands, by single lines. When representing immediate constituents in linear formulas, by convention the operator is placed before the operand. (55) reads as follows. The operator *up* and its operand *gave* are the immediate constituents of the resultant (*gave up*). The operator (*gave up*) and its operand *smoking* are the immediate constituents of the resultant ((*gave up*) *smoking*). The operator ((*gave up*) *smoking*) and its operand *John* are the immediate constituents of the resultant (((*gave up*) *smoking*) *John*). The operator *fortunately* and its operand (((*gave up*) *smoking*) *John*) are the immediate constituents of the resultant (*fortunately* (((*gave up*) *smoking*) *John*)).

[D38] **CONSTITUENT:**

If there exists a sequence of expressions x_1, x_2, \dots, x_n such that x_i is an immediate constituent of x_{i+1} (for $i = 1, 2, \dots, n-1$), then x_i is a constituent of x_n . In other words, an expression e_1 is a constituent of another expression e_2 , if e_1 is an expression obtained at the i -th step in the n -step derivation of e_2 .

Note that we defined the notions of immediate constituent and constituent independently of linear word order. While we treat constituency as a relational design of grammar, in current linguistic literature definitions of immediate constituents include the requirement that immediate constituents be linearly adjacent elements in a string. This requirement misses the true relational nature of constituency, resulting in mixing constituency with the linear word order, which in itself is alien to constituency, being rather a particular way of representing constituency.

9.4 Dependency relations as invariants under changes of constituency

I will show that the constituency and dependency relations between words are consequences of the Word Combination Law. Often linguists choose to con-

centrate exclusively either on constituency relations or on dependency relations. This is a lopsided approach to the investigation of language. In fact, constituency and dependency relations complement each other and must be studied together in their interaction.

How does it follow that constituency and dependency relations are consequences of the Word Combination Law?

As a first step, we establish the Law of Word Combination Dependencies:

[D39] LAW OF WORD COMBINATION DEPENDENCIES

Given a binary combination AB of operator A with its operand B, where either A or B, or both, are word combinations, if the grammatical class of the combination AB is different from the grammatical class of operand B, then operator A is the head and operand B, the dependent of the combination AB. If, on the other hand, the grammatical class of the combination AB is the same as the grammatical class of operand B, then operand B is the head and operator A, the dependent of the combination AB.

As the second step, we establish the Law of Word Dependencies:

[D40] LAW OF WORD DEPENDENCIES

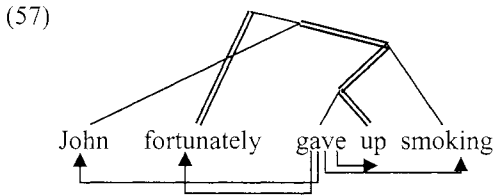
Given constituents A and B such that A is the head and B its dependent, if word W_1 is the head of A and word W_2 is the head of B, than word W_2 depends on word W_1 .

To illustrate the Law of Word Combination Dependencies, let us turn to word combination tree (55) presented above. As a first step, we establish word combination dependencies. In accordance with the Law of Word Combination Dependencies, *gave* is the head and *up* is its dependent; *gave up* is the head and *smoking* is its dependent; *gave up smoking* is the head and *John* is its dependent; *John gave up smoking* is the head and *fortunately* is its dependent. This could be represented as follows:

- (56) i: $gave \rightarrow up$
 ii: $(gave \rightarrow up) \rightarrow smoking$
 iii: $((gave \rightarrow up) \rightarrow smoking) \rightarrow John$
 iv: $((gave \rightarrow up) \rightarrow smoking) \rightarrow John) \rightarrow fortunately$

As a second step, we establish dependencies between words in accordance with the Law of Word Dependencies. Since *gave up* and *smoking* are constituents of *gave up smoking* such that *gave up* is head and *smoking* is its dependent, and since the word *gave* is the head of the constituent *gave up* and *smoking* is head of the constituent *smoking* (as the only word of this constituent), then *gave* is the head of *smoking* and *smoking* is its dependent. Further, since *John* and *gave up smoking* are constituents of *John gave up smoking* such that *gave*

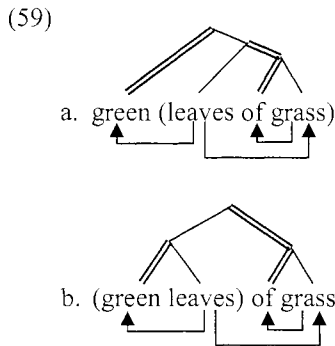
up smoking is the head and *John* is its dependent, and since the word *gave* is head of *gave us smoking*, then *gave* is the head and *John* is its dependent. By similar reasoning we establish that *gave* is head of *fortunately*, which its dependent. We can sum this up in the following diagram:



Studying the interaction between constituency and dependency relations, we discover that the dependency relations between words can be regarded as invariants under the changes of the constituency relations. Consider the phrase:

(58) green leaves of grass

We can analyze this phrase in two ways:



In (59a), the operator *green* determines the operand (*leaves of grass*). In (59b), the operator *of grass* determines the operand (*green leaves*).

(59a) and (59b) exhibit a stylistic difference that does not concern grammar. Considering these two analyses, we discover that the dependency relations between words are invariant under the changes of constituency relations.

9.5 The Nucleus Law

Before we define the Nucleus Law, let us introduce the concept of the *complex*. By a complex I mean any binary combination of contensive autonomous words. Every complex is a combination of words, but not every combination of words is a complex. A complex must have at least two contensive autonomous words as its components. For example the phrase *in the house* or *under the table* is not a complex because it does not include at least two contensive autonomous words as its components. The phrase *the catcher in the rye* is a complex because it has two contensive autonomous words as its components. A complex may include a hierarchy of word combinations. Thus, *the beautiful house of his father* consists of three combinations: 1) *the beautiful house of his father*, 2) *the beautiful house*, 3) *house of his father*.

I advance the Nucleus Law as an explication and extension of Saussure's notion of opposition, which has dominated research carried out by his followers.

[D41] NUCLEUS LAW

Given a binary complex AB of operator A with its operand B, if the structural class represented by the binary complex AB is different from the structural class represented by operand B, then operator A is the nucleus and operand B, the margin of the complex AB. If, on the other hand, the structural class of the complex AB is the same as the structural class represented by operand B, then operand B is the nucleus and operator A, the margin of the complex AB. The nucleus can occur outside AB, without the margin co-occurring, whereas the margin occurs only if the nucleus co-occurs.

The Nucleus Law is one of the most significant laws of Semiotic Linguistics. What is the significance of the Nucleus Law?

Sentences and members of sentences are fundamental word combinations. Many linguists recognize correctly that the sentence has binary structure: it consists of two sentence members: subject and predicate, or *subject group* and *predicate group*. We call the binary structure of the sentence the *predicative articulation* of the sentence. The binary structure of the sentence contrasts with the binary structure of members of the sentence like NOUN+ADJECTIVE (*round table*), NOUN+PREPOSITIONAL ATTRIBUTE (*the leg of the table*), VERB+ADVERB (*runs quickly*), and so on. We refer to the binary structure of the members of the sentence as their *attributive articulation*.

For someone who identifies the linguistic terms 'subject' and 'predicate' with these terms as they are used in logic, the distinction between predicative and attributive articulation appears to pose no problem and requires no further

explication. Are linguistic concepts of subject and predicate identical with the concepts of subject and predicate as they are used in mathematical logic? Categorically, no. The logical concepts of subject and predicate are tied to truth conditions — the notion alien to the true goals of linguistics. The linguistic concepts of subject and predicate must be defined in terms of proper linguistic notions. The confusion of linguistic concepts of subject and predicate with logical concepts of subject and predicate is no less objectionable than the confusion of the linguistic concept of syntax with the logical concept of syntax.

The Nucleus Law offers an illuminating characterization of subject and predicate and other syntactic concepts in terms of purely linguistic notions. How does this law capture the essential properties of attributive and predicative structures in terms of precise linguistic concepts? Let us consider the attributive structure, such as *the blue sky*, and the predicative structure, such as *the sky is blue*, with respect to dependency relations between the components of these structures. The dependency of the phrase *blue* is comparable to that of *is blue*: under the Word Combination Law, both *blue* and *is blue* are operators of *the sky* because their meanings are supplemented by the meaning of *the sky*. However, under the Nucleus Law, *the sky* is the nucleus of *the blue sky* (because the grammatical class of *the blue sky* is the same as that of *the sky*) and the margin of *the sky is blue* (because the grammatical class of the sentence is not the same as that of the predicate).

If we look at our definition of dependency, we see that dependency between the binary components of a sentence and dependency between the binary components of a member of a sentence are mutually converse relations: in a sentence, the operand (subject) depends on its operator (predicate), whereas in a member of a sentence, conversely, it is the operator (attribute) that depends on its operand (any attributive support, like a noun for an adjective or a verb for an adverb). Our description provides a linguistic characterization of subject, predicate, and other syntactic relations as distinct from the characterization of these notions in logic.

9.6 The Nucleus Law and the Principle of Superposition

In the Nucleus Law, the predicate is the nucleus of the sentence and the subject is its margin, because the predicate is the operator and the subject is its operand and the result of the application of the predicate to the subject — the sentence — belongs to a different class of combinations than subject. This means that the predicate can occur outside a complete sentence: the predicate can repre-

sent the sentence by superposing with it. This is the case with impersonal sentences such as Latin *Pluit* 'It is raining' or Russian *Morozit* 'It is freezing.'

There are facts that appear to contradict the Nucleus Law. Consider the sentence:

(60) The innocent are often deceived by the unscrupulous.

The phrases *the innocent* and *the unscrupulous* are clearly perceived to stand for some reduced noun phrases like *the innocent people* and *the unscrupulous people*. Under the Nucleus Law, *the innocent people* can be reduced to *the people*, rather than to *the innocent*, because both *the people* and *the innocent people* belong to the same grammatical class of the noun. The same reasoning applies to *the unscrupulous people*. The Nucleus Law rules out adjectives without co-occurring nouns as it rules out adjectives as constitutive components of noun phrases.

To resolve this contradiction we invoke the notion of superposition. In (60) the adjectives *innocent* and *unscrupulous* are not ordinary adjective but adjectives superposed with nouns, <adjective SUP noun>. Adjectives that belong in the syncretic grammatical class <adjective SUP noun> function as nouns and therefore do not require co-occurrence of nouns like ordinary adjectives.

Similarly, there are one-word sentences that cannot be viewed as resulting from the superposition of a predicate with a sentence, as for example, *Shame!* or *Excellent!* Since neither word is a true predicate and hence a sentence nucleus, these sentences are both outside the scope of the Nucleus Law and contradict it because this law rules out one-word sentences if the only sentence word is not a true predicate.

The Nucleus Law specifies the behavior of the nuclei of syntactic constructions. If a word functions as a sentence, it does not mean that it is the nucleus of the sentence. Sentences like *Shame!* or *Excellent!* must be explained by the Principle of Superposition as cases of direct superposition of word classes with the syntactic class of the sentence. These sentences do not belong to the grammatical class <predicate SUP sentence> like subjectless impersonal sentences. Rather *Shame!* belongs to the class <noun SUP sentence>, and *Excellent!*, to the class <adjective SUP sentence>. Only a word whose primary function is to be a predicate, that is a verb, can serve as a sentence nucleus.

It should be noted that the use of the concept of superposition is not an ad hoc measure. The concept of superposition was introduced on independent grounds and constitutes an essential characterization of the functioning of language.

9.7 The Generalized Nucleus Law

The Nucleus Law can be generalized to define an isomorphism between the structures of the sentence, syllable, word, and phoneme. In order to formulate the Generalized Nucleus Law, we need to introduce the concept of *configuration*.

We distinguish between two replaceable units that belong in one and the same class (for example, two nouns or two phonemes) and two units in a combination (for example, NOUN+VERB, forming a sentence or CONSONANT+VOWEL, forming a syllable), i.e., between two semantic units and two syntactic units.

Let us consider a semantic opposition between two replaceable classes, traditionally called *markedness* or *privative* opposition. This is the opposition between two terms NEUTRAL-NEGATIVE:POSITIVE, where the positive term has an extra feature over the negative term on which the opposition is based, but in all other respects is identical to the negative. According to the Range-Content Law (6.7), which applies both to the communicative and phonemic planes of language, to the extent that the positive term is richer in features, its range of occurrence is narrower than that of the negative term. In certain contexts the markedness opposition suspends and is said to *neutralize*, where it is then represented just by the neutral-negative term.

In morphology, one type of markedness opposition is represented by the relation between the basic and derived word, like *lion:lioness* or *book:booklet*. Since derivation involves adding an affix and hence the morphology of the derived word is richer, its range of occurrence is narrower. Thus, while *I saw a lioness* implies (or is replaceable) with *I saw a lion*, *I saw a lion* does not imply *I saw a lioness*. The opposition is said to neutralize in the unmarked *lion*: when used on its own *lion* could stand for either term of the derivation opposition, i.e. mean either male or female lion.

A well-known example of the markedness opposition in phonology is the opposition VOICELESS:VOICED present in many languages, like Russian, Polish or German. Phonemes like /b, d, g/ are in all respects identical to corresponding /p, t, k/, except that the former sets includes the additional feature, or positive mark, VOICE. So that, for example, *p* is defined as a labial stop and *b* as a voiced labial stop. The voicelessness of the former is interpreted as an absence of voice. Since the feature content of voiced consonants is richer in comparison to their voiceless counterparts, their range of occurrence is narrower. Thus, in Russian, Polish, and German there are contexts where this opposition suspends. In all these languages the word-final /p:/b/, /t:/d/, /k:/g/, etc. are neutralized to be represented by the voiceless term; so that the voiceless consonant can

‘mean’ either term of the opposition. So, in Russian for example, /bok/ can either mean ‘side’ or ‘god,’ while in non-word-final position in the genitive singular form of these words the distinction is maintained: /boka/:/boga/.

We can now redefine the markedness opposition as a semantic binary counterpart of a syntactic binary unit. We introduce the term *configuration* to cover both the markedness opposition, which can be termed *paradigmatic configuration*, and word combination, which can be termed *syntactic configuration*. Since the markedness opposition is minimally represented by the unmarked term (when the opposition is neutralized), we interpret the feature set of the unmarked term as the nucleus of the paradigmatic configuration, and the mark as its margin. We further extend the concept of operator to mean a configuration-forming device, and interpret the mark of the markedness opposition as an operator for forming paradigmatic configurations.

We are ready to state the Generalized Nucleus Law:

[D42] **GENERALIZED NUCLEUS LAW**

Given a configuration AB of operator A and its operand B, if the grammatical class of configuration AB is different from the grammatical class of operand B, then operator A is the nucleus and operand B, the margin of the configuration AB. If, on the other hand, the grammatical class of the configuration AB is the same as the grammatical class of operand B, then operand B is the nucleus and operator A, the margin of the configuration AB. The nucleus can occur outside AB, without the margin co-occurring, whereas the margin occurs only if the nucleus co-occurs. If the nucleus occurs outside the configuration AB, then the nucleus takes on the function of AB on top of its primary function of the nucleus of AB.

Since paradigmatic configuration by definition does not involve class change, according to the Generalized Nucleus Law, the unmarked term of the markedness opposition is always the nucleus of the paradigmatic configuration and the mark is the margin.

The Generalized Nucleus Law states universal isomorphic well-formedness constraints on the four types of linguistic unit: sentence, word, syllable, and phoneme. The empirical content of this law may be represented by the whole-part and part-part proportions:

(61) **WHOLE-PART ISOMORPHISM:**

LINGUISTIC				DERIVED	MARKED
UNIT	=	SENTENCE	=	WORD	=
NUCLEUS		PREDICATE		BASIC	UNMARKED
		CORE		WORD	PHONEME

(62) PART-PART ISOMORPHISM:

$$\frac{\text{MARGIN}}{\text{NUCLEUS}} = \frac{\text{SUBJECT}}{\text{PREDICATE}} = \frac{\text{ONSET}}{\text{CORE}} = \frac{\text{AFFIX}}{\text{BASIC WORD}} = \frac{\text{MARK}}{\text{UNMARKED PHONEME}}$$

The Generalized Nucleus Law provides a straightforward account of the constraints on sentence and syllable structure. The phenomenon of neutralization is a special instance of the Generalized Nucleus Law.

In application to sentence structure, the Generalized Nucleus Law highlights the opposition PREDICATE:SUBJECT, predicting that when neutralized, this opposition is represented by the predicate. In other words, predicate is the minimal requirement for the sentence. This is the case when a verb is used in impersonal and other constructions that do not differentiate between subject and predicate.

The isomorphism of sentence and syllable structure is detailed in the next section (9.8).

Turning now to the structure of the word and considering the relation between the derived and basic word, we see that the root (or basic word) is the nucleus, and the derivational affix is the margin. The affix presupposes the root whereas the root does not presuppose the affix. The root can occur without the affix, and the affixless word represents the neutralized opposition where the meanings of two terms are superposed. For example, in *lioness*, the root *lion* is the nucleus and the affix *-ess* is the margin because *-ess* cannot occur on its own and thus presupposes *lion*, whereas *lion* does not presuppose *-ess*: *lion* can occur independently. When *lion* occurs on its own outside the opposition with *lioness*, its meaning coincides with that of *lioness*: *lion* could mean either male or female lion.

The relation between unmarked and marked phonemes parallels the relation between basic and derived words. To see this, consider the VOICED:VOICELESS alternation described above. Let us denote any voiceless consonant by P and its voiced counterpart by B. We see that B can be analyzed into a nonlinear hierarchy P+VOICE. P is the nucleus and VOICE is the margin of P+VOICE because VOICE presupposes P whereas P does not presuppose VOICE — P may be used independently. In certain contexts (word-final position, before unvoiced consonants, etc.) P may either function as P proper or superpose with P+VOICE. Clearly, not only does the relation between the nucleus and the margin of a marked phoneme parallel the relation between the nucleus and the margin of a derived word, but both these relations parallel the relations between the nucleus and the margin in the sentence and the syllable.

9.8 Isomorphism between sentence and syllable structure

The parallelism between sentence and syllable structure can be elaborated in some detail.

Let us recall that a complete syllable consists of three consecutive elements: 1) the *onset* consonant cluster, 2) the *nucleus* vowel, and 3) the final consonant cluster, termed *coda*. The combination of the nucleus and coda is referred to as the syllable *core*. To illustrate, in the syllable *start*, the vowel *a* represents its nucleus, *st* its onset, *rt* its coda, and *art* its core. A syllable without a coda is called an *open syllable*, and a syllable with a coda is called a *closed syllable*.

The table below states the correspondences between sentence and syllable structure:

(63) SENTENCE	SYLLABLE
predicate	syllable nucleus
subject group	onset
Predicate group	core

How are these correspondences motivated? Sentences and syllables share a common property of being basic structures: sentences are basic structures of semantics and syllables are basic structures of phonology. Both predicates and vowels are *constitutive* elements of their structures. By ‘constitutive’ I mean those elements that can represent their structures, that is to say, be the sole components of their structures: a minimal sentence is a predicate, and a minimal syllable is a vowel. Given the nucleus status of the predicate and vowel, both subject and onset, then, are margins in their respective structures. These correspondences result in parallelism between the dichotomies SUBJECT:PREDICATE and ONSET:NUCLEUS, or (SUBJECT GROUP:PREDICATE GROUP and ONSET:CORE).

To extend the analogy, the syllable and its components can be assigned classes corresponding to the syntactic classes. Thus the syllable is assigned the class ‘sentence.’ The onset, that is, the consonant or consonant group immediately preceding the vowel, are assigned the class ‘noun.’ Vowels in an open syllable are assigned the class ‘intransitive verb’ and those in a closed syllable, the class ‘transitive verb.’ Depending on the structure of the onset, the penultimate onset consonant may be assigned the class ‘adjective,’ the antepenultimate onset consonant, the class ‘adjective’ or ‘operator changing a noun into an adjective,’ and so on. Depending on the structure of the coda, codal consonants may be assigned classes of ‘noun’ or ‘adverb.’ Recalling the discussion in 8.4.1, we can also say that just as words can be assigned superposed classes, so can phonemes: the Czech consonant *l* that functions as a vowel in *vlk* is as-

signed the class <noun SUP verb>; the French vowel *i* that functions as a consonant in *viens* is assigned class <verb SUP noun>.

Let us now consider what Prince and Smolensky (1993; Bybee 1999) call ‘the Jakobsonian typology,’ which claims the universal preference for CV (consonant-vowel) syllables: while all languages allow syllables with onsets, some languages disallow V-initial syllables. This phenomenon is explained by the Generalized Nucleus Law. Under this law, just as the complete structure of the sentence is PREDICATE+SUBJECT, the complete structure of the syllable is CORE+ONSET. The V-initial syllable, that is a syllable without an onset, is a reduced syllable, just as a subjectless sentence is a reduced sentence. Since the standard structure of the sentence is PREDICATE+SUBJECT, this structure occurs more often than the reduced sentence structure. Likewise, the complete syllable structure, that is CORE+ONSET, or CV-structure, occurs more often than the reduced, that is V-initial, structure of the syllable without an onset.

9.9 The strange properties of the Nucleus Law

As we saw from the examples above, the Nucleus Law has good empirical support. But this law also has some strange properties. Why should the phoneme, syllable, or any expression whatsoever have a binary structure? Why is the Nucleus Law valid both in grammar and phonology? To understand this law, we must be able to answer these questions. In fact, the answers to these questions are to be found in the areas of knowledge that lie beyond the study of natural language. To accept the validity of the law, it is enough to confine ourselves to purely linguistic facts; we need not go any further. Still, the strangeness of the Nucleus Law looms large in our minds and we must seek an explanation for it, even if this takes us beyond the proper confines of linguistics. We are in the position of Feynman’s chemist before quantum mechanics made its debut:

The theory of chemistry, i.e., of the reactions themselves, was summarized to a large extent in the periodic chart of Mendeléeve, which brings out many strange relationships among the various elements, and it was the collection of rules as to which substance is combined with which, and how, that constituted inorganic chemistry. ... All these rules were ultimately explained in principle by quantum mechanics, so that theoretical chemistry is in fact physics. (Feynman 1963: 48-49)

The laws of theoretical chemistry came to be treated as instances of more general laws of quantum mechanics. Similarly, the laws of the theory of grammar could be treated as instances of more general laws of semiotics — the sci-

ence of sign systems. Unfortunately, the linguist is in a less favorable position than the chemist. Theoretical chemistry is based on a well developed science — quantum mechanics. But semiotics cannot be called a science in the sense of a coherent body of concepts and postulates. Rather, in its current state, semiotics is an area of related studies which are expected to be integrated into a coherent system of knowledge in future. When we develop Semiotic Linguistics — a semiotic theory of language — it does not mean that we are able to base our theory on semiotics as a coherent system of knowledge. It only means that we can assume some general principles and laws which characterize the properties of the signs of human language and which after proper modifications and generalizations can serve as the foundations of semiotics as a coherent system of knowledge. As it is, Semiotic Linguistics is the only coherent system of knowledge in the area of studies of sign systems. The extrapolation of the principles and laws of Semiotic Linguistics to other areas of semiotic studies is important both for Semiotic Linguistics itself and as a contribution to the development of semiotics as a coherent science. The generalized statements of Semiotic Linguistics can explain phenomena in other fields of semiotic studies and, paradoxically, throw new light on the phenomena of natural language themselves. We see the phenomena in a new light because generalized principles and laws abstract from inessential features which obscure the true nature of semiotic phenomena in natural languages.

Let us return to our questions. Why should a well-formed unit in natural language have a binary structure, consisting of a nucleus and a margin and reducible to the nucleus? We propose the hypothesis that this type of binary structure is a general semiotic phenomenon which is fundamental both for natural languages and other sign systems. Consider the language of music. In musical language the opposition of the major and minor key forms a binary structure which can be reduced to the minor key, representing the whole binary structure. This is done, for example, in the opening of Beethoven's ninth symphony or in the beginning of the overture to Wagner's *Der Fliegende Holländer*. As an example from another field, consider oppositions of colors. Take the black and white opposition. Gray can represent the reduction of this opposition in favor of white on a black background. This shows that the distinction of a nucleus and a margin is relative to the context: what is a nucleus in one context can be a margin in another, and vice versa. A similar phenomenon is observed with opposition between geometrical figures. Thus, viewed from an angle of 45° or 60°, a circle is perceived as an ellipsis. This means that in the context of these angles the opposition of the circle and ellipsis is reduced in favor of the ellipsis.

Chapter 10

The Theory of the Sentence

10.1 Predicative and attributive articulation of the sentence

The sentence is a privileged word combination. The sentence is a privileged word combination because from the functional perspective it is a message-carrying unit. From the functional perspective, language is an instrument of communication. Communication is an exchange of messages, and the sentence is the linguistic carrier of messages. This is why the sentence is a privileged word combination.

As a word combination, the sentence is constructed by combining words under the Word Combination Law, that is, by applying a word or phrase A viewed as an operator to a word or phrase B, viewed as the operand of A. The resultant of this operation is a word combination having an applicative structure. We can represent applicative word combination graphically on the example sentence *John wrote letters*:

(64)

$$\begin{array}{r} \text{wrote} \quad \text{letters} \\ \hline (\text{wrote letters}) \quad \text{John} \\ \hline (\text{wrote letters}) \text{John} \end{array}$$

As was mentioned above, applicative structure is independent of the linear order of words. The convention of placing the operator before its operands in representations of applicative structure has nothing to do with the actual linear order of sentence constituents.

The sentence is a privileged word combination due to its function as a basic communicative unit. As such, the sentence has a syntactic-functional structure:

it articulates into single words or word combinations having various syntactic functions. We recognize two kinds of functional articulation: 1) predicative articulation and 2) attributive articulation. *Predicative articulation* is the articulation of the sentence in terms of the predicate and its arguments — subject, direct object, and indirect object. Predicate arguments are called *terms* of the sentence, subject being the *first term*, direct object, the *second term*, and indirect object, the *third term* of the predicate. *Attributive articulation* is the articulation of the predicate and its arguments into their constitutive components and their attributes. The term ‘attribute’ covers all sorts of predicate and term modifiers.

If we take ‘sentence’ and ‘term’ as primitive concepts and introduce ‘operator’ as another primitive concept, we can define all the terms of the sentence through the two primitive concepts: *sentence* and *term*.

On the Word Combination Law (9.2.4), the operator constituent combines with a constituent, called its operand, to form another constituent, called its resultant. The operator is by definition a means of adding a constituent to form another constituent. The *type* of the operator, then, is specified by its operand and resultant. Let X and Y denote grammatical classes, or types, and O denote a primitive operator, called *type constructor*. The type of the operator that combines with operand X to obtain resultant Y is specified as:

(65) OXY

The operator type in (65) reads: ‘an operator that combines with an operand X to produce a resultant Y.’

If T represents the type of terms, and S represents that of sentences, then the predicative articulation of the sentence — that is predicates and their operands — can be represented as:

(66)OTS intransitive predicate with subject as its single operand
 OTOTS transitive predicate with direct object as its first operand and subject
 as its second operand
 OTOTOTS ditransitive predicate with indirect object as its first operand, direct
 object as its second operand, and subject as its third operand

For convenience we can introduce a variable P to denote any kind of predicate — intransitive, transitive, or ditransitive — the attributive articulation of the sentence can be represented as:

(67)OPP attribute whose operand is an intransitive, transitive or ditransitive predi-
 cate
 OTT attribute whose operand is a term (subject, direct object, or indirect object)

OSS attribute whose operand is a sentence

We can use subscripts to attain a finer-grain notation, such as T_2 for a second term or P_3 for a three-place (ditransitive) predicate.

10.2 Sentence articulation laws

From the standpoint of part-whole relations, the functional units of the sentence are its constituents, and the sentence is the constituent of itself. The following four laws define all the functional units of the sentence. The first three characterize the predicative articulation of the sentence, and the last one characterizes the attributive sentence articulation.

[D43] SENTENCE ARTICULATION LAW 1

If X is an operator that combines with a term Y to form a sentence Z , then X is an intransitive predicate and Y is a subject.

In *John came*, *came* is an operator that combines with the term *John* to form the sentence *John came*. Therefore, *came* is an intransitive predicate, and *John* is a subject.

[D44] SENTENCE ARTICULATION LAW 2

If X is an operator that combines with a term Y to form an intransitive predicate Z , then X is a transitive predicate and Y is a direct object.

In *John likes birds*, *likes* is an operator that combines with *birds* to form the intransitive predicate *likes birds*. Therefore, *likes* is a transitive predicate, and *birds* is a direct object.

[D45] SENTENCE ARTICULATION LAW 3

If X is an operator that combines with a term Y to form a transitive predicate Z , then X is a ditransitive predicate and Y is the indirect object.

In *John sent Mary a letter*, the operator *sent* first combines with *Mary* to form the transitive predicate *sent Mary*, then with *a letter* to form the intransitive predicate *sent Mary a letter*, and finally with *John* to form the sentence, which can be represented as follows:

(68) (((sent Mary) (a letter)) John)

Therefore, *sent* is a ditransitive predicate, *John* is a subject, *a letter* is a direct object, and *Mary* is an indirect object.

[D46] SENTENCE ARTICULATION LAW 4

If X is an operator that combines with a phrase Y to form a phrase Z of the same type as Y, then X is an attribute of Y.

We illustrate Sentence Articulation Law 4 with four types of example, corresponding to the four types of operand phrase Y. 1) In *blue sky*, *blue* is an operator that combines with its operand *sky* to form its resultant *blue sky*. Since both *sky* and *blue sky* are identically typed as terms, *blue* is an attribute of *sky*. 2) In *runs quickly*, *quickly* is an operator that combines with its operand *runs* to form its resultant *runs quickly*. Since both *runs* and *runs quickly* are identically typed as intransitive predicates, *quickly* is an attribute of *runs*. 3) In *Unfortunately John lost*, *unfortunately* is an operator that combines with the sentence *John lost* to form its resultant *Unfortunately John lost*. Since both *John lost* and *Unfortunately John lost* are identically typed as sentences, *unfortunately* is an attribute of *John lost*. 4) In *runs very quickly*, *very* is an operator that combines with its operand *quickly* to form its resultant *very quickly*. Since both *quickly* and *very quickly* are attributes of *runs*, they both are of the same type, and therefore *very* is an attribute of *quickly*. These examples show that there are four classes of attributes: attributes of terms, attributes of predicates, attributes of sentences, and attributes of attributes.

10.3 Obligatory Subject Law and Term Uniqueness Law

Sentence articulation laws present a hierarchy of principles defining the functional constituents of the sentence. Sentence Articulation Law 1 is the basis of the hierarchy. Sentence Articulation Law 2 is based on Sentence Articulation Law 1, and Sentence Articulation Law 3 is based on Sentence Articulation Law 2. The Sentence Articulation Law 4 is based on sentence articulation laws 1-3.

The hierarchy of sentence articulation laws has some important consequences. It follows from the sentence articulation laws 1-3 that every sentence that has an indirect object, also has a direct object; and that every sentence with a direct object also has a subject. The reverse is not true: not every sentence that has a direct object also has an indirect object, nor every sentence that has a subject also has a direct object. This can be summarized into the Obligatory Subject Law, which is a corollary of sentence articulation laws:

[D47] OBLIGATORY SUBJECT LAW

If a word combination is sentence, it has a subject.

Formulated in one way or another, the Obligatory Subject Law is recognized by many different linguistic frameworks. There are various types of sen-

tence, like impersonal sentences, that may be adduced as potential counterexamples to the Obligatory Subject Law. A proper analysis of these sentences shows that they contain subjects in the form of *dummy* or *zero terms* (Perlmutter 1983: 100-101; Mel'čuk 1988: 312-322). Thus, on the numerous examples from Russian, Mel'čuk argues conclusively that there is no natural way of accounting for the syntactic and semantic properties of impersonal constructions unless we assume the presence of a grammatical subject in such sentences, termed 'zero subject' in his framework. Rather than use the notions of dummy or zero subject, the current framework of Semiotic Linguistics explains the apparent absence of subject in impersonal and other subjectless sentences in terms of the Nucleus Law and the concept of superposition of types (9.6).

Another corollary of sentence articulation laws 1-3 is the Term Uniqueness Law:

[D48] TERM UNIQUENESS LAW

No simple sentence can contain more than one subject, one direct object, and one indirect object.

It follows from the Term Uniqueness Law that if a sentence contains two subjects, two direct objects, or two indirect objects, then it is a complex structure formed by combining two simple sentences.

10.4 Law of Binary Structuration of the Sentence

In accordance with the Word Combination Law (9.2.4), we formulate the Law of Binary Structuration of the Sentence:

[D49] LAW OF BINARY STRUCTURATION OF THE SENTENCE

A sentence constitutes a hierarchy of binary combinations of its constituents.

The Law of Binary Structuration of the Sentence is an empirically testable claim. This law assumes asymmetry in predicate-argument relations. To assume asymmetry in predicate-argument relations is to treat, e.g., the subject-predicate relation as different from the object-predicate relation. Specifically, on our view, predicate is more closely connected with its object than its subject. There is no consensus on this matter in grammatical theory. For example, Jackendoff's framework (Jackendoff 1976), Lexical-Functional Grammar (Bresnan 1982, 2001), and Montague Grammar (Dowty 1982) assume symmetry, while Marantz's framework (Marantz 1984) implies asymmetry, that is, that the predicate is more closely connected with its object than its subject. The symmetrical notation looks like this:

- (69) PRED (X, Y, Z)
give (John, money, Mary)

The notation in (69) presents all predicate arguments as syntactically and semantically independent and on a par. Semiotic Linguistics views the problem of the relation between the predicate and its arguments as part of a larger problem of the relation between any many-place operator and its operands: are operands of many-place operators symmetrical or asymmetrical? Semiotic grammar claims that many-place operators of language are stratified into a series of unary operators such that the order of a many-place operator's combination with its operands is based on the decreasing degree of closeness between the operator and its operands.

Let us consider some facts supporting the subject-object asymmetry claim. Take the sentence *The hunter killed the bear*. On our claim, *killed* and *the bear* are more closely connected than *killed* and *the hunter*. One consideration in support of this analysis is that the combination of a transitive predicate with a direct object is equivalent to an intransitive predicate. Thus in some languages this combination can be replaced by an intransitive predicate. For example, in Russian *lovit' rybu* 'to catch fish' can be replaced with the transitive verb *rybachit'* 'to fish.' Conversely, an intransitive verb can be replaced by a transitive verb with a direct object. For example, *to dine* is replaceable by *to have dinner*.

Another reason for insisting on a closer connection between the transitive verb and direct object is that nouns derived from intransitive verbs are oriented towards the subjects of the action (*genetivus subjectivus*) while the nouns derived from transitive verbs tend to be oriented towards the objects of the action (*genetivus objectivus*). Compare:

- (70) a. the dog barked : the barking of the dog
b. they abducted the woman : the abduction of the woman

The ambiguity of phrases such as *the shooting of the hunters* must be explained by the fact that although to *shoot* is transitive, it can also be used as an intransitive verb: we can say *the hunters were shooting* without specifying the object. The orientation of nouns derived from transitive verbs towards the object of action is a universal tendency observed in typologically very different language groups.

The subject-object asymmetry is one of the important motivations for the Applicative Principle (9.2.3). Semiotic Linguistics redefines the n-place operator as a series of one-place operators, with the n-place operator applying only

to its first operand, the resultant of this application applying to the second operand, and so on.

10.5 Word-based syntactic phenomena

Let us recall that signs are divided into classes according to their function in sign combinations. Words are the privileged signs of language; word combinations are the privileged sign combinations, and sentences are the privileged word combinations.

Every word and every member of the sentence has one primary function — represented by the primary form of the word and by the primary form of the member of the sentence — and a number of secondary functions — represented by the secondary forms of the word and by the secondary forms of the member of the sentence.

We distinguish four principal classes of words according to their primary syntactic function in the sentence: 1) the noun, whose primary syntactic function is subject, 2) the verb, whose primary syntactic function is predicate; 3) the adjective, whose primary syntactic function is attribute of a term; 4) the adverb, whose primary syntactic function is attribute of a predicate. In addition to its primary function, any word of a class may take on functions of other classes, which are called the secondary functions of the word.

Similarly, we can distinguish the members of the sentence by assigning them primary functions defined in terms of the relation OPERATOR:OPERAND, as was done in (66) and (67). As a result of a series of successive superpositions, a member of the sentence can obtain a series of successive secondary functions.

Why do we need to include the concept of the word with its primary and secondary functions into syntactic theory? Semiotic Linguistics needs the hierarchy of the syntactic functions of the word because there are syntactic problems that cannot be solved using the conceptual machinery of the hierarchy of the syntactic functions of the members of the sentence.

There are two classes of syntactic phenomena: 1) syntactic phenomena that can be explained in terms of mapping of one word combination into another one; 2) syntactic phenomena that can be explained in terms of mapping of one word class into another one, rather than in terms of word combination mappings. The first type are *transformation*-based syntactic phenomena, which will be dealt with in the section on diathesis (10.6). A classic example of this type of phenomena is passive constructions.

As an example of the second type of syntactic phenomena, consider the Russian sentence:

- (71) *Ivan chital knigu celuju noch*.
 ‘John read the book all night.’

In (71), we have two accusatives: *knigu* ‘book’ and *noch* ‘night.’ The syntactic function of the two accusatives is very different: the first accusative functions as a direct object and the second accusative functions as an oblique. To explain this difference, Semiotic Linguistics uses analysis of the formal case system of Russian. The primary syntactic function of the accusative is direct object, but its secondary function is oblique. Here we have an instance of mapping of a word with a primary function of direct object on a class of words whose primary function is oblique.

As another example of a word-mapping syntactic problem, consider the Russian sentence:

- (72) *On upravljaet zavodom*.
 ‘He manages a factory.’

The instrumental case *zavodom* ‘factory’ functions as a direct object so that we can derive a passive from (72): *Zavod upravljaetsja im* ‘The factory is managed by him.’ The primary syntactic function of the instrumental is oblique, and its secondary function is direct object. In (72) the instrumental functions as the accusative.

As a final example of a word-mapping syntactic problem, consider the English sentence:

- (73) He looked at the picture at the factory.

The syntactic function of *at the picture* is very different from the syntactic function of *at the factory*. The primary syntactic function of a prepositional construction is oblique, but its secondary function is direct object. In (73), *at the picture* functions as the direct object of *looked*.

Examples (71), (72) and (73) illustrate the syntactic phenomena that need to be explained in terms of the mapping of the syntactic functions of word classes rather than in terms of the mapping of the syntactic functions of word combinations.

10.6 Transformation-based syntactic phenomena: the theory of diatheses

In this section, I present the essentials of an outline of a new theory of diatheses which develops the ideas presented in (Desclés, Guentchéva, Shaumyan 1985, 1986; Shaumyan 1987; Desclés 1990).

The term *diathesis* was introduced into linguistics by Tesnière (1966: 242-243) for what had been called *voice*. Tesnière distinguished four diatheses: 1) active, 2) passive, 3) reflexive, and 4) reciprocal.

Tesnière's theory of diatheses is based on the notion of valence which he defined as the number of *actantes* a verb is able to govern. Tesnière's theory must be recognized as the first attempt to treat voice from a unified point of view. However, by today's standards set by the semiotic theory of language, Tesnière's theory is obsolete. The main defect of this theory is its disregard of the relational aspect of voices: the interplay between voices is based not only on the change of the number of actantes but primarily on the relation-changing operations over predicates which do not necessarily involve a change in the number of actantes. Among other defects is the confusion between classes and their syntactic functions: Tesnière promiscuously uses 'noun' and 'actante' as interchangeable terms, and he fails to distinguish between 'verb' as a word class and 'verb' as a syntactic function.

By way of introduction to what is involved in diathesis, let us take a look at the passive. Consider the dependency relations in the following corresponding active and passive constructions:

- (74) a. Shakespeare wrote *Hamlet*.
 Shakespeare ← (wrote → *Hamlet*)
 b. *Hamlet* was written by Shakespeare.
 Hamlet ← ((was → written) → (by → Shakespeare))

The dependency relations of (74a) were obtained on the basis of the Nucleus Law: *wrote* is type OTOTS and *Hamlet* is type T. Since the resultant of the application of *wrote* to *Hamlet* is of a different type from that of the operand *Hamlet*, *Hamlet* depends on *wrote*. Similar considerations lead us to establish that *Shakespeare* depends on (*wrote*→*Hamlet*).

By comparing (74a) with (74b) we note that the relation between (*was*→*written*) in (74b) and (*by*→*Shakespeare*) is isomorphic to the relation between *wrote* and *Shakespeare* in (74a). Hence we come up with establishing an isomorphism between (74a) and (74b).

In an inflectional language like Russian the isomorphism between active and passive is even more transparent. Translating (74) into Russian, we get:

- (75) a. *Shekspir* ← (*napisal* → «*Gamleta*»-ACCUSATIVE)
 b. «*Gamlet*» ← (*napisan* → *Shekspirom*-INSTRUMENTAL)

(75a) corresponds to (74a) and (75b) corresponds to (74b). The instrumental *Shekspirom* corresponds to the prepositional phrase *by Shakespeare*. The simple Russian phrase *napisan* corresponds to the complex English phrase *was written*.

On the Nucleus Law, we establish isomorphism between active and passive at the level of their basic components. We conclude that passive is the converse of active.

Let us denote subject by 1, direct object by 2, indirect object by 3, and any oblique term by a variable Q. In accordance with sentence articulation laws 1-4 presented in 10.1, we can establish a hierarchy of syntactic terms I call the *ap- plicative hierarchy*:

$$(76) \quad [1 > 2 > 3] > Q$$

The brackets enclose predicate terms, members of the predicative frame. Under the Range-Content Law: 3 is marked with respect to 2, because the range of 2 is greater than the range of 3: 2 occurs both in transitive and ditransitive constructions whereas 3 occurs only in ditransitive constructions. And 2 is marked with respect to 1 because the range of 1 is greater than the range of 2: 2 occurs only in transitive and ditransitive constructions whereas 1 occurs in both of these plus in intransitive constructions. Finally, Q is marked with respect to the predicative frame, because the range of the predicative frame is greater than the range of Q: the predicative frame occurs in every sentence whereas Q occurs only in some sentences. Q presupposes the predicative frame whereas the predicative frame does not presuppose Q.

Given the ordering presented in (76), we are ready to define diathesis:

[D50] **DIATHESIS**

Diathesis is a transformation of a sentence A into a sentence B under the following possible superposition constraints:

1. *If 3 coincides with 2, then 2 must superpose with Q:*
 $\langle 3 \text{ SUP } 2 \rangle \rightarrow \langle 2 \text{ SUP } Q \rangle$
2. *If 2 coincides with 1, then 1 must superpose with Q:*
 $\langle 2 \text{ SUP } 1 \rangle \rightarrow \langle 1 \text{ SUP } Q \rangle$
3. *If 3 coincides with 1, then 1 must superpose with Q:*
 $\langle 3 \text{ SUP } 1 \rangle \rightarrow \langle 1 \text{ SUP } Q \rangle$

The arrow ‘→’ reads ‘entails.’ For example, the formula in item 1 of the definition reads: the superposition of indirect object and direct object entails

superposition of direct object and oblique. Briefly, the constraints state that if a sentence term A is realized as a higher-ordered term B, then the term B will realize as an oblique. Or, in other words, if A is promoted to the order of B, then B is demoted to Q.

To illustrate our definition of diathesis, let us look at some examples.

- (77) a. Fred bought a book.
b. A book was bought by Fred.

In (77a), the primary function of *Fred* is 1, and the primary function of *a book* is 2. The passivization of (77a) involves superposition. In (77b), 2 is superposed with 1 and 1 is superposed with Q. We can represent this by the diagram:

- (78) Fred a book
a. $\frac{1}{\langle 1 \text{ SUP } Q \rangle} \quad \frac{2}{\langle 2 \text{ SUP } 1 \rangle} \text{ SUP}$
b. $\langle 1 \text{ SUP } Q \rangle \quad \langle 2 \text{ SUP } 1 \rangle \text{ SUP}$

As another example, consider:

- (79) a. John handed the scarf to Mary.
b. John handed Mary the scarf.
c. Mary was handed the scarf by John.

In (79a), the primary function of *John* is 1, of *the scarf* is 2, and of *to Mary* is 3. The derivation of the passive construction in (79c) from (79a) requires an intermediate transformation (79b):

- (80) John the scarf Mary
a. $\frac{1}{\langle 1 \text{ SUP } 1 \rangle} \quad \frac{2}{\langle 2 \text{ SUP } Q \rangle} \quad \frac{3}{\langle 3 \text{ SUP } 2 \rangle} \text{ SUP}$
b. $\langle 1 \text{ SUP } 1 \rangle \quad \langle 2 \text{ SUP } Q \rangle \quad \langle 3 \text{ SUP } 2 \rangle \text{ SUP}$
c. $\langle \langle 1 \text{ SUP } 1 \rangle \text{ SUP } Q \rangle \quad \langle \langle 2 \text{ SUP } Q \rangle \text{ SUP } Q \rangle \quad \langle \langle 3 \text{ SUP } 2 \rangle \text{ SUP } 1 \rangle \text{ SUP}$

Diagram (80) shows that sentence transformation does not necessarily involve a superposition of the function of every sentence member with some other function. Thus, the function of *John* remains the same through the transformation of (79a) into (79b). The situation when a function does not change with a transformation may be called *null superposition*.

Consider an example from Russian:

- (81) a. *Shkola obespechila uchebniki uchenikam.*
school-NOM supplied textbooks-ACC students-DAT
'The school supplied textbooks to students.'

- b. *Shkola obespechila uchenikov uchebnikami.*
 school-NOM supplied students-ACC textbooks-INSTR
 'The school supplied students with textbooks.'

In (81a) the primary function of *shkola* is 1, of *uchebniki* 2, and of *uchenikam* 3. The transformation of (81a) into (81b) involves the superposition of 3 and 2, which entails the superposition of 2 and Q, as shown in the following diagram:

(82)	<i>shkola</i>	<i>uchebniki</i>	<i>uchenikam</i>	
a.	1	2	3	SUP
c.	⟨1 SUP 1⟩	⟨2 SUP Q⟩	⟨3 SUP 2⟩	

Diagram (82) shows that the transformation of (81a) into (81b) involves the superposition of 3 with 2, which entails the superposition of 2 with Q, and the null superposition of 1.

Why does the superposition of a term function X with the term function Y involve the superposition of Y with the function of the oblique term Q? For example, why does the superposition of 2 with 1 entail the superposition of 1 with Q? This phenomenon is a consequence of the Term Uniqueness Law, which allows only one of each function to be present simultaneously in a sentence. If, for example, in a sentence, 2 coincides with 1, and 1 does not superpose with Q, then the sentence will have two 1's, which violates the constraint imposed by the Term Uniqueness Law on the structure of the sentence.

On examples (74) and (75) we saw that corresponding passive and active are isomorphic if analyzed in terms of dependency relations. The isomorphism is explained by the identity of the dependency relations between the second argument of the predicate and the predicate, on the one hand, and the dependency relation between the predicate and its attribute, on the other hand. The same reasoning applies to any case of transformation. Any passive transformation can and must be described both in terms of superposition and in terms of the conversion operation. Converseness relation constitutes an essential aspect of passive transformation.

10.7 Passive

Let us now take an in-depth look at the passive voice. Pursuing the program of disentangling grammar from the non-grammatical facts belonging in the lexicon, we want to define a theoretical concept of passive as distinct from the

various taxonomic versions of this concept tailored to meet the lexical constraints on the rules of passive in individual languages.

10.7.1 Bipartite passive as a paradigmatic phenomenon

What is called passive covers heterogeneous phenomena. We must sharply distinguish between passive as a paradigmatic phenomenon and passive as a syntactic phenomenon. These are quite different things. Consider languages such as classical Arabic or the earlier stages of Latin. These languages had only bipartite, or short, passive, which did not correlate with tripartite, or long, passive as neither classical Arabic nor early Latin had the tripartite construction. It turns out that if bipartite passive does not correlate with tripartite passive, it is a semantic rather than syntactic phenomenon. Compare the following Latin constructions:

- (83) a. *Venator necat.*
‘The hunter kills.’
b. *Venator necatur.*
‘The hunter is killed.’

In (83) we have a semantic opposition between *necat* and *necatur*, which are related morphologically. Let us now compare this with tripartite passive constructions:

- (84) a. *Venator necat lupum.*
‘The hunter kills the wolf.’
b. *Lupus necatur a venatore.*
‘The wolf is killed by the hunter.’

(83) and (84) are significantly different. In (83) *necat* and *necatur* are opposed to each other as two items in a semantic alternation. In (84) there is no opposition between *necat* and *necatur*. Rather we have a transformation of (84a) into (84b). By establishing isomorphism between the two constructions based on the Nucleus Law, we conclude that the each construction is related to the other as its converse. The functional equality of (84a) and (84b) does not permit us to evaluate the difference between *necat* and *necatur*.

In the study of diatheses, one cannot overstate the importance of a rigorous distinction between two levels: 1) the semantic level and 2) the level of syntactic transformations. The level of syntactic transformations is higher with respect to the semantic level in a way that is analogous to the distinction of two levels in phonology: the phonological level is higher with respect to the phonetic level. Thus, at the phonetic level, the aspirated p^h in the English word *pot*

and the non-aspirated *p* in the English word *top* are two distinct entities. But at the phonological level, the English aspirated *p^h* and non-aspirated *p* are two instances of the same entity — the phoneme /p/.

The grammatical value of the passive predicate becomes overt only at the semantic level. Thus, the functional equality of the Latin (84a) and (84b) does not permit us to evaluate *necatur*. The proper grammatical value of the passive form *necatur* becomes overt only at the lower level of contrasting reduced bipartite passive constructions (83a) and (83b). Semantic oppositions take place at a level lower than that of syntactic transformations. At the higher level — the level of syntactic transformations — *A necat B* becomes *B necatur ab A*. At the lower level — the level of semantic oppositions (lower level) *A necat* becomes *A necatur*. A sentence consisting of a subject plus a derived intransitive verb cannot be considered a passive construction until it enters the opposition BIPARTITE PASSIVE : TRIPARTITE PASSIVE.

We must conclude that if a language lacks the opposition BIPARTITE PASSIVE : TRIPARTITE PASSIVE, then bipartite passive is a semantic rather than syntactic class. Classical Arabic and early Latin have passive only as a semantic class.

10.7.2 *Passive proper*

Passive proper is a transformational notion. We use the term ‘transformation’ here to refer to a specific operation defining an equivalence relation between word combinations, independently of their representation in terms of linear order, case marking, or verbal morphology. Transformation is an operation mapping one word combination into another equivalent word combination. The structure of a word combination remains invariant of the transformation. Active and passive share their grammatical structure. By saying that a transformation defines the equivalence relation between active and passive sentences, I do not mean to say that corresponding active and passive constructions have the same meaning. They usually have different meanings. We should not confuse equivalence with identity.

One could object to our conclusion that passive is the converse of active on the grounds that passive is intransitive whereas active is transitive. To solve this puzzle, let us consider the status of the Latin prepositional phrase *a venatore* in (84b), English agentive phrase in *by Shakespeare* (74b), or Russian instrumental *Shekspiro* in (75b). What are they? Superficially, they are an oblique case and an oblique prepositional term. But this is not all. These oblique terms behave like subjects. They have a dual character: they are both

subjects and obliques simultaneously. I emphasize: they are neither subjects nor obliques; they are both.

One could also object to the claim that tripartite passive is a transformation of the active construction on the grounds that there is no straightforward correspondence between active and passive constructions. For example, not every active construction can be passivized:

(85) This jug holds two pints.

Sentence (85) does not transpose into a passive sentence. *A Grammar of Contemporary English* (Quirk, Greenbaum, Leech & Svartvik et al. 1976: 803-806) distinguishes five types of 'voice constraint' associated with the verb, object, agent, meaning, and frequency of use. Some verbs like *say*, *calculate* or *repute*, have no direct active analogue (Quirk et al. 1976: 841):

- (86) a. He was said to do it. ~ *They said him to do it.
b. He was calculated to do it. ~ *They calculated him to do it.
c. He was reputed to do it ~ *They reputed him to do it.

What can we say to this objection? We must answer it from the standpoint of the central goal of the theory of grammar. The central goal of the theory of grammar is the discovery of the laws of grammar, which in this case is the discovery of the law of passivization, that is, the discovery of the invariant of the class of grammatical rules of passivization that occur in various languages. As was said earlier, the laws of grammar cannot be formulated in terms of linear word order, case markings, or verbal morphology. Nor can the laws of grammar be formulated in terms of the lexical constraints of individual languages. Constraints on passivization in English are the lexical constraints of English. Other languages may have other individual lexical constraints on passivization. According to the Principle of the Contrast of Structural and Lexical Signs, the proper subject matter of the theory of grammar is the relation between structural and lexical constituents of words and word combinations. We must not confuse grammar with the lexicon. Lexical constraints on passivization belong in the lexicon. The study of the behavior of individual words is important because a complete knowledge of an individual language includes the knowledge of the lexicon. But this study is part of the study of the lexicon; it is not part of the subject matter of grammar. In formulating the laws of grammar we have to abstract from the lexicon of individual languages. This means that we must use a proper idealization in order to be able to formulate the law of passivization or any other law of grammar. The theory of grammar is impossible unless it uses a proper idealization to define its subject matter. I repeat: we should not con-

fuse grammatical meanings with lexical meanings, nor grammatical constraints with lexical constraints, nor grammar with the lexicon.

10.7.3 Relation between bipartite and tripartite passive

We may ask: what is the relation between tripartite and bipartite passive? Under the Nucleus Law and the Principle of Maximal Distinction (8.6) bipartite passive is a reduction of tripartite passive. In making this claim we must do away with a number of possible objections.

Firstly, it may be objected that languages like classical Arabic did not have tripartite passive. This objection was dealt with earlier, when we said that bipartite passive does not contrast with tripartite passive. Bipartite passive is not passive proper but a semantic phenomenon.

Secondly, it may be objected that historically, tripartite passive developed from bipartite passive. The answer to this is that synchronic relations are independent of diachronic considerations. It is very probable that historically impersonal sentences preceded subject-predicate sentences. It may well be that historically subject-predicate sentences were derived from impersonal constructions. But language evolution should not be confused with the contemporary language state. From a synchronic point of view, bipartite passive is a reduction of tripartite passive.

Thirdly, it may be objected that bipartite passive is the standard form of passive, while tripartite passive is used only for stylistic purposes. True, but this consideration has nothing to do with the theory of grammar. The theory of grammar is concerned with the structural analysis of language rather than with various uses of grammatical constructions.

Fourthly, one can argue that bipartite passive outnumbers tripartite passive and so must be basic. In fact, the numerical preponderance of bipartite passive over tripartite passive is a constant factor in all languages having the opposition BIPARTITE PASSIVE : TRIPARTITE PASSIVE. This phenomenon is a natural consequence of the fact that tripartite passive is only a stylistic variant of the corresponding active construction and is therefore less necessary. Yet the numerical preponderance of bipartite passive in itself neither proves nor disproves that tripartite passive is subordinate to bipartite passive. The theory of grammar has to look for more substantial arguments to determine whether tripartite passive is subordinate to bipartite passive.

10.7.4 Reciprocal subordination between a syntactic unit and its nucleus

As a final objection to our conclusion that bipartite passive is derivative with respect to tripartite passive, it should be observed that by using the application

operation we first construct bipartite passive and only then tripartite passive. It could be argued that under this constructional hierarchy, bipartite passive is basic and tripartite passive superposed. One could even propose to treat bipartite passive as a conversion of the active with an unspecified subject, as we have in the German:

- (87) *Man liest dieses Buch gerne.*
'People read this book with pleasure.'

In (87) *Man* denotes an unspecified subject like the French *on*. It could be proposed that the conversion of the active with an unspecified subject into the bipartite passive construction with an unspecified agentive term be taken as the basis for the explanation of tripartite passive. Viewed from this angle, tripartite passive is explained as a result of the extension of the bipartite passive with an unspecified agentive term by adding an oblique term denoting some concrete agent.

I agree that from the point of view of the process of construction, bipartite passive is a fundamental structure. But this is not the issue. The issue is the quest for an explanation of the equivalence between the active with a normal subject and a direct object and the corresponding tripartite passive. The characterization of tripartite passive as an extension of bipartite passive is correct, but it is only one part of the story. In our quest for an explanation of the equivalence relation between tripartite passive and the corresponding active, we discover the duality of the part-whole relation in language. On the one hand, to the extent that the whole is constructed of parts, parts are fundamental and the whole is subordinate to parts. But on the other hand, the whole is the goal and parts are only means for constructing the whole — and from this perspective parts are subordinate to the whole.

Think of a house. We can describe how a house is constructed from building blocks; but we can also describe a house from another perspective: how it functions and what the purpose of a particular block in the whole is. This analogy illustrates the concept of the dual hierarchy between the parts and the whole: the whole is subordinated to its parts from the point of view of the construction of the whole from its parts; but the parts are subordinated to the whole from the standpoint of the functioning of the whole. This is true of any language unit.

The structure of every linguistic unit is characterized by this dual hierarchy: the constructional hierarchy and the functional hierarchy. With respect to the constructional hierarchy, any complex unit is subordinated to parts from which it is constructed, and so, naturally, tripartite passive is subordinate to bipartite passive. With respect to the functional hierarchy, the behavior of every simple unit is subordinated to the functional properties of the complex unit whose

parts they are, and so, naturally, from this standpoint bipartite passive is subordinate to tripartite passive.

The correct analysis of passive rests on a corollary of the Nucleus Law — the Law of Dual Subordination of a Syntactic Unit and Its Nucleus:

[D51] LAW OF DUAL SUBORDINATION OF A SYNTACTIC UNIT AND ITS NUCLEUS

A syntactic unit is subordinated to its nucleus insofar as the nucleus is the base from which the syntactic unit is derived. By contrast, the nucleus is subordinated to its syntactic unit insofar as the syntactic unit may be reduced to the nucleus, so that the unit is represented by its nucleus.

To see the action of the Law of Dual Subordination of a Syntactic Unit and Its Nucleus, let us consider a Russian sentence:

(88) *Ivan ubil volka.*
‘John killed a wolf.’

(88) can be analyzed as follows:

- (89) a. (Ivan (ubil volka))
 b. (ubil volka)
 c. ubil

In (89a), we have the complete structure of (88) and in (89b-c) we have its reduced structures: (89b) is the nucleus of (89a) and (89c) is the nucleus of (89b). Insofar as nuclei are bases from which syntactic units are derived, (*ubil volka*) is subordinated to *ubil*, and (*Ivan (ubil volka)*) is subordinated to (*ubil volka*). On the other hand, from the functional perspective, (*ubil volka*) represents and is subordinated to (*Ivan (ubil volka)*), and *ubil* represents and is subordinated to (*ubil volka*).

The functional hierarchy of the linguistic unit is crucial. If we do not understand the functional hierarchy of the structure of linguistic units, we are unable to explain the equivalence between tripartite passive and the corresponding active. More generally, we are unable to construct an explanatory theory of diatheses because the essential part of this theory is the explanation of equivalence relations between various structures.

The Nucleus Law and the Principle of Maximal Distinction offer deep insight into the functional hierarchy of the structure of linguistic units. Our theory of diatheses can only be properly understood in the light of these theoretical statements.

10.7.5 Middle voice

In conclusion, let us consider questions concerning the distinction between semantic and syntactic aspects of diatheses as raised by the middle voice.

What is the relation between passive and middle diathesis?

There is an essential difference between the oppositions ACTIVE:PASSIVE and ACTIVE:MIDDLE. The first is a syntactic opposition, while the second, like the paradigmatic bipartite passive described in 10.7.1, is a semantic opposition. As a purely semantic opposition ACTIVE:MIDDLE is subordinate to ACTIVE:PASSIVE.

By its origin, the middle voice is a development of an intransitive value which has superposed with the function of the passive verb. The fact of the matter is that the middle voice is a combinatory variant of bipartite passive. Like bipartite passive, middle contrasts with tripartite passive: while tripartite passive is based on the conversion operation, the middle voice involves only the direct object in the accusative.

As was shown earlier, the opposition of tripartite passive and corresponding active belongs to the higher level of syntax — to the level of syntactic transformations. This is not true of the opposition between active and middle. This opposition is reducible to the mere semantic differences. For example, λούει τὰς χεῖρας ('washes the hands') and λούεται τὰς χεῖρας ('washes himself the hands') is reducible to the semantic difference λούει:λούεται (for more details, see Kuryłowicz 1964: 56ff).

Since the middle diathesis does not belong to the level of syntactic transformations, it is not commensurable with passive proper and must be considered a semantic rather than syntactic phenomenon.

10.8 Critique of the generativist notion of transformation

10.8.1 Nominal constructions

Although generative transformational grammar arose in reaction to classical linguistics, in fact generative transformational grammar is in the same league as classical linguistics: both confuse linguistic and logical analysis and, as a result, study linguistic variants rather than linguistic invariants.

This is most clear from the way the device of transformation is used by the generative transformational grammar. No matter what the linguistic structure under analysis is, transformational grammar will derive it from a sentence buried in the unfathomable depths of so-called 'deep structure.' Many theses have been written uncovering ingenious sentential constructions underlying every conceivable word combination. Semiotic Linguistics recognizes transformation as a linguistic process. However, explicit linguistic motivation is required to

posit a transformation for each particular type of syntactic combination. To see the difference between the two approaches, let us consider some examples.

Let us start with nominal combinations, like *the big table*. As we said, generative grammar invariably and erroneously treats a nominal construction (where by nominal construction we mean sentences with a predicate consisting of a copula plus noun or adjective) as a transformation from the sentence *the table is big*. Semiotic Linguistics, on the other hand, regards *the big table* as a basic, transformation-free construction.

How do we decide which structure is to be recognized as basic and which as derived? To answer this question, let us consider the relation between the adjective and the noun as constituents of the syntactic combination ADJECTIVE+NOUN, where the adjective is an operator and the noun, its operand.

The primary syntactic function of the adjective and the noun must be established in accordance with the Principle of Maximal Distinction (8.6), on which the primary function of a sign is determined by the context where this sign is maximally distinct from related signs. On the Principle of Maximal Distinction, the maximal distinction between a noun and a verb is given by the context NOUN + FINITE VERB as in this context the noun functions unequivocally as subject and the verb as predicate. And the maximal distinction between a noun and an adjective is given by the context ADJECTIVE+NOUN as in this context the adjective functions unequivocally as an attribute of a noun.

It would be wrong to determine the characteristic function of a noun or an adjective by their function as predicates in a nominal sentence, that is, a sentence having the structure NOUN+NOMINAL as, for example, in the Russian sentences *On — student* 'He is a student' or *Bumaga belaja* 'The paper is white.' In this context, we cannot determine the characteristic syntactic function of a noun or an adjective because in this context the syntactic function of nouns and adjectives coincides. This is the context of a suspension of the differentiation between the characteristic syntactic functions of the parts of speech. The use of nouns and adjective as predicates in nominal sentences determines their secondary rather than their primary syntactic function.

Generative transformational grammar makes a methodological mistake when it considers *white paper* a transformation of *paper is white*. Rather, the reverse is correct: *paper is white* is a transformation of *white paper* because the attributive syntactic function is the characteristic syntactic function of adjectives and the predicative syntactic function is a secondary one. On the other hand, a participial construction like *a flying plane* is less basic with respect to *a plane flies* because the characteristic syntactic function of verbs is to be predicates in predicative constructions, and their syntactic functions in other contexts are secondary.

It is erroneous to consider the expression COPULA+ADJECTIVE or COPULA+NOUN an independent predicate. This expression forms a context that assigns the adjective a secondary syntactic function of a predicate on top of its primary syntactic function of an attribute of a noun.

We must distinguish two kinds of syntactic contexts: the contexts that unequivocally determine the primary syntactic function of signs by maximally differentiating between them and the contexts where the difference between primary syntactic functions of signs is neutralized and where signs acquire secondary syntactic functions. The Principle of Maximal Distinction defines a context that determines the *invariant* of a sign under a class of superpositions determining its secondary functions.

10.8.2 Apposition

Similar sentence-based bias leads transformationalists to analyze appositive constructions like *Peter, Tsar of Russia* as derived from *Peter was Tsar of Russia*. On our view, apposition is a special case of syntactic phenomenon of extraction, whereby a sentence constituent is made prominent by being extracted from its normal syntactic position. Compare: *my brother John lives in London* and *John, my brother, lives in London*. On our view, the noun phrase *Tsar of Russia* has a secondary syntactic function of the attribute in the apposition *Peter, Tsar of Russia* and a secondary syntactic function of the predicate in the sentence *Peter was Tsar of Russia*.

10.8.3 Genitive case

The genitive case is often regarded by the transformationalists as the instrument of transformation in nominalizing constructions, such as *the arrival of the enemy* and *the destruction of the city*. The genitive plays an important role in the derivation of verbal nouns from finite verbs: *genetivus subjectivus* represents the subject and the *genetivus objectivus* represents the direct object.

Granting the fact that the genitive is used in the derivation of nominalization, we must nonetheless reject transformationalists' further claims that all genitive structures are derived from sentences. It is wrong to claim that *domus patris* 'father's house' is a structure derived from the sentence *domus est patris* 'the house is father's.'

In contrast to other oblique cases and prepositional combinations, the genitive is primarily an adnominal, rather than adverbial, case. Together with the nominative and the accusative, the genitive constitutes the basis of the case system of any inflectional language (Kuryłowicz 1973: 131-150). In this way, the genitive is opposed to peripheral cases like the dative, instrumental, loca-

tive, etc. The genitive always has the primary syntactic function of an attribute of a noun regardless of whether it is motivated by a verbal transformation or not, as is the case with *genetivus partitivus*, *genetivus possessivus*, *genetivus mensurae*, etc. Transformations do not define the distinction between basic and derived combinations of signs: primary syntactic function does.

In the constructions like *domus patris* the genitive has its proper syntactic function of noun attribute. To claim that *domus patris* is derived from *domus est patris* is as misguided as to claim that *the big table* is derived from *the table is big*.

10.8.4 Concrete and abstract nouns

The indiscriminate sentence-based analysis of noun phrases offered by transformational grammar betrays the logical view of language abstracted from the way language articulates into lexical and structural components. Sentence is not necessarily a basic syntactic structure. Whether a noun or a sentence is basic must be established by a careful linguistic analysis.

Having said this, let us now briefly consider the status of so-called abstract nouns. It is common both among logicians and among linguists to treat concrete and abstract nouns as two opposed classes (roughly, concrete nouns denote whole entities, while abstract nouns refer to single properties of objects, like quality, action, etc.). It is a methodological mistake to oppose these two classes of nouns directly. Abstract nouns differ from concrete nouns directly not by their meaning but by their syntactic function. The syntactic function of abstract nouns is to compress a sentence into a nominal group, as in: *The president arrived* → *The arrival of the president*. In the process of nominalization, the predicate becomes the head of a nominal group. According to the distinction between two kinds of predicates, we distinguish two kinds of nominal groups: nominal groups derived from verbal predicates and nominal groups derived from nominal predicates.

The functional derivation of nominalized nouns maybe represented as follows:

- (90) Level I. Sentences: *students arrive; the girl is beautiful*
 Level II. Derived nominal groups: *the arrival of students; the beauty of the girl*
 Level III. Abstract nouns: *arrival; beauty*

From the functional point of view, abstract nouns are part of the nominal groups, from which they can be extracted. To oppose directly abstract nouns, which involve derivation, and concrete nouns, which do not, is a methodologi-

cal mistake comparable to the confusion of prosodemes with differential features of phonemes.

10.8.5 Confusion of lexical and structural signs

As we have observed, we must distinguish between two kinds of syntactic contexts defined by the Principle of Maximal Distinction: 1) contexts that unequivocally determine the primary syntactic function of signs by maximally differentiating between them and 2) contexts where the difference between primary syntactic functions of signs is neutralized and where signs acquire secondary syntactic functions. The failure to do so leads to a confused and erroneous analysis.

Consider the sentences:

- (91) a. She is eager to please.
- b. She is easy to please.

Transformational grammarians assign (91a) and (91b) different deep structures on the grounds that the relation between *she* and *please* is that of a subject in (91a) and that of an object in (91b).

Is the difference between (91a) and (91b) a difference of syntactic structure? Does the difference in the relation between *she* and *please* in (91) mean that (91a) and (91b) have different syntactic structures? Transformational grammar answers 'yes' and assigns different deep structures to these sentences. But let us have a deeper look at this problem; let us consider it from a semiotic point of view.

If in certain contexts the opposition SUBJECT:OBJECT is suspended, then object participates in the functioning of subject, so that subject becomes indeterminate: depending on the lexical context, subject functions as subject or it may function as object. In our case, *she* functions as subject in the context of the word *eager* and as object in the context of the word *easy*. Unaware of the semiotic concepts, semiotic laws, and semiotic techniques of linguistic analysis, transformational grammar confounds structural morphemes with lexical ones — confounds linguistic analysis with psychological one, inventing en route fictitious entities such as deep structures and assigning them to poorly understood syntactic structures of word combinations.

There is a drastic difference between lexical and structural signs: while lexical signs interpret reality directly, structural signs interpret lexical signs themselves. The stratification of language into the level of lexical signs and the level of structural signs is the essential feature of language as opposed to thought. A characteristic feature of the logical analysis is the abstraction from the distinc-

tion between lexical and structural signs. While the linguistic analysis of language entirely hinges on the distinction between lexical and structural signs, the logical analysis of language is, in contrast, a global analysis of words and sentences that deliberately abstracts from the distinction between lexical and structural signs.

10.8.6 Use of transformations in linguistics

To summarize, we remark that: 1) correctly defined syntactic transformations play a significant role in the system of language because they determine significant syntactic processes of language; 2) both sentences and noun phrases can serve as basic syntactic combinations; 3) derivations of certain words, like words that involve word class change, imply syntactic transformation.

Chapter 11

Genotype Categorial Calculus

11.1 The theoretical apparatus of Semiotic Linguistics

Before I present an outline of the mathematical formalism used by Semiotic Linguistics, I want to emphasize that we should make a clear distinction between a theory and a mathematical notation it adopts. A theory, and in our case a linguistic theory, is complete in itself regardless whether or not it is represented by a mathematical formalism, and no formalism can ever replace a theory for which it is employed.

In the development of semiotic theory of language, our guiding light was the Principle of Differences. One cannot overstate its importance. Linguistic meanings are linguistic forms of thought. As Sapir put it (1921: 217-218), “Language and our thought-grooves are inextricably interrelated, are in a sense one and the same.” It is wrong to say that thought itself is intrinsically formless; for thought does not exist before and independently of language, nor does language exist before and independently of thought.

The notion of language as thought-grooves, as the form of thought, has been widely recognized by linguists and philosophers. It is a well-established fact that different languages discriminate the elements of reality in different ways — that is, different languages classify reality in different ways. This phenomenon was first described clearly by Humboldt (1836) and later studied by a number of linguists and philosophers, among them by Sapir (1921) and Whorf (1956). Linguistics must explain this phenomenon. It must answer the question: Why do different languages classify reality in different ways?

To answer this question linguistics must analyze the essential properties of linguistic expressions. By such an analysis we discover that the fundamental properties of linguistic expressions — morphemes, words, combinations of

words, sentences — is interdependence between sound and meaning. This is not a simple combination of the two entities. Rather it is their blend and their bond, comparable to a chemical bond between two substances, like oxygen and hydrogen. The qualities of water are not reducible to the qualities of oxygen and hydrogen on their own: water is a completely new substance that emerges from the combination of the two elements. Similarly, linguistic expressions are not reducible to sound and meaning taken separately. Meaning separated from sound is a concept — a psychological rather than a linguistic entity. Sound separated from meaning is an acoustic fact rather than a linguistic entity. The analogy with chemistry falls short in one important respect that both water and the elements it consists of — oxygen and hydrogen — are chemical substances, both are facts of chemistry. By contrast, when we decompose a word or any other linguistic unit into a concept and vocal element, both the concept and the vocal element cease to be linguistic facts; they no longer belong to linguistics.

The sound-meaning bond is a fundamental property of language on which all its other properties depend. What we call sign is sound in its relation to meaning. A sign is a vocal entity having a meaning. In this sense, all linguistic expressions are signs. The study of properties of linguistic expressions is the study of the properties of linguistic signs. This view of linguistic units is what I call the *semiotic view of language*. Accordingly, I call the sound-meaning bond the basic semiotic fact of language, the basic concept of linguistics.

The Principle of Differences says that the only distinctions between meanings that are semiotically relevant are those distinctions that correlate with their signs, and vice versa, the only distinctions between signs that are relevant are those that correlate with the distinctions between meanings. Given two meanings A and B, they belong in different classes if they correlate with different signs, and in the same class if they do not. This law characterizes the essence of language — what may be called *linguistic reality*. It establishes a new technique of representing sound and meaning, opposed to the techniques of representation employed by the generativist paradigm, Montague Grammar and various other linguistic frameworks. The main error of the existing doctrines is that they ignore the sound-meaning bond: either they represent differences and similarities between vocal expressions regardless of whether or not there are concomitant differences and similarities between meanings (like generative phonology) or conversely, they represent differences and similarities between meanings regardless of whether or not there are concomitant differences and similarities between vocal expressions (like generative semantics). The idea that language concepts can be analyzed separately from their encoding by sounds or that sounds can be analyzed separately from the concepts they represent is banished from linguistics by the Principle of Differences. In accordance

with this principle we formulate a system of new principles which fundamentally obviate the techniques of analysis currently in use. I call these principles the *semiotic constraints on grammar*. They are keys to overcoming the present crisis of linguistics.

Formalist linguistics of the Chomskian paradigm does not recognize the distinction of the two levels of the study of language, which makes it unfit to be a study of language universals. If grammatical concepts and laws are to be understood as language-independent, universal entities cannot be defined and formulated in terms of linear order or linearly ordered constituents.

11.2 The choice of the mathematical framework

The formal framework of genotype grammar is genotype calculus, which is the metalanguage of combinatory logic, modified and interpreted in terms of the concepts of genotype grammar.

There is a deep analogy between genotype calculus and combinatory logic: both genotype calculus and combinatory logic are concerned with entities invariant of their linear representations. Combinatory logic was formulated as a system in which formal objects were conceived of rather differently than in standard formalizations of mathematical logic. The standard formalizations of logic demand that formal objects be expressions of some 'object language,' that is, that they be strings formed of the symbols of that object language by concatenation. By contrast, in combinatory logic formal objects, called *obs*, are completely unspecified. It is merely postulated that there is a binary operation of application among them, that *obs* are constructed from the primitive objects, called *atoms*, by this operation, and that the construction of an *ob* must be unique. This means that *obs* are thought of not as strings of atoms but like genealogical trees. Of course, there are various ways in which such a tree may be associated with a string. Any method of making such an association between *obs* and special expressions called *wefs* (*well-formed expressions*) is called a *representation of the system*. A linear language is a representation in this sense only if it is monotectonic, that is, if every *wef* in this language indicates a unique construction, that is, a unique tree (cf. Curry & Feys 1958; Curry 1961).

We may think of natural language in an analogous manner. That is, we may think of it not as a system of expressions, but as a system of non-linearly ordered phrases formed from primitive, or atomic, phrases by operators. We may go further and think of a phrase as a construction by means of a single operation of application. In this way we may conceive of the grammatical structure of natural language as something independent of the way it is represented in

terms of expressions. This grammatical structure may be studied in terms of categories of operators. Thus, we must distinguish two levels: *genotype grammar* (corresponding to Curry's *tectogrammatics*), which is the study of grammatical structure in itself, and *phenotype grammar* (Curry's *phenogrammatics*), which is the way the grammatical structure is represented by expressions. Semiotic universals belong in genotype grammar, which is the main part of Semiotic Linguistics (for the use of genotype calculus on the phenotype level, see Segond 1990; Shaumyan & Segond 1992, 1993, 1994).

In all sciences, mathematics, and especially its modern technological form of computational mathematics, has played only a subordinate, superposed role. Mathematics is only a form in which we express our understanding of nature and reality; but it is not the content of that understanding.

It is important to distinguish two concepts of form: linguistic form and mathematical form. Linguistic form is an intrinsic form of language. Mathematical form is an extrinsic form imposed on language. Mathematical form is useful when it corresponds to linguistic form and is used to present linguistic form precisely and make it more intelligible. There is no guarantee that mathematical form in itself corresponds to linguistic form. It may or may not correspond to linguistic form. In the latter case the use of mathematics in linguistics is pernicious. The epitome of the pernicious use of mathematics in linguistics is generative phonology. Generative phonology pretends to deal with the form of sound, but in reality it deals with the substance of sound rather than with its form. Paradoxically, the use of mathematics in generative phonology pretends to be a kind of formal linguistics, but in reality it is the study of substance rather than form and as such is the worst kind of taxonomy — the worst kind of vulgar empiricism.

What is important is that mathematical form must be adequate to linguistic form. We reject standard mathematical logic as an inadequate tool for expressing the content of a theory of grammar. But new developments of logic produced quite different types of logical theories that are closely related to linguistics. I have in mind combinatory logic, in the first place. The semantic theory of combinatory logic, properly modified, can serve as a mathematical model of natural language. I have developed a formal semantic model of natural language, called genotype calculus. This model is an effective tool for expressing laws of grammar. Genotype calculus is one of the possible productive application of mathematics to linguistics.

The mathematical framework for semiotic universal grammar is a version of categorical grammar. Categorical grammar is not a theory of grammar but a mathematical calculus, whose various versions have been applied to very different and even mutually incompatible linguistic theories. My version of cate-

gorial grammar may be called *meronymic categorial calculus* because it deals exclusively with meronymic, or part-whole, relations between classes. In contrast, other versions of categorial grammar as proposed by Lambek, Moortgat or Steedman, are concerned with tying categorial types to word order to solve word-order problems in the first place rather than aspiring to investigate the structure of word combinations, which makes these versions very different and even incompatible with meronymic categorial calculus.

11.3 An outline of genotype calculus

Genotype grammar uses a variable-free formal language, called *genotype calculus*, as its formal framework. *Genotype calculus* is an applicative semiotic system used as a formal metalanguage for describing natural languages. Although genotype grammar can be presented precisely entirely in terms of ordinary English, ordinary Russian, or any other ordinary non-formal language enriched by technical terms, genotype calculus makes the presentation of genotype grammar more compact and transparent. Therefore, I use genotype calculus whenever it is convenient. A complete presentation of genotype grammar is found in (Shaumyan 1987) and (Desclés 1990). Here I will be concerned with some basic ideas of genotype calculus.

In genotype grammar, from the standpoint of the grammatical meaning of the signs, there are three fundamental types, or classes, of signs: terms, sentences, and operators. The first two types we call *closed signs* in contradistinction to operators. From the standpoint of the complexity of the signs, genotype grammar recognizes two kinds of signs: 1) atomic signs and 2) composite signs constructed from atomic signs. By convention, we identify atomic signs with words: every atomic sign is a word. And we identify a composite sign with a combination of words.

For the classification of signs into types, or categories, we need four sorts of primitive notions:

- a. *Primitive sign types*. These are the types denoted by the symbol τ and symbol s . In the main interpretation, τ is interpreted as ‘term’ and s is interpreted as ‘sentence.’ (In formulating the laws of isomorphism between sentence, word, syllable, and phoneme, s can be interpreted as ‘complex’ and τ as ‘margin’; see 9.7, 9.8.).
- b. *Rules for constructing composite types from primitive ones*.
- c. *Axioms assigning types to atomic signs* (which are words, by convention).

- d. *Rules for inferring the type of a composite sign* (a word combination, by convention) when the types of its components are known. These include: 1) the application operation, 2) combinators, 3) natural deduction.

As an applicative system, genotype calculus is based on the Applicative Principle:

[D52] APPLICATIVE PRINCIPLE

Given an operator F of operands x_1, x_2, \dots, x_n , F can be replaced by the operator F' of x_1 , which yields the operator F'' of x_2 , and so on.

F' is said to be a *curried version* of F (called so after Haskell B. Curry — the creator of combinatory logic). The binary operation of combining F' with x_1 , yielding F'' , combining F'' with x_2 , and so on, is called the *application operation*, or, simply, *application*.

To denote operator sign types, let us introduce the primitive operator **O**, called *type constructor*. In an applicative system, an operator expression A combines with an operand expression B to form a resultant AB . If the type of the operand B is X and the type the resultant AB is Y , we can denote the type of the operator A as:

$$(92) \quad OXY$$

(92) reads: ‘operator type that combines with type X to produce the resultant Y .’

We can define the formal concept of sign type as follows:

- a. T and S are sign types.
- b. If X and Y are sign types, then OXY is a sign type.

Taking T and S as primitives, we can generate an inductive class of types as follows: $T, S, OTT, OSS, OTS, OST, OTOTS, OOTSOTS$, and so on.

In representing types we use the parentheses-free Polish notation, which is more convenient than Curry’s notation with internal parentheses.

Signs are assigned types by the type-assignment axiom schema:

$$(93) \quad xA$$

In (93) x is a sign type and A is a sign. This axiom schema is interpreted as ‘sign A belongs to type x .’

We assume the following constraints on type assignment:

1. *Inclusion*: Every atomic sign is assigned a proper type.
2. *Exclusion*: No sign belongs to more than one proper type.

3. *Superposition*: Every sign can be assigned superposed types superposed on its proper type.

The basic deductive process is specified by the Combination Rule:

[D53] **COMBINATION RULE**

If sign A belongs to type Oxy and sign B belongs to type x, then they combine to yield (AB) of type y:

$$(94) \quad \frac{\text{Oxy A} \quad \text{x B}}{\text{y AB}}$$

To make the genotype grammar notation compact, the concept of the recursively defined adjoined symbol is used (Shaumyan 1987: 199). A type symbol is called adjoined if it is introduced into the type system by a definition of the form:

$$(95) \quad z = \text{OXY}$$

where z denotes an adjoined type and OXY denotes a type where x and y are either other adjoined type symbols, or τ , or s .

We introduce adjoined type symbols recursively by a process called *definitional reduction*. By this process all adjoined type symbols are defined in terms of the ultimate definitia τ and s . We can introduce as many adjoined type symbols as we need. Here are some examples of definitional reduction for adjoined type symbols:

$$(96) \quad \begin{aligned} P_1 &= \text{OTS} \\ P_2 &= \text{OTP}_1 = \text{OTOTS} \\ P_3 &= \text{OTP}_2 = \text{OTOTOTS} \\ D_1 &= \text{OP}_1 P_1 = \text{OOTSOTS} \\ D_2 &= \text{OP}_2 P_2 = \text{OOTP}_1 \text{OTP}_1 = \text{OOTOTSOTOTS} \end{aligned}$$

The canonical word order requires that an operator precedes its adjacent operand. For example, the canonical form of *My brother, who is a nice guy, likes chocolate* is: *((likes chocolate) (my (who is (a nice guy)) brother))*.

Chapter 12

Semiotic Linguistics and Cognitive Grammar

Since there is a drastic difference between the conceptual foundations of Semiotic Linguistics and existing formalist grammars I do not feel that a comparison of Semiotic Linguistics with formalist grammars could be fruitful. But Semiotic Linguistics can be usefully compared with Langacker's theory of Cognitive Grammar. Cognitive Grammar is not a formalist grammar and although Semiotic Linguistics and Cognitive Grammar use sometimes different terms, they share a common ground. Thus, Semiotic Linguistics says that the use of signs is an essential feature of language, and Cognitive Grammar says the same recognizing that language is symbolic in nature. Like Semiotic Linguistics, Cognitive Grammar recognizes that from the symbolic nature of language it follows that meaning is central to essentially all linguistic concerns, that grammar is inherently symbolic and hence meaningful, and that it makes no sense to posit separate grammatical and semantic components. Both Semiotic Linguistics and Cognitive Grammar recognize that language is an integral part of human cognition.

There are also a lot of essential differences between Semiotic Linguistics and Cognitive Grammar and pointing out the differences between the two theories may be of interest and benefit for researchers working on either of these theories. As a basis for comparison I rely on Ronald W. Langacker's two-volume *Foundations of Cognitive Grammar* (Volume I, *Theoretical Prerequisites*, 1987; Volume II, *Descriptive Applications*, 1991) and John R. Taylor's *Cognitive Grammar* (2002), which reflects the advances in Cognitive Grammar since the appearance of Langacker's foundational work.

What strikes one at the first look at Langacker's work is its breadth. The two volumes make 1114 pages, covering both the theory of grammar and examples of its applications. All essential aspects of the theory of grammar are covered.

Volume I, titled “Theoretical Prerequisites,” starts with Part I, containing guiding assumptions and fundamental concepts, followed by Part II, devoted to the semantic structure, and Part III, concerned with grammatical organization. Volume II presents various detailed examples of applications of the theory of grammar: Part I is concerned with the nominal structure, Part II with the clause structure, and Part III with things beyond the clause.

Langacker’s work is of great interest and value to all concerned with the theory of grammar and linguistic theory. It is a significant event in that it marks a radical break with the formalist trend that has dominated contemporary linguistics. And it is also significant that although Semiotic Linguistics and Cognitive Grammar developed independently from each other, they have come to share a common ground. Hence a comparison of Semiotic Linguistics and Cognitive Grammar may throw new light on each of them and contribute to their progress.

Before comparing the two theories, let me first define the point of view of the comparison. Semiotic Linguistics is concerned with the foundations of the theory of grammar — it is concerned with the fundamental concepts underlying the theory of grammar. Therefore, in spite of the fact that Langacker’s research goes significantly beyond the foundations, I will limit my comparison exclusively to the fundamental concepts of the theory of grammar. The question I ask is this: What does Semiotic Linguistics and Cognitive Grammar contribute to the foundations of the theory of grammar, and what is the place of these contributions in the history of linguistics? One may object that this restriction of the scope of the comparison is unfair as it excludes from it the many contributions of Cognitive Grammar, which, although they do not belong to the foundations of the theory of grammar, nonetheless are of great value for linguistics. To this charge I answer: no matter how excellent achievements of a research are, the progress of science is measured by changes in its conceptual foundations.

We discover that Cognitive Grammar is guided by the assumption that language is symbolic in nature. Thus, Langacker writes:

Language is symbolic in nature. It makes available to the speaker — for either personal or communicative use — an open-ended set of linguistic **signs** or **expressions**, each of which associates a semantic representation of some kind with a phonological representation. I therefore embrace the spirit of classical Saussurean diagrams [...]. From the symbolic nature of language follows the centrality of meaning to virtually all linguistic concerns. Meaning is what language is all about; the analyst who ignores it to concentrate solely on matters of form severely impoverishes the nature and necessary subject matter of the discipline and ultimately distorts the character of the phenomena described. But is not enough to agree that

meaning is important if it results, say, merely in positing a separate semantic “component,” treating grammar separately as an anonymous entity. I contend that grammar itself, i.e., patterns of grouping morphemes into progressively larger configurations, is inherently symbolic and hence meaningful. Thus, it makes no more sense to posit separate semantic and grammatical components than it does to divide a dictionary into two components, one listing lexical forms and the other listing lexical meanings. Grammar is simply the structuring and symbolization of semantic content; for a linguistic theory to be regarded as natural and illuminating, it must handle meaning organically rather than prosthetically. (Langacker 1987: 11-12)

Cognitive Grammar is guided by the assumption that language is symbolic in nature, and Semiotic Linguistics is guided, in its own terms, by this assumption, as well. From the symbolic nature of language Cognitive Grammar infers the centrality of meaning to the study of language, and Semiotic Linguistics does the same. Cognitive Grammar rejects positing separate grammatical and semantic components, as does Semiotic Linguistics.

Semiotic Linguistics and Cognitive Grammar share a common ground because they are related to Saussure’s theory and to post-Saussurean structuralism. Yet in spite of the shared common ground, there are also substantial differences between the two frameworks.

Semiotic Linguistics is a crucial expansion of the conceptual foundations it shares with Cognitive Grammar. In fact, it is the expansion of the conceptual foundations that has led to a new research program. The new research program of Semiotic Linguistics is the result of the discovery and explanation of linguistic anomalies with respect to conceptual foundations shared by it with Cognitive Grammar.

The discovery of anomalies and creation of new principles and concepts as the result of the investigation of anomalies is central to Semiotic Linguistics. Cognitive Grammar, on the other hand, neither recognizes anomalies, nor sees the crucial problems they pose.

Central to the study of language is the investigation of categorization. The importance of the research on categorization has been recognized in recent literature on cognitive linguistics. But while recognizing the importance of the research on categorization, Cognitive Grammar does not recognize the crucial problems of categorization significant for creating new linguistic principles and concepts. Semiotic Linguistics has discovered essential anomalies of categorization whose investigation has led to significant results. As was demonstrated throughout the book, to solve the problems involved in the anomalies of categorization, it was necessary to split concepts: to split the sound into the sound proper and the phoneme, and to split the meaning into the meaning proper and

information. The phoneme is not more general than the sound; a sound is not an instance of a phoneme. The phoneme and the sound are entities of different levels of language: the sound belongs to the physical level, and the phoneme to the functional level. The sound and the phoneme do not differ with respect of generality; the phoneme is not more general than the sound, but it differs from the sound by belonging to the functional level of language. All sounds and phonemes are initially concrete entities; sounds are concrete entities belonging to the physical level, and phonemes are concrete entities belonging to the functional level. Phonemes cannot be deduced from the physical properties of sounds. A concrete phoneme is a construct that is engineered by building concrete distinctive oppositions between concrete sounds. Identical concrete phonemes form classes of identical concrete phonemes. It is convenient to treat a class of identical concrete phonemes as occurrences of one and the same phoneme in different positions. In order to do that, we use a special type of abstraction I call the *identifying idealization*. Under the identifying idealization we treat identical concrete phonemes as different occurrences of one and the same phoneme. For example, the word *kukt* 'cooked' is treated as consisting of one occurrence of phoneme /u/, two occurrences of phoneme /k/, and one occurrence of phoneme /t/. (Identifying idealization is the same as 'class-as-one reduction', the term we used in 7.3.3.)

The expansion of the conceptual foundations by Semiotic Linguistics has led to the discovery of the Principle of Differences, a principle on whose validity Semiotic Linguistics and semiotic grammar stand or fall. By using the Principle of Differences, supplemented by the Principle of Phonological Differences, Semiotic Linguistics has solved the problem of semantic and phonological categorization. Cognitive Grammar, on the other hand, has yet to find a satisfactory solution to this problem.

The solution to the problem of semantic and phonological categorization has raised the question: If a linguistic category is not based on shared properties, what are then the relations between units that belong to a category? The answer is the hierarchy of primary and secondary functions of units defined by the Principle of Superposition. It seems that the units having primary functions can be regarded, using Lakoff's terminology, as prototypes with respect to the units having secondary functions. Metaphors are words with secondary functions derived from primary functions by superposition.

We have serious objections with regard to the definition of units and the organization of Cognitive Grammar. Langacker (1987: 76) posits three basic types of structures: semantic, phonological, and symbolic. But symbolic structures are not distinct from semantic and phonological structures; rather they

combine the two. A symbolic structure is bipolar, consisting of a semantic pole, a phonological pole, and the association between them.

The bipolarity of the symbolic structure and the direct association between the semantic pole and the phonological pole runs into a problem. The problem is in the positing a direct association between the semantic pole and the phonological pole. A phoneme is part of a symbol. A sequence of phonemes is a sequence of parts of a symbol. As parts of a symbol, phonemes do not have meaning. Rather they have a diacritic function, that is, they serve to differentiate one sign from another. Now, a symbol is not a mere sum of its parts — a mere sum of its phonemes — but a new entity, characterized by having a meaning. Hence, the symbolic structure is not a direct association between the semantic pole and the phonological pole. Rather, the symbolic structure is a distinct structure intermediate between the semantic structure and the phonological structure. The basic structures are the semantic structure and the symbolic structure. The phonological structure, on the other hand, is subordinate to the symbolic structure. In order to understand how the phonological structure is subordinate to the symbolic structure, consider a symbolic system that is simpler than any human language and has only two phonemes, call them phonemes *A* and *B*. Phonemes *A* and *B* are diacritics, that is, signals that do not have meaning but are used to produce symbols. Call the class of symbols produced by the phonemes *A* and *B* the *lexicon* of the symbolic system. If the proposed symbolic system is to have symbols of only one phoneme length, it will be able to produce at most two symbols. Its lexicon can be increased, however, by allowing symbols produced by pairing the phonemes, giving four further signs: *AA*, *AB*, *BA*, *BB*. By allowing combining the two phonemes into triples further eight symbols can be produced: *AAA*, *AAB*, *ABA*, *ABB*, *BAA*, *BAB*, *BBA*, *BBB*. The longer the sequence, the larger the lexicon. The general rule is: *m* different phonemes in sequences of length *n* yield m^n different symbols. Since the potential size of the lexicon increases exponentially as the length of the allowable sequence increases linearly, sequencing is an efficient way to achieve a large lexicon with a limited number of phonemes.

Both Semiotic Linguistics and Cognitive Grammar are cognitive theories of language in the sense that both recognize that language resides in the mind and both attempt to describe what it is in the mind that enables people to create and understand linguistic expressions. But while Cognitive Grammar approaches the mind from a psychological point of view and relies on psychology, Semiotic Linguistics is free from psychological concerns and approaches the mind from its social aspects. To this end, the concepts of social mind and social consciousness have been introduced. Semiotic Linguistics regards its cognitive

theory of language as independent from psychology and rather grounded in the theory of the social mind and consciousness.

Summing up our comparison of Semiotic Linguistics and Cognitive Grammar, we discover considerable differences between the two theories of language. Yet in spite of their divergences, both are rooted in the research program advanced by Saussure. This is why Semiotic Linguistics and Cognitive Grammar belong in the same paradigm, which I venture to call the Saussurean Paradigm.

Epilogue

The work presented in this book validates the hypothesis that lies at the basis of Semiotic Linguistics. The hypothesis was that the essential facts of language can be discovered and explained by inferring them from the principles of the linguistic sign. Our inquiry showed that the principles of the linguistic sign are universal and describe the fundamental nature of language.

The study of language involves a sharp distinction between language data and facts of language. Language data is what we observe. Facts of language are those which are not accessible to direct observation but have to be discovered. Unlike other sciences, linguistics is in a very special situation. Language units and other concrete facts of language are not immediately apprehensible. Sausure characterized this situation as follows:

In most sciences the question of units never even arises: the units are delimited from the outset. In zoology, the animal immediately presents itself. Astronomy works with units that are separated in space, the stars. The chemist can study the nature and composition of potassium bichromate without doubting for an instant that this is a well-defined object.

When a science has no concrete units that are immediately recognizable, it is because they are not necessary. In history, for example, is the unit the individual, the era, or the nation? We do not know. But what does it matter?

But as the game of chess is entirely in the combination of the different chess pieces, language is characterized as a system based entirely on the opposition of its concrete units. We can neither dispense with becoming acquainted with them nor take a single step without coming back to them; and still, delimiting them is such a delicate problem that we may wonder at first whether they really exist.

Language then has the strange, striking characteristic of not having entities that are perceptible at the outset and yet of not permitting us to doubt that they exist and that their functioning constitutes it. Doubtless

we have here a feature that distinguishes language from other semiological institutions. (Saussure 1972: 149)

Any basic notion of fact in synchronic linguistics depends directly on our conception of the unit. Synchronic facts are identities and differences. The linguistic mechanism hinges on identities and differences which are counterparts of each other. The problem of identities and differences is ubiquitous. This problem is nothing but part of the larger problem of units. As further linguistic facts we have semiotic values and, ultimately, the synchronic reality, which covers all the basic facts of language.

Since language is a system of signs, the linguistic sign is a key to the discovery of the facts of language. From the principles inherent in the linguistic sign we infer linguistic units, the conditions of their identities and differences, and all other facts of languages. As we infer the facts of language from the principles of the linguistic sign, we at the same time explain them. Due to the special situation of linguistics the discovery and explanation of facts of language coincide.

The formulation of the principles of the linguistic sign and their function in the discovery and explanation of language facts leads to the recognition that linguistics belongs to a special domain of research called Semiotic Linguistics. The notion of Semiotic Linguistics has raised the question: What is the relation between Semiotic Linguistics and semiotics, Saussure's putative general science of sign systems? The analysis of sign systems other than language shows that these systems drastically differ from language. Nonlinguistic sign systems are second-order semiotic systems that have neither phonemes nor signs of language. Their signs are not linguistic signs but larger fragments of discourse. The signs of myths, narratives, works of art, etc. all have properties of sign systems only insofar as they can be interpreted by the linguistic signs of language. Hence, we cannot accept Saussure's statement that linguistics is part of semiotics. We have to reverse Saussure's idea: linguistics is not part of semiotics, not even its most privileged part; rather, it is semiotics that is part of linguistics. Of course, this contention makes sense only if linguistics is understood and treated as a science of systems of linguistic signs, which at present it is not. This is why I propose the term 'Semiotic Linguistics' as the name for linguistics which is concerned with its proper subject matter: systems of signs of language. Semiotic Linguistics is the future of linguistics.

The complementarity of linguistic identities and differences is codified in the Principle of Differences, which is a cornerstone of Semiotic Linguistics. The discovery of this principle is as foundational to linguistics as the discovery of the law of inertia has been for mechanics.

As a consequence of the Principle of Differences and its corollary Principle of Duality of Categorization we had to split the traditional concept of meaning into 'meaning proper' and 'information.' This split is as necessary as the splitting of 'sound' into 'sound proper' and 'phoneme.' Meaning and information, on the one hand, and sound and phoneme, on the other hand, constitute dualities. Meaning is information considered in relation to the sign that represents it, and information is meaning considered under its information-carrying properties. Likewise, phoneme is sound considered under its distinctive function, and sound is phoneme considered under its vocal properties. The splitting of the two concepts is as important for linguistics as the splitting of the concept of heat into 'heat proper' and 'temperature' was for physics.

The discovery of dualities underlying the system of language runs as a leit-motif throughout this book: dualities between language and thought, language and language use, the individual and society, sign and meaning, meaning and information, meaning- and information-changing context, the phoneme and sound, the word and sentence, structural and lexical meanings, structural and linear ordering, synchrony and diachrony, etc. To these we must add the important cognitive duality of data and facts. Facts of language are not something given in advance for the convenience of our observation. Facts of language have to be discovered by laying bare the dialectical interaction of the contradictory members of each of the dualities that simultaneously presuppose and exclude each other. Facts of language have to be discovered by the resolution of dialectical contradictions.

The failure to see dualities of language does away with linguistics as a theoretical enterprise. Among the vices of contemporary linguistics the vilest is the confusion of logical and linguistic meaning and the resulting stance to treat the sentence as the only essential unit of language, ignoring the correlation of the word and sentence as complementary and interdependent units.

An important theoretical innovation of this book is defining sign in terms of the concept of field, that is, the hierarchy of the primary and secondary functions of a sign. The concept of field implies the operation of superposition, whereby the primary and a secondary function of a sign are combined into a complex, stratified function. Using the Principle of Superposition, we explain the antinomies posed by the structural and logical meanings of language, which is the heart of the linguistic science. The concepts of sign field and superposition permeate both the semantic and phonological systems of language. These concepts characterize natural language as distinct from all artificial languages, like programming languages.

The discovery that the sentence is only a combination of signs and not a linguistic sign itself has led us to recognize that the word is the central sign of

language. The sentence belongs to language insofar as it is a combination of signs. However, it is a unit of language use rather than a unit of language. We must invert the common practice of contemporary linguistics of treating the sentence as central to syntax and rather accord this place to the word. The inversion means a complete overhaul of syntax. Contrary to the established definitions of syntax as theory of the sentence, I redefine syntax as theory of word combinations.

An important aspect of Semiotic Linguistics is the generalization of the concept of the linguistic sign to include the phoneme. This generalization is valid since phonemes are diacritics, that is, signs signifying ‘otherness.’ Phonemes are special signs that distinguish regular signs from one another: phonemes are signs of regular signs. This generalization means that language consists of two sign systems: the communicative and phonemic one. One cannot overstate the significance of this generalization. There is an abyss between the communicative and phonemic systems of language, so that one would hardly expect to find them to have much — if anything — in common. Astoundingly and contrary to our expectations, the generalization reveals a deep-seated isomorphism between the two systems of language. The gap between the communicative and phonemic systems of language is as wide as the gap between a building structure and the physical properties of bricks from which it is built. If in spite their great differences, the two systems display a profound affinity and even identity of structure, we must recognize that they must meet some common conditions of existence.

The discovery of isomorphism between communicative and phonemic systems of language gives us a deeper understanding of the method of Semiotic Linguistics. This method internally compares the two semiotic systems and explains the discovered phenomena by reducing them to the principles and laws of the generalized concept of the linguistic sign that includes both regular signs and phonemes. The fact that the principles and laws of Semiotic Linguistics provide a uniform explanation of the facts of synchrony and diachrony yields additional support to their validity.

If I have succeeded in demonstrating the coherence and explanatory advantage of Semiotic Linguistics, then the significance of this approach cannot be overstated. Much of the value of a theory — be it a theory of genes or a theory of the structure of matter — is in its capacity to tell researchers what to look for, enabling them to discover facts that would otherwise have gone unnoticed. Thus, the new theories of matter and light implied the possibility that the universe may contain hitherto unimaginable objects called black holes. Astronomers could identify black holes only thanks to the new theories of matter and light. Had the concept not been made available by the new theories of matter

and light, the very existence of black holes would not have been ever suspected. Moreover, if by accidental observation astronomers were to discover black holes, a mere observation not backed up by a requisite theory could not have supported the astronomers' claim that they discovered anything. With the emergence of Semiotic Linguistics we discover a very different picture of language and the facts of language. Much of the value of Semiotic Linguistics lies not only in the ability to tell the investigators what to look for, thereby enabling them to discover new facts of language that would otherwise have escaped their notice, but also in the ability to provide the necessary theoretical support for the reevaluation of discoveries which had already been made in linguistics but whose significance was overlooked because of the lack of any theoretical support.

I have outlined the subject matter of linguistic theory as defined by two major constraints — the Principle of Differences and the Principle of the Contrast of Structural and Lexical Signs. These constraints are the necessary condition for recognizing linguistic theory as a specific research domain independent of logic. The great divide between semiotic universal grammar and present linguistic theories (whether or not they identify themselves as universal grammars) is in that while the former follows a strict course of distinguishing linguistic from psychological analysis, the latter confound the two.

What are the results of separating language from thought by applying the Principle of Differences and the Principle of the Contrast of Structural and Lexical Signs as constraints on viewing language data? Did this separation restrict our field of vision with respect to the area of grammatical theory? No, it did not. On the contrary, in addition to the proper definition of the subject matter of linguistic theory, this separation is of great heuristic value. It has led us to a new view of a language as a system of conflicting forces. Both in synchrony and in diachrony we observe permanent conflicts between lexical and structural meanings, between form and function, between congruent and incongruent function. Diachronic processes are characterized by the emergence of new incongruent functions followed by a subsequent change of these incongruent functions into congruent ones.

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List of Definitions

[D1]	Language.....	11
[D2]	Transfer Principle.....	14
[D3]	Form and Meaning of a Linguistic Unit.....	43
[D4]	Principle of Complementarity of Form and Meaning.....	44
[D5]	Principle of the Arbitrariness of the Sign	62
[D6]	Principle of the Conventionality of the Sign.....	62
[D7]	Principle of Differences	63
[D8]	Value	64
[D9]	Principle of Duality of Categorization.....	69
[D10]	Principle of Phonological Differences.....	73
[D11]	Principle of Phonological Duality of Categorization.....	74
[D12]	Principle of the Contrast of Structural and Lexical Signs.....	86
[D13]	Structure of the Word or Word Combination	86
[D14]	Structure of the Contensive Autonomous Word.....	95
[D15]	Structure of the Word Combination.....	98
[D16]	Structure of the Syllable.....	100
[D17]	Structural Class	103
[D18]	Proportionality Law	105
[D19]	Generalized Principle of Differences.....	106
[D20]	Law of Autonomy of Grammar from the Lexicon.....	111
[D21]	Law of the Syntactic Field	116
[D22]	Field	131
[D23]	Principle of Superposition.....	131
[D24]	Law of Sign-Function Correspondence	134
[D25]	Range-Content Law	134
[D26]	Principle of Diachronic Differentiation	146
[D27]	Analogical Model.....	159
[D28]	Law of the Functional Identity of Phonemes	167
[D29]	Law of the Duality of Phonemes	167

[D30]	Word	194
[D31]	Law of Contensive Autonomous Word Classes	200
[D32]	Principle of Maximal Distinction.....	205
[D33]	Word	210
[D34]	Word Combination Law (preliminary definition).....	210
[D35]	Applicative Principle	212
[D36]	Word Combination Law (final definition).....	213
[D37]	Immediate Constituent	213
[D38]	Constituent:	214
[D39]	Law of Word Combination Dependencies.....	215
[D40]	Law of Word Dependencies.....	215
[D41]	Nucleus Law	217
[D42]	Generalized Nucleus Law	221
[D43]	Sentence Articulation Law 1.....	228
[D44]	Sentence Articulation Law 2.....	228
[D45]	Sentence Articulation Law 3.....	228
[D46]	Sentence Articulation Law 4.....	229
[D47]	Obligatory Subject Law	229
[D48]	Term Uniqueness Law	230
[D49]	Law of Binary Structuration of the Sentence.....	230
[D50]	Diathesis.....	235
[D51]	Law of Dual Subordination of a Syntactic Unit and Its Nucleus...243	
[D52]	Applicative Principle	255
[D53]	Combination Rule	256

Index of languages

- Arabic, 238, 239, 241
Armenian, 165–67
Basque, 120
Chinese, xvi, 96, 97, 116–17, 198, 207
Chinook, 199
Czech, 223
Danish, 168–69
Dyirbal, 59, 65
English, xvi, 6, 14, 32, 34–35, 38, 40, 41, 42, 52, 59, 60, 61, 63, 65, 66, 79, 80, 82, 87, 88, 93, 96, 97, 121, 122, 124, 128, 146, 156, 159, 165, 167, 196, 198, 199, 203, 233, 235, 238, 239, 240
Eskimo, 109, 121
French, 35, 73, 104, 121, 203, 224, 242
German, 35, 38, 61, 83, 84, 85, 109, 147, 220, 242
Greek, 165–67, 191
Hopi, xvi, 33
Hottentot, 109
Indo-European, 146, 199
Indonesian, 14, 87, 88
Iranian, 147
Iroquoian, 207
Japanese, 32
Latin, xvi, 41, 87, 100–102, 107, 134, 146, 147, 156, 196, 207, 219, 238–39
Nootkan, 207
Philippine languages, 207
Polish, 124, 220
Polynesian languages, 207
Romance languages, 146
Russian, 32, 34, 35, 38, 52, 61, 63, 65, 66, 73, 87, 102–4, 121, 122, 124, 129, 130, 134, 138, 139, 144, 156, 172, 173, 195, 196, 207, 208, 219, 220, 230, 231, 233, 234, 235, 236, 239, 243, 245
Salishan, 207
Sanskrit, 41
Slavic, 147
South-East Asian languages, 117
Takelma, 138, 139, 140
Tibetan, 117, 199
Tongan, 207
Vietnamese, 207

Index of names

- Ajdukiewicz, 2
Apresjan, xxv, 142–44, 208
Aristotle, 29, 30
Ashby, 150
Bach, 175
Bakhtin, xii
Bally, 2, 151
Bar-Hillel, 2
Bar-Hillel, Gaifman & Shamir, 2
Benveniste, 2, 71
Bloomfield, 81, 148, 171, 184, 186, 192, 193
Bohr, 19, 175, 176
Bresnan, xxvi, 230
Bühler, xxv, 2
Bybee, 224
Campbell, 159
Carnap, 179
Chomsky, xx, 3, 21, 30, 33, 81, 111, 153, 161, 181, 184–86
Chomsky & Halle, 80–81
Comrie, 119–20
Curry, xxiii, 2, 252–53, 161, 195, 252–53, 255
Curry & Feys, xxiii, 161, 252
Cusanus, 175
Darwin, 33
Deleuze, 77
Descartes, 84
Desclés, xxiii, 2, 234, 254
Desclés, Guentchéva & Shaumyan, xxv, 234
Dowty, 230
Feynman, 224
Fitch, 49
Foley & Van Valin, 119
Frege, 30
Fries, 118
Galileo, xvii, xviii, 74, 111
Gazdar, Klein, Pullum & Sag, 185
Halliday, xxv
Hanson, 154
Harris, Roy, xxv, 54, 148, 149
Harris, Zelig, 184
Hegel, 23, 175, 176
Hempel, 187
Hengeveld, 207
Hertz, 160, 161
Hesse, 160
Hjelmslev, xiii, xxv, 2, 189–91
Hobbes, 30
Hudak, 16
Humboldt, xii, xiii, 45, 250
Husserl, 48
Jackendoff, 82, 230
Jakobson, xii, xxv, 2, 58, 59, 174
Jia, xxii
Jones, Daniel, 35
Jones, Hudak & Shaumyan, xxii
Kaplan, 180, 181
Karcevskij, xxv, 2
Keenan, 164
Kelvin, 159
Kenstowicz, 81
Kinkade, 207
Koffka, 209
Kohler, 83
Köhler, 210
Kuhn, 154, 179
Kuipers, 207
Kuryłowicz, xxv, 2, 145, 151, 244, 246
Lakatos, 154

- Lakoff, 59, 125, 260
Lamb, xiii, xxv, 59, 60
Lambek, 2, 254
Langacker, 257, 258, 259, 260
Laudan, xxv, 154, 179, 180, 187
Lehiste, 83, 84
Leibniz, 29, 30
Lekomcev, xxv
Leśniewski, 2
Lichtenberg, 153
Locke, 29, 30, 57
Losev, xxv
Mach, 153
Makkai, xxv
Marantz, 117, 118, 230
Martinet, xxv, 2, 113, 151, 171, 194, 202, 203
Marx, 23, 69, 170, 175, 176
Matthews, xxv
McCawley, 79, 142
Mel'čuk, xxv, 230
Montague, 30
Moortgat, 188, 254
Morris, 13
Newton, xvii, xviii, 74, 111, 154
Ogden & Richards, 30
Peirce, 30, 50, 56, 57
Perlmutter, 230
Perlmutter & Postal, xxvi, 158
Peshkovskij, xxv, 2, 110
Pike, xxv
Plato, 29
Popper, 179
Post, 161
Prince & Smolensky, 224
Propp, xii
Pullum, 185
Quine, 35, 171
Quirk, Greenbaum, Leech & Svartvik, 240
Rousseau, 23, 62
Russell, 30
Sapir, xii, xxv, 2, 15, 16, 108–10, 112–16, 138–41, 198–200, 204–8, 250
Sasse, 207
Saussure, xii, xiii, xiv, xvii, xix, xx, xxv, 1, 8, 9, 10, 11, 31, 32, 45, 50, 53–57, 54, 61, 63, 69, 70, 71, 74–79, 170, 184, 189, 192, 217, 259, 262, 263–64
Schenker, 174
Schönfinkel, 212
Segond, 253
Shaumyan, xxii, xxiii, 17, 82, 158, 163, 165, 234, 254, 256
Shaumyan, xxvi
Shaumyan & Hudak, xxii, xxiii, xxv
Shaumyan & Segond, xxv, 253
Shaumyan & Soboleva, xxii
Shaumyan & Soboleva, xxv
Shaumyan & Sypniewski, xxv
Sloty, 151
Solncev, xxv, 115–16
Solnceva, 116
Sova, 138
Steedman, 254
Stepanov, xxv
Stoll, 185
Sullivan, 171–74
Sullivan & Bogdan, 171
Taylor, 257
Tesnière, 2, 151, 234
Thomson, 159
Toulmin, xxv, 23, 145, 154–55
Trubetskoy, xxv, 2
Twaddell, 171, 172
Uspenskij, xxv
Van Frasen, 187
Wardrip-Fruin, 83
Watson, 153
Whorf, xii, 39, 250
Wierzbicka, xii, xxv, 13
Wilson, 35
Wittgenstein, xxv, 30, 78, 149, 153, 154, 156
Xolodovich, 2
Yngve, 171
Zawadowski, xxv

Index of terms[†]

A

- abstraction, xiii, xxi, xxiii, 28, 32, 33, 111, 150, 162, 169, 260, *also see generalizing a., naturalistic a., rational a., reduction a.*
from sign form, 15, 114
from sound to phoneme, 165
horizontal/vertical, 32
in biology, 33
in Chomsky, 33
in logic, 248
in science, 35
level of, 15, 34
naturalistic, 163, 164
of general term, 171
of notion of language, 34
of rational structure of an object, 162–64
of structural from lexical meanings, 119
phonological, 171
psychological scale of, in Sapir, 112–14
semiotic, 152, 165, 225
- acquisition of chess, 26
acquisition of language, xx, 22, 24
active, xxvi, *also see passive*
ad hoc hypothesis, 181
adjoined type, 256
affinity of meaning, *see semantic a.*
agent, 117–19, 120
agglutinative languages, 115, 116, 117, 206
algorithm, 185, 186
alternant, 127, **130**, 131, 133, *also see free a.*
alternation, 79, 125, 130, *also see free a., opposition*
of basic & derived words, 136
of meanings, 72, 102, 107, 129
of morphemes, 80
of passive & active, 141
of phonemes, 124, 129
of primary & secondary functions, 131, 141
of sounds, 47
of words, 124, 126
semantic, 238
- alternation context, **130**
- ambiguity
conceptual, 181, 192
in homonymy, 72, 98
of lexical classes, 201
of transitive nominalization, 231
spurious, 128
- analogical model, 152, **159**, 158–61
- analogy, *see negative a., neutral a., positive a., parallelism*
- analogy between
atom & solar system, 159
classes of sounds, meanings & commodities, 191
collective-individuals & cell-molecules, 21, 25
conceptual & phonological systems, 160
development of linguistics & biology, 34
energy as form of matter & language as form of thought, xiii
flow of electricity & fluid, 159
freedom of language use & political freedom, 23
genotype calculus & combinatory logic, 252
identities of meanings & sounds, 67
language & building, 242, 266

[†] Page numbers in bold refer to pages where the term is defined or explained.

- language & chess, 24, 26, 31, 51, 160, 263
 language & economics, 160
 language & instrument, 36
 language & logic, in Curry, 252
 language & map, 51
 language & mathematical system, 108
 language-thought & energy-matter
 continua, xiii
 meaning & phoneme alternation, 124, 129
 meaning-information & phoneme-sound, 7,
 69, 122
 phoneme & commodity, 170
 sentence & syllable structure, 223
 sign/sound-meaning & hydrogen-oxygen
 bond, in Saussure, 45, 251
 sign-meaning, master-servant, husband-
 wife & ancestor-descendant relations, 46,
 47, 52
 structural classes of phonemes & words,
 104
 syntactic & physical field, 204
 words & musical notes, 124
 anomaly, 18, 19, 20, 61, 65, 259
 antinomy, 19, 137, 140, 141
 of electron as particle-wave, 19
 of grammar & lexicon, 110
 of linguistic & logical meanings, 132
 of meanings, 136–37, 138, 141–42, 151
 of structural & lexical meanings, 88–89,
 92–93, 137–38, 151
 of structural & logical meanings, 141, 265
 of structure & meaning, 140
 of transitivity, 138–41
 of word classification, 137
 structural, 138
 appearance in scientific inquiry, xvii
 application, 16, 212, 213, 218, 226, 232, 234,
 252, 255
 in Moortgat, 188
 application operation, 212, 241, 255
 applicative hierarchy, 235
 Applicative principle, 212, 213, 231, 255
 applicative structure, 226
 applicative system, 254, 255
 applicative universal grammar, xxii
 apposition, 246
 arbitrariness of sign, xvi, 10, 29, 38, 56, 57,
 61, 62, 63, 70, 71
 art, theory of, xii
 articulation, *also see attributive a.*,
 predicative a.
 by speech organs, 166
 functional, 227
 into lexical & structural meanings, 92
 into lexical & structural morphemes, 95
 into lexical & structural signs, 86, 88–89,
 92, 142, 247
 into primary & secondary meanings, 142,
 208
 of language into units, xxi, 10, 42–44
 of sentence/sentence member, 227
 of thought into signs, 121
 of vocal form into phonemes, 12, 73
 artificial language, 48, 80, 151, 161, 265
 associativity of Lambek calculus, 188
 assumption, 155, *also see monosemy a.*
 about nominalization, generativist, 5
 in science, 156, 175, 178
 objectivist, 29
 of distinctive features, 82, 171
 of fundamental language-use model, 39
 of language-thought, 27
 of morpheme, 198
 of operand symmetry, 212
 of phonetics, 181
 of symbolic nature of language, 258, 259
 of synonymy, 148, 149
 astronomy, 180, 263, 266, 267
 asymmetry of operator-operand/predicate-
 argument relations, 212–13, 230–31
 atomic sign, 254, 255
 attribute, relational, 12, 13, 24, 45, 49–50, 54,
 55
 attribute, syntactic, 227–29
 attributive articulation, 217–18, 227–28
 autonomous word, 128, 135, 195–97, *also see*
 contensive a.w.
- B**
 basic sign, 134–35
 basic sign combination, 247
 basic structure, 105, 223, 245, 261
 basic word, 5, 97, 220, 221–22
 as primary syntactic function, 125, 134,
 135–37, 204, 205
 behaviorism, 153
 Bible, 29, 32
 binary combination, xv, 215, 217, 230

- binary operation, 212, 252, 255
 binary relation, 46, 47, 49, 50, 52
 binary structure, 217, 224, 225, 230
 biology, xxvi, 7, 21, 24, 33, 175, 176, 182
 extension of into other sciences, 33
 human, xx
 laws of, 24, 33
 universals of, 34
 biology of language, 24–26
 bipartite passive, 238–39, 241–44, *also see*
 paradigmatic p.
 black hole as theory-licensed fact, 266
 bond between
 commodity & human needs, 190
 commodity & worth-value relations, 190
 genotype & sign representation, 15
 language & thought, xiii
 molecules, chemical, xiii, 45, 251
 sign & meaning, 2, 3, 18, 45, 47, 79
 sign device & meaning, 15
 sound & concept, 55
 sound & meaning, 251
 sound & thought, xiii, xvi, xxi, 74, 75
 things & relations, 191
 brain, biological properties of, xxi, 24
 Brownian movement, 144, 150
C
 calculus, *see mathematical c., mathematical formalism, genotype c., Lambek c.*
 canonical form, 256
 categorial calculus, *see genotype c.c., Lambek c., meronymic c.c.*
 categorial grammar, xxiii, 2, 161, *also see*
 generalized c.g.
 categorization, 18, 58, 59, 65, 77–79, 259–60
 category, 18, 77–78, 253, 254, 260, *also see*
 class
 causal relation, in Peirce, 50, 56
 causation, 76, 145
 causative, 79, 123, 139
 chemistry, xxvi, 33, 251, 263
 reducibility of to physics, 24, 224
 circularity, 64, 181
 class, xv, xvi, 18, *also see category, classes, consonant c., deep c., differential c., grammatical c., lexical c., paradigmatic c., part of speech c., phoneme c., phonetic c., predicate c., semantic c., structural c., surface c., syntactic c., type c., universal linguistic c., value c., vowel c., word c., worth c.*
 as single object, 169
 of changes of vocal forms, 14
 of referent, 51
 of subject, 104
 class change, 221
 class formation, xvii, 18
 class membership, 54
 class-as-one reduction, 169, 260
 classes
 cognitive, 30, 77
 formal, 200
 formal, convention-based, 76
 foundation of, 95
 heterogeneous, 191
 linguistic fundamental, xxii, 39, 40
 logical vs. linguistic, 78
 of attributes, 229
 of basic structures, 105
 of combinations, 218
 of commodities, 191
 of communicative form of sound, xvi
 of communicative form of thought, xvi
 of concepts, xvi
 of concrete phonemes, 172
 of contensive words, 95, 128, **200**, 201
 of deep structures, 4
 of derived structures, 105
 of forms of sound, xvi
 of functionally equivalent sounds, 178, 181
 of functionally identical phonemes, 169
 of fundamental word combinations, 5, 6
 of grammatically correct sentences, 149
 of identical concrete phonemes, 260
 of identical meanings, 169
 of identical phonemes, 169
 of identical signs, 169
 of individual languages, 35
 of individual signs, 87
 of informations, xvi, 70
 of lexical signs, 87, 88
 of linguistic meanings, xvi
 of logical content of thought, xvi
 of logical meanings, 68
 of meanings, xv–xviii, 66–67, 70, 78, 183, 200, 251
 of non-autonomous words, 197
 of paradigmatic elements, 99

- of physical content of sound, xvi
- of physically equivalent sounds, 178, 181
- of replaceable units, 220
- of segments, 173
- of sentences, 87
- of signs, xv–xvi, 86–87, 96, 113–14, 183, 254
- of sounds, xvi–xviii, 67, 78–79, 181
- of sounds proper, xvi
- of sounds, functional, 69
- of sounds, physical, 70
- of sounds, semiotic, 67
- of superpositions, 246
- of surface structures, 4
- of syllable components, 223
- of syllables, 100, 104
- of symbols, 261
- of synonymous expressions, 149, 150
- of syntactic elements, 99
- of syntactic phenomena, 232
- of units, 42, 95
- of vowels, 104
- of word combination constituents, 99
- of word forms, 194
- phonological, 104
- superposed, 223
- classification, *also see dual c., categorization*
 - linguistic, 78
 - of autonomous words, 195
 - of formal patterns, 200
 - of grammatical properties of words, 205
 - of languages, *see typology*
 - of lexical meanings, 199
 - of linguistic problems, 176
 - of nouns, 40
 - of phonemes, 104
 - of reality, 94, 250
 - of signs, 9, 232, 254
 - of signs, in Peirce, 57
 - of sounds, 165, 167
 - of words, 104, 195, 198, 201
 - of words, in modern linguistics, 207
 - of words, in Peirce, 57
 - structural, 105
 - typological, 112
- closed sign, 254
- closeness of operator-operand/predicate-argument connection, *see asymmetry*
- coda, 203, 223
- cognition, xiii, 7, 77, 78, 79, 257
- cognitive grammar, 257–62
- coincidence
 - of formal & logical transitivity, 138
 - of functional & physical equivalence of sounds, 178
 - of functional identities & differences of sounds, 163
 - of functions, 125, 126, 132, 136, 245
 - of functions of verb tenses, 128
 - of meanings, 124–27, 130, 136, 147, 222
 - of phonemes, 146, 147
 - of physical identities & differences of sounds, 163
 - of predicate terms, 235, 237
 - of signs, 146, 147
 - of structural & lexical meanings, 93
 - of structure & function, 141
 - of syntactic functions, 6, 128, 207
 - of voiced & voiceless consonants, 124, 130
 - of word & morpheme, 197
- collective, 21–23
- collective representations, 22, 82, 84
- color, 9, 10, 76, 164
- color spectrum, 52
- combination, 18, 155, 220, *also see morpheme c., sign c., word c., syllable, syntactic c.*
 - as gestalt, 209
 - form & structure of, 95
 - of lexical signs, 114
 - of operator with operands, 212, 213
 - of operator with operands, order of, 231
- Combination rule, **256**
- combinator, xxiii, 255
- combinatory logic, xiv, 7, 16, 161, 212, 252–53, 255
- comitative verb, 139
- commodity, 69, 170–71, 190–91
- communication, 15, 22, 24, 26, 36–38, 40, 86, 97, 133, 142, 226
 - condition of, 76, 164
 - condition of existence of, 11
 - instance of, 37
 - process of, 36, 37, 51
- communicative
 - dimension of meaning, 76, 164
 - function, 11, 14, 26, 36, 89
 - plane of language, 202, 220

- situation, 95
 structure, 93, 95, 96, 98
 system, 266
- competence, in Chomsky, 181
- complementarity, 175, 186
 of identities & differences, 264
 of individual & society, 37
 of language & thought, 38
 of synonymy & polysemy, 127, 150
- complementarity principle, 19, 175, 176
- complex, 217, 254
- complex modifier-relator languages, 115
- complex relator languages, 115
- complexity
 of data, 149, 150
 of natural languages, 185
 of sign, 134, 254
 of system, 150
- composite sign, 255
- computer programming language, 16, 48, 151, 265
- computer science, 16, 253
- concatenation, 16, 17, 188, 252
- concept (information), 18, 28, 37, 48, 52–55, 59–61, 65, 121–2, 251, *also see information*
- concepts (theoretical), 179, 187, *also see technical term*
 abstract, 32, 162
 as empirical generalization, 119
 defined through laws, 163
 disambiguation of, in Bohr, 175
 established, 266
 extralinguistic, xxvii
 grammatical, 119
 in biology, 33
 in Hertz, 161
 in Hjelmslev, 191
 in Peirce, 57
 linguistic, xiv, 149, 209, 218, 258, 265
 linguistic, in Sapir, 206
 logical, xiv, 80, 140, 209
 of contemporary linguistics, 20
 of higher order/level, 19, 158
 of physics, 35, 157
 of Semiotic Linguistics, 53
 primitive, 70, 149, 254
 proper vs. vocabulary, 158
 reanalysis of, 181, 192
- semantic weight of, 158
- semiotic, 53, 248
- syntactic, 3, 218
- concepts and laws, 19, 161
- cognitive power of, 33
 grammatical, xxii, 252
- conceptual analysis, 81, 182
 in Sapir, 112
 of well-established facts, 184
- conceptual content
 as worth of meaning, 69
 of sign, 63
 of thought, 76
 units of, 75
- conceptual framework, 152, 157, 158
- conceptual linkage as inference, 158
- conceptual problems, 175–81
- conceptual system of language, 160
- configuration, 220, 221
- conflict between
 congruent & incongruent function, 267
 form & function, 267
 language & thought, 1, 38
 language stability & flexibility, 133
 structural & lexical meanings, 93, 118–120, 137, 267
 theories, 181
 vocal form & meaning, 100
- confusion
 of empirical & logical necessity, 186
 of essential & extraneous features, 178
 of everyday & technical notions, 35
 of functional & physical aspects of phoneme, 81
 of heterogeneous data in synonymy, 150
 of lexical & structural meanings, 117–20
 of lexical & structural morphemes, 248
 of lexical & structural signs, 248
 of linguistic & extralinguistic concepts, xv, xix, 46
 of linguistic & logical analysis of meaning, 142, 144, 244, 265
 of linguistic & logical concepts, 2, 3, 6, 7, 94, 218
 of linguistic & non-linguistic facts, xxi
 of linguistic & psychological analysis, 248, 267
 of linguistics & logic, xiv, 1, 3, 4, 165
 of meaning & information, 123

- of prosodemes & differential features of phonemes, 248
- of relationships & levels of reality, in Hjelmslev, 191
- of sign & signified, in Saussure, 50, 53, 55
- of synchrony & diachrony, 76
- of word classes & their syntactic function, in Tesnière, 234
- congruity
 - of structural & lexical meanings, 110, 137
 - of syntactic & paradigmatic functions, 137
- consciousness, 9, 22, 24, 37, 38, 82, *also see social c.*
- consequentialism, 187
- consonant, 202, 203, 220, 223, 224
 - voiced/voiceless, 124, 129, 220, 222
- consonant class, 202
- constituency relation, 213–16
- constituent, **214**, 213–16, 227, *also see immediate c., lexical c., structural c.*
 - grammatical, 89
 - linearly ordered, 226, 252
 - of combination, 211, 245
 - of sentence, 228, 230, 246
 - of sentence, functional, 229
 - of unit, 42–43
 - of word, 95–97
 - of word combination, 95–96, 99
- constituent function of a unit, 43
- constituent level, 43
- constituent structure, 188
- constitutive element, 42, 219, **223**, 227
- constraint, *also see semiotic c., superposition c.*
 - generative, 185
 - grammatical, 241
 - lexical, 110, 111, 238, 240
 - of sign-meaning bond, 3
 - of term uniqueness, 237
 - on linguistic theory, 267
 - on range of possibilities, 154
 - on structure, 222
 - on type assignment, 255
 - on well-formedness, universal, 154
 - on well-formedness, universal isomorphic, 221
- contentive autonomous word, **95–98**, 116, 126, 128, 136, 195, 201, 205, 217
 - as universal fact, 97
 - dependent/independent, 196, 206
 - structure of, **95–97**, 116
- contentive function of words, 195
- content, 122, *also see conceptual c., informational c.*
 - of empirical object, 159
 - of expression, 86
 - of linguistic perception, 84
 - of meaning, 68, 142
 - of phoneme, 170
 - of phonological perception, 85
 - of sign, 134, 135, 204
 - of sound, 68
 - of thought, xiv, xxi, 122, 124
 - of understanding of reality, 253
 - of word, 92
 - paradigmatic, 91
- context, 80, 87, 102, 107, 118, 123–28, 201, 245, 246, *also see alternation c., information-changing c., meaning-changing c., phoneme-changing c., phonemic c., phonetic c., phonological c., semantic c., sound-changing c., subsystemic c., syntactic c., systemic c., value-changing c., worth-changing c.*
 - as derivational marker, 136
 - as structural sign, 96
 - function-changing, 131
 - grammatical, 47
 - identical, 63, 72–73, 102, 107
 - informational, 128
 - lexical, 248
 - linguistic, 143
 - logical, 143
 - maximally distinct, 205, 245, 246, 248
 - metaphoric, 148
 - neutralizing, 220–21, 222, 246, 248
 - non-syntactic, **129**, 131
 - of ergative noun, 120
 - of geometric opposition, 225
 - of nominal sentence, 245
 - of nucleus-margin distinction, 225
 - of phoneme, 147
 - of sign, 48, 63, 98, 106, 183
 - of sign operation, xx
 - of sign series, 106
 - of sound, 73, 202, 203
 - of word, 60, 65, 72, 97
 - physical, 144

- regular, 48
 relevant, 96
 semantic, 144
 special, 48, 136
 value-/worth-based, 124
 contradiction, *see conflict, dialectical c., opposition*
 contradiction between
 communality of language & freedom of its use, 23
 phonetic & phonological descriptions of duration, 84
 structural & logical meanings, 138–40
 subjectivity & individual-society duality, 38
 contrast, 115, 172, 174, *also see opposition*
 contrast between
 grammar & logic, 92
 inventories of structural & lexical signs, 114
 middle & tripartite passive, 244
 phonetic & phonological definition of sounds, 202
 predicative & attributive articulation, 217
 relator & modifier-relator languages, 115
 segmental phonemes, 172–74
 semiotic & logical analysis, 89
 vowels & consonants, 202
 conventionality, xvi, 10, 38, 50, 62, 88
 conventionalized form
 of representation of reality, xi, xv, 30
 of thought, 30, 38, 76, 164
 conventionalized vs. conventional, xi
 converse relations, 49
 ‘to be sign for’ & ‘to be meaning of’, 49, 53
 of active & passive, 132, 141, 235, 237–39, 242
 of sentence & sentence member dependency, 218
 conversion operation, 237, 244
 core (of syllable), 221–24
 correlation
 of classes of communicative form & logical content of thought, xvi
 of classes of communicative form & physical content of sound, xvi
 of differentiation of signs & meanings, 146
 of distinctions of signs & meanings, 183
 of distinctions of vocal forms & meanings
 as primitive notion, 64
 of form & meaning, 43
 of persons, 40
 of secondary form & meaning, 141
 of sign & meaning, 18, 45, 64–67, 72, 75, 78–79, 122–23, 144, 251
 of sign & sound, 73
 of sound & meaning as semiotic phenomenon, 81
 of structural/lexical sign & meaning, 90
 of vocal form & meaning, 63, 64, 134
 of word & sentence, 265
 correspondence, *also see one-to-one c.*
 of active & passive, 132, 234, 237, 239–44
 of linguistic & mathematical form, 253
 of primary syntactic function & basic sign/word, 134, 206
 of primary/secondary form of sign & its primary/secondary syntactic functions, 133
 of secondary syntactic function & derived sign, 134
 of sentence & syllable structure, 223
 of sign & meaning, 45, 52, 63, 65, 70, 72, 90, 106, 183
 of sign & sound, 73
Cours de linguistique générale, xix, xxi, 1, 61
 cross-linguistic analysis, 39, 149, 156, 184
 culture, 25, 108
 in Bohr, 176
 in Sapir, 109
- D**
- decomposition of a unit, 42, 43, 44
 deduction, 158, 169, 178
 natural, 255
 of sign types, 256
 deep classes of sounds/meanings, 6–7, 70
 deep levels of reality, hierarchy of, 78
 deep stratum of language, 7
 deep structure, 3–7, 181, 244, 248
 definitional reduction, 256
 deictic function, 195
 deixis, 39, 40
 dependency relation, xv, 90, 200, 213–16, 218, 234, 237
 dependency structure, 188
 dependent, **215**

- derivation, 125, 137, 147, 220, 247, *also see semantic d., functional d., nominalizing d., sentence d.*
 in special context, 136
 in transformational grammar, 244
 morphological, 135, 136
 nominalizing, 137, 246
 non-syntactic, 125, 126, 127, 136, 260
 of constituent, 214
 of passive, 236
 of secondary metaphoric function, 260
 of syntactic unit, 243
 of verbal noun, 246
 structural, 105
 syntactic, 5, 135
 transformation-based, 249
 derivation opposition, 220, 222
 derivator, 114–15
 derived lexeme, 194
 derived nominal group, 4, 5, 247
 derived noun, 231, 246
 derived sign, 134–35
 derived sign combination, 247
 derived structure, 105, 147, 186, 245
 derived syntactic unit, 243
 derived vocal form, 134
 derived word, 5, 199, 220–22
 as secondary (syntactic) function, 97, 125, 134–37, 204–5
 derived word combination, 6
 diachrony, xx, xxii, 3, 33, 39, 76, 80, 144–46, 241, 265–67
 diacritic, 177, 261, 266
 dialectical contradiction, 265
 dialectical method, xvii, 176
 dialectical unity, 19, *also see individual-society, language-thought*
 of identity-difference, 77
 of individual-society, 36–37
 of language-thought, xxi, 27, 38
 dialectics, 175–76
 of language, xvii
 dialogue relation between persons, 37
 diathesis, 232, 234–39, **235**
 semantic/syntactic aspect of, 244
 dichotomy, *see opposition*
 difference, xv, xvi, 69–70, *also see identity/d.*
 philosophical category of, 76–77
 semiotic, 30, 66, 70
 differences between
 concrete phonemes, 167
 contexts, 72, 103
 languages, 32, 39, 115, 207
 meanings, 30, 31, 45, 70, 72, 79, 103, 129–30, 134, 146
 phonemes, 124, 129, 147, 167, 168
 positions, 79
 segmental phonemes, 172–74
 signs, 31, 45, 62, 70, 79, 204
 sounds, 73, 79, 130
 sounds as terms of opposition, 167
 sounds, physical, 143
 structural & lexical signs/meanings, 90
 things of the world, xvi, 31, 70
 vocal forms, 30, 134
 word classes, 201
 words, xvi
 differences/similarities between vocal expressions/meanings, 251
 differential classes of signs/meanings, 75
 differential form of sound/meaning, 68–69, 124
 differential identity, 103
 differential property
 of meaning, 30, 64, 69
 of phoneme, 74
 of sign, 30, 63, 64, 69
 of sign relation, 56
 differentiation, 147, 150
 as correlated with superposition, 148
 maximal, 246
 of meanings, 146
 of phonemes, 147
 of signs, 146
 of structural classes, 106
 of word's domain, 147
 suspension of, 245
 discovery, 183
 in diachrony, 145
 in theoretical linguistics, 152, 182
 of a new language, xxiii, 182
 of average behavior, 144
 of deep categories in science, 78
 of essence of language, 144, 250
 of essential properties, 163
 of forms of grammatical patterns, 156
 of isomorphism, 160

- of laws vs. description of observable variability, 150
- of linguistic facts, 263
- of new empirical data, 184
- of patterns of articulation, 92
- of primary characteristics of data, 56
- of semiotic principles, laws & concepts, xii
- of system in text, 170
- theoretical support for, 267
- discreteness, 27, 196
- discreteness condition, 107, 194
- distinctive feature, 82–84, 166, 171–75
- as basic unit of phonology, 171
- as functional characteristic of sound classes, 175
- as integrant, 43
- as segmental property, 83, 84
- concrete, 167
- physical form of, 166
- regarded as phoneme, 171
- vs. phonetic feature, 83
- distinctive function, xviii, 68, 104, 122, 130, 158, 167, 191, 265
- as form/essence of phoneme, 170
- as value of sound, 170
- distinctive opposition, 166–69, 177
- concrete, 167, 260
- semiotic properties of, 177
- distribution, 208
- allophonic, in Sullivan, 173
- in a syllable, 203
- of durations, 83, 84
- of grammatical concepts, in Sapir, 15
- of phoneme, 203
- of structural and lexical signs, 112
- distributional analysis, 173, 208
- distributive relations, 42
- diversity of natural languages, 39
- explanation of, xvi, xviii, xix
- domain
- of phoneme, 147
- of sign, 146
- of word, semantic, 146–48
- dual classification of phoneme/sound, 178, 181
- dual phoneme, 130
- dualism, linguistic, in Sova, 140
- duality, *also see language-thought d., sound-thought d., individual-society d., cognitive d.*
- of commodity, 170, 190–91
- of data & facts, cognitive, 265
- of economics, 76
- of electromagnetic radiation, 175
- of form & meaning, 43
- of husband, 55
- of language, xxi, xxii, 24, 75, 265
- of language & language use, 265
- of matter-energy, 204
- of meaning, 85, 170
- of meaning & information, 122, 265
- of meaning- & information-changing contexts, 265
- of oblique in passive, 239
- of Olivier & Hamlet, 131
- of part-whole relation, 242
- of phoneme, 170, 175
- of phoneme & sound, 122, 265
- of sign, 55
- of sign & meaning, 49, 265
- of sign-function, 204
- of sound, 85, 178, 191
- of sound & meaning, xvii, 81
- of structural & lexical meanings, 265
- of structural & linear ordering, 265
- of superposed word, 202
- of synchrony & diachrony, 265
- of value-based sciences, 76
- of word & sentence, 265
- duality theory of phoneme, 179
- dummy subject, 230
- duplex, 131, 132, 151
- duplex entity, 126
- duplex function, 132
- duplex sign, 134
- duration, in phonology, 82–85
- E
- economic history, 76
- economics, 190
- economy of expression, 87, 88
- ego-coordinates, 39
- empirical adequacy of a theory, 187
- empirical object, 158–61, 163
- empirical problems, 153, 176, 177, 179
- empiricism, 155–56, 180, 187, 253

- epistemological perspective, 189
- equivalence
 of active & tripartite passive, 242–43
 of sound, functional/physical, 178
 synonymic, 148
 vs. identity, 239
- ergative, xxvi, 119, 120
- essence/essential property
 defined through laws, 162
 discovery of, in science, xvii, 194
 of class of concrete objects, 172
 of game, 24
 of mammals, 178
 of movement of bodies, 162
 of theoretical object, 162–63, 178
- ethno-syntax, xii
- evolution of language, 76, 146, 241
- explanation
 by inference from principles and laws of
 linguistic sign, xx, 263
 by reduction to ontological postulates, 153
 by reduction to principles and laws of
 linguistic sign, 266
 good/better, 180
 in Chomsky's paradigm, 21
 in classical linguistics, xxiv
 in physics, 175, 176
 in science, 153, 180, 224
 in terms of sign properties, xxii
 linguistic, 132, 150, 183
 of general semiotic phenomena, 225
 of new phenomenon, 21
 ultimate, xx
 uniform, xx, 266
 uniform, in biology, 33
- explication of concepts, 53, 157, **192**, 217
- expressive function, 195, 197
- extraction, 246, 247
- F
- faculty of language, xx, xxi, 24, 39
- fallacy of affirming the consequent, 186–87
- family resemblance, 149, 150
- feature, 171, 220–21, *also see distinctive f.*
- field, 48, **131**, 151, 265, *also see syntactic f.*
 and sentence, 209
 as constituent of a sign, 96
 as sign property, 48
 as totality of relevant contexts, xx, 48, 96, 131
 in physics, 159, 204
 non-syntactic, 131
 paradigmatic, 131
- field tier, 48
- form, 253, 267, *also see canonical f., conventionalized f., differential f., grammatical f., lexical f., linguistic f., logical f., physical f., primary f., secondary f., sign f., vocal f., word f.*
 in Sapir, 15
 mathematical, 253
 of empirical object, 159, 162–63
 of language-specific regularities, 156
 of phoneme, 170
 of phonological perception, 85
 of sound, 253
 of thought, xxi, 122, 123, 124
 phonetic, 147
- formal framework, 160, 161, 252
- formal language, 16, 152, 160–61, 254
- formal metalanguage, 252, 254
- formal model, 161, 187, 253
- formal pattern, 15, 199, 200
- formal representation, 161
- formal system, 16, 94, 161
- formalism, 187, 188, 250, *also see categorial grammar, mathematical f.*
- formalist linguistics, xxvii, 184–88, 252–53, 257–58
- free alternant, 73, **130**
- free alternation, 63, 72–74, 73, 107
- function, 267, *also see constituent f., contentive f., deictic f., distinctive f., duplex f., expressive f., grammatical f., paradigmatic f., primary f., representational f., secondary f., sign-f., syntactic f., vocative f.*
 as term in linguistics, 158
 congruent/incongruent, 267
 diachronic change of, 145
 in biology, 33
 in sign combination, 232
 of adjective, 201
 of chess piece, 31
 of noun, 201
 of sentence member, 141, 236
 of superposed case, 233
 of word, 137

stratified, 151, 265
 superposed, 136
 unequivocal, 205, 245
 functional derivation, 130–31, 135–37, 146, 205, 247
 functional distinction between vowels and consonants, 202
 functional equality, 238, 239
 functional grammar, 58, 59
 functional hierarchy of linguistic unit, 242–43
 functional identity of sounds as phonemes, 167
 functional level of speech flow, 84, 260
 functional point of view, xxii, 14, 39, 207, 226, 243, 247
 functional shift, in diachrony, 146
 fusion of meanings, **100**, 102, 103, 105
 fusional languages, 115

G

generalization, 64, 97, 162–64
 about sign systems, 8, 9, 10, 11
 empirical, 180
 from linguistic facts, 183
 from linguistics to semiotics, 225
 nomological and theoretical, 180
 of concept of sign, 266
 generalized categorial grammar, 188
 Generalized nucleus law, 220–24, **221**
 Generalized principle of differences, **106**, 107
 generalizing abstraction, 162, 163
 generation of data, 81, 185, 186
 generative morphology, 81
 generative phonology, 80, 81, 82, 251, 253
 generative semantics, 79, 94, 251
 generative syntax, 2, 4, 94
 generative transformational grammar, xxvi, 2–6, 94, 181, 183–87, 186, 244–48, 247
 genetic point of view, xxii, 39
 genitive, 246–47
 genotype, 15
 genotype calculus, xxiii, 161, 252–55
 genotype categorial calculus, 250
 genotype grammar, 15–17, 157, 252–56
 genotype structure, 213
 genotype system, 17
 geometrical optics, 155
 gestalt, 209–10
 government, 90
 government and binding syntax, 185
 grammar, xx, 13, 88, 110, 224, *also see*
cognitive g., generative g., functional g.,
generalized phrase structure g., lexical-
functional g., Montague g., relational g.,
semiotic g.
 as autonomous from lexicon, 109, 111, 237, 240
 as autonomous from semantics, 12, 13, 259
 as essence of language, 108
 as ideal object, 111
 as inherently symbolic, 257
 as investigation of laws of articulation, 92
 as patterns of grouping morphemes into configurations, 259
 as semiotic problem, 80
 as sentence-generating device, 3
 as structural part of language, 109
 as structuring and symbolization of semantic content, 259
 as study of interaction of structural constituents among themselves and with lexical constituents, 89, 92
 formalist, xxvii
 language-specific, xviii, 156, 157
 relational design of, 214
 subject matter of, 89
 two levels of, in Curry, 17
 vs. style, 216
 grammatical analysis, *see linguistic a.*
 grammatical class, 215, 218–19, 221, 227
 grammatical component, 257, 259
 grammatical correctness, 149, 186
 grammatical form, 42, 96
 grammatical function, 80, 105
 grammatical semantics, 13
 grammatical structure, 111, 118, 160, 239, 252
 grammatical system of language, 160
 grammatical, as structuralist term, 89

H

having a meaning, 47, 49–50, 52–4, 251, 261
 having a sign, 47, 49, 50, 52
 head, **215**, 247
 heterogeneity
 of language & thought, 140
 of lexical & structural meanings, 118

of meanings, 60–61, 63, 65–66, 93, 100, 102–3, 107
 hierarchical system of typology, 116
 hierarchy, xv, *also see applicative h., deep levels, functional h.*
 constructional, 242
 of alternations of primary & secondary functions of signs & phonemes, 131
 of autonomous & non-autonomous words, 197
 of binary combinations of sentence constituents, 230
 of constituent word combinations, 217
 of deep & surface structures, 4, 6
 of functional capacities of words, 207
 of immediate constituents, 214
 of meanings/functions of a sign, xx
 of minimal free forms, 193
 of paradigmatic & syntactic meanings, 99
 of parts & whole, dual, 242
 of primary & secondary functions, 105, 132, 141–42, 151, 201, 260, 265
 criterion for establishing of, 134
 of primary & secondary meanings, 58
 of primary & secondary syntactic functions, 4, 6, 116, 202, 204, 208
 of secondary language strata, 7
 of semiotic disciplines, 8, 9, 10, 11
 of sentence articulation laws, 229
 of sentence structure, xiv
 of sign's vocal forms, xx
 of signs, 172
 of signs with multilayered meanings, 137
 of structured levels of reality, 25
 of syntactic design of language, xv
 of syntactic functions
 of linguistic sign, 204
 of phoneme, 202
 of sentence members, 232
 of word, 201, 202, 206, 232
 of syntactic terms, 235
 of voiced consonant, nonlinear, 222
 semiotic, xx
 homonymy, 71–72, 100, 105, 107, 143
 as sign property, 97
 diagnostic condition of, 72, 107
 human community, 24, 133
 essential condition of, 11

hypothesis, 155, 184, 187, *also see ad hoc h., superposition h.*
 about binary structure, 225
 about form of rules, 157
 about identity/difference of sounds, 166
 about linguistic antinomies, 140–41
 as empirical statement, 155
 as empirically decidable statement, 187
 at the basis of Semiotic Linguistics, 263
 metaphysical, in Hjelmslev, 189
 of functional hierarchy of a word class, 201

I

idealization, 111, *also see identifying i.*
 of grammar, 111, 240
 of language, xx
 identifying idealization, 260
 identity, xv, xvi, *also see differential i., functional i.*
 as repetition of differences, 67, 75–77
 linguistic, 61
 material, 81
 of commodities, 170–71
 of meanings, 38, 63, 66–68, 103
 of meanings in synonymy, 148
 of meanings of sign series, 103
 of phonemes, 171, 178
 of phonemes, functional, 167, 169, 170
 of phonemes, physical, 167, 169
 of sounds, 67, 103, 165, 166
 of sounds, functional, 177
 of structure, 103, 266
 of vocal forms, 103
 philosophical category of, 76, 77
 semiotic, 64, 81
 subordinated to differences, 66, 69
 subsumed under 'difference', 67, 77
 identity/difference, xvi, 3
 as repetition/difference, in Deleuze, 77
 as synchronic fact, 264
 as uninferable from empirical data, 81
 conventionalized, 76, 164
 dialectical opposition of, 77
 in Saussure, 75
 linguistic, xvi, 66, 75, 76, 264
 of communicative dimension of meaning, 76, 164
 of distinctive function, 104

- of informational dimension of meaning, 164
 - of linguistic units, 264
 - of logical dimension of meaning, 76
 - of meanings, xv, **63**, 66–68, 72–73, 81, **106**, **182**
 - of signs, xv, **63**, **106**, **182**
 - of sounds, 67–68, **73**, 81, 104, 165
 - of sounds, functional, 163
 - of sounds, physical, 67, 69, 73, 163
 - of things of the world, xv, xvi
 - of words, xv, xvi
 - semantic, 67, 73
 - semiotic, 66, 67
 - immediate constituent, **213**, 214
 - impersonal, 219, 222, 230, 241
 - incorporating languages, 116, 206
 - individual psychology, xi, 21–22, 25–26, 82
 - individual-society duality, 37, 38, 265
 - induction, 145, 169
 - inference, linguistic, xviii, 19, 61, 183, *also see conceptual linkage*
 - inflectional languages, 115, 116, 206, 246
 - information, 68, 69, 85, 92, 121–25, 143, 260, 265, *also see concept*
 - as content, 123
 - as logical class of meanings, 7
 - as meaning, 52
 - as meaning outside sign relation, 122
 - as meaning taken under its worth, 69
 - as part of thought, 140
 - as variant of meaning, 130
 - as worth of meaning, 121
 - context-dependent, 123
 - identical, 122
 - implied by meaning, 69
 - in itself, 52
 - inference of, 80
 - logical, 143
 - pure form of, 170
 - variations of, 52
 - informational content, 69, 85, 123, 128, 164, 170
 - informational dimension of meaning, 164–65
 - information-changing context, 124–25, 128–30, 183, 265
 - innate capacity to produce & use signs, xx
 - integrant, 43
 - integrant level, 43
 - integrative relations, 42
 - interaction between
 - constituency & dependency, 215–16
 - grammatical theory & patterns, 157
 - language & thought, xiii
 - structural constituents & structural and lexical constituents, 89–90, 92
 - syntactic voices, 234
 - syntagmatic & paradigmatic relations, 174
 - interdependence
 - of sound & meaning, xviii, 64, 251
 - of synonymy & polysemy, 126
 - of word & sentence, 265
 - interpretation
 - as property of meaning, 9
 - as relation between sign systems, 9
 - in antinomy resolution, 93
 - of lexical by structural meanings, 88
 - of one sound as two phonemes, 178
 - of reality, xiii
 - of reality, direct/indirect, 88, 92–93, 99
 - of semiotic system, 10, 264
 - interpreted/interpreting sign system, 9
 - interpretive system, in logic, 94
 - interrelation between
 - form & meaning of unit, 44
 - grammar & lexicon, 111
 - structural & lexical meanings, 110
 - intransitivity, 132, 138–39, 244
 - invariant, 14, 16, 39, 86, 95, 98, 100, 119, 144, 150, 154, 157, 194, 208, 214, 216, 239–40, 244, 246, 252
 - isolation, isolating languages, 115–17, 198, 206
 - isomorphism, 159, 160, 221, 222
 - isomorphism between
 - active & tripartite passive, 234, 235, 237–38
 - communicative & phonemic systems, 266
 - grammatical & phonological systems, 160
 - semantic & phonological systems, 73
 - sentence & syllable structure, 100, 222–23
 - sentence, word, syllable & phoneme structure, 220, 254
 - sets of laws & principles, 160
- K
- knowledge of language, xxii, 26

L

- Lambek calculus, 161, 188, *also see categorial grammar*
- language, **11**, *also see artificial l., computer programming l., formal l.*
 and human mind, 3
 anthropocentric nature of, 40
 as cognitive form of thought, xv
 as collection of data, 186
 as communicative form of thought, xiii, xv, 1, 3, 164
 as communicative interpretation of reality, 86, 142
 as communicative interpretation of thought, 11
 as complete sign system, 8, 10
 as complex network of relationships between signs, 28
 as complex object, xix
 as conventionalized analysis of reality, 38, 50–51
 as conventionalized mold, 30
 as conventionalized organization of thought, 27–28
 as correlated systems of vocal and meaning differences, 69
 as cultural entity, 25
 as distinct aspect of human mind, 1, 2
 as distinct from thought, xxi, 18, 28
 as distinct phenomenon, 56, 57
 as divine gift, 29
 as established system, 76
 as folk model of the world, xi–xiii, 11, 51
 as form, 123
 as form of analysis of thought & reality, 70
 as form of language-thought continuum, xxi, 89
 as form of thought, xxi, 11, 123, 140, 165, 191, 250
 as general concept, 32
 as hierarchy of distinct levels, 174
 as idealized sign system, xx
 as implemented in text, 26
 as individuative term, in Wilson, 35
 as information carrier, 123
 as instrument of communication, xi, xv, xvi, 12, 23, 36, 46, 169, 226
 as instrument of thought, xvi, 23, 46
 as integral part of cognition, 257
 as intermediary between thought & reality, xiii–xv
 as interpretant of sign systems, 9–11
 as logical system, in Montague grammar, 153
 as mathematically specifiable empirical object, 184
 as matrix for expression of thought, in Sapir, 109
 as mental entity, 36
 as nomenclature list, 29, 133
 as phenomenon of social mind, xi, 22, 24–25, 85, 153
 as physiologically based mentalist structures, in Chomsky, 153
 as primitive notion, 34
 as public property, 23, 34
 as representation of thought, xxi, 27
 as residing in the mind, 18
 as semiotic mechanism of communication, 133
 as semiotic phenomenon, xxii
 as set of sentences, 3, 186
 as sign & meaning system, 10, 50, 51
 as sign system, xxi, 2, 11, 22, 25, 34, 38, 44, 53, 71, 153, 160, 209, 264
 as social institution, xxii, 23, 26, 34, 76, 82
 as social phenomenon, xx, 25, 26, 76
 as sound-meaning relator, 182–83
 as sound-thought articulator, xxi, 32
 as subjectivist model of the world, 37
 as system of conflicting forces, 267
 as system of dependencies, 200
 as system of oppositions, 263
 as system of possible structural & functional processes, 35
 as system of rules, 26
 as theoretical object, 27, 35, 186
 as thought organized in signs, 12, 23
 as thought-grooves, 15, 250
 as tool for describing reality, 85
 as universal semiotic matrix, xviii
 as variable, xiii
 as very large system, 150
 as word-sentence sign system, 3
 basic semiotic fact of, 251
 biological basis of, 24–25
 complexity of, 140

- conscious & automatic processes of, 82
 essence of, xxii, 11, 24, 26, 55–56, 90, 132, 151, 183, 186, 248, 251, 257, 263
 everyday notion of, 35
 existence of, xxi, 27, 38, 62
 flexibility & stability of, 133
 form of, 145, 253
 form of, in Sapir, 109
 function of, 36
 functional aspect of, xxii
 genetic aspect of, xxii, 36
 in Peirce, 57
 individual, 32–33, 35, 39, 88, 110, 156–57, 238, 240
 individual & social aspects of, 75
 internal form of, in Humboldt, xii
 levels of, 42, 66, 68, 78, 99, 198, 238, 260
 logical view of, 3, 247
 morpheme-free, 198
 morphologically poor, 96–97, 117
 morphologically rich, 96–97, 196
 objectivist view of, 28, 30
 of everyday, 23, 161
 of science, 23, 25, 48, 151
 organic nature of, 34
 phonological design of, xx
 semantic properties of, 25
 semiotic nature of, 1, 8, 112, 183
 semiotic view of, xxv, 251
 stratification of, 7, 78, 248
 structural & meaning capacities of, 11
 structural analysis of, 241
 substance of, 34
 substantiative entities of, 176
 symbolic nature of, 257–59
 systems of, 266
 vs. language use, xxii, 51
- language change, 38, 145
 language community, xi, xiii, xv, xxi, 10, 23, 38, 51, 62, 82, 108
 language fact, *see linguistic fact*
 language type, 34, 116
 language use, xx–xxi, 23, 36, 39–41, 51, 53, 56, 62, 182, 241, 265–66
 language-thought, xxi, 27–28, 32
 language-thought continuum, xiii, xvi, xxi, 1, 7, 11, 18, 89, 164
 levels of, xiii
 theory of, 7
- language-thought duality, xix, 27–28, 265
 law
 as defining invariant set of possibilities, **154**
 infeasible, 74
 of gravity, 156
 of higher level, 191
 of inertia, 156, 162, 264
 of refraction, 155
 Law, *also see Generalized nucleus l., Nucleus l., Oblique subject l., Range-content l., Term uniqueness l.*
 Law of autonomy of grammar from the lexicon, **111**
 Law of binary structuration of the sentence, **230**
 Law of contensive autonomous word classes, **200**, 208–9
 Law of dual subordination of a syntactic unit and its nucleus, **243**
 Law of sign-function correspondence, **134–5**
 Law of the duality of phonemes, 163, **167**, 169, 181
 Law of the functional identity of phonemes, 104, 163, **167**, 177
 Law of the syntactic field, **116**
 Law of word combination dependencies, **215**
 Law of word dependencies, **215**
 laws, 152, 157
 analogical structure of, 159
 as mid-level statements, 155
 common to language and thought, 7
 explanatory, xvii
 generative, 185
 level of, 157
 of individual languages, 33
 of interconnection of sign & meaning, 28
 of life, discovery of, 182
 of mature science, 111
 of motion, xvii, 111, 157, 158
 of sign operations, xi
 of the flow of fluid, 159
 semiotic, 155, 248
 specific to level of scientific description, xxiv
 vs. principles, 155
- laws of grammar, 110, 154, 157, 185
 as empirically falsifiable claims, 154
 as invariants, 149, 157

- discovery of, 240
 expressed by genotype, 253
 laws of language, xiii, xv, xx, 25, 28, 87
 as laws of linguistic invariants, 144
 discovery of, xxiii, 182
 reducibility of to sign properties, xx
 vs. laws of other sciences, xxiv
 vs. laws of thought, xiii
 level, *also see abstraction, constituent l., deep l., functional l., integrant l., language, language-thought continuum, laws, linguistic analysis, linguistics, logic, logical meaning, meaning, morpheme l., morphological l., observational l., phoneme l., phonetic l., phonological l., phonology, physical l., principles, reality, semantic l., semantic opposition, sentence l., social coercion, subphonemic l., synchrony, syntactic l., system l., taxonomic generalization, text l., theory, typology, value l., word l., worth l.*
 of articulation, 42
 of description of reality, xxiv
 of distinction of signs and phonemes, 15
 of distinctive features, 43, 173, 174
 of form & sense, in Sova, 140
 of function in the sentence, 201
 of interaction of syntagmatic & paradigmatic relations, 174
 of lexical signs, 248
 of paradigmatic relations, 174
 of paradigmatic signs, 92
 of structural signs, 248
 of units, 43
 lexeme, **194**, 197
 lexical class, 199, 200, 201
 lexical constituent, 86, 89–90, 92–93, 137, 142, 240, 247
 lexical form, 42, 259
 lexical functional grammar, xxvi, 230
 lexical meaning, 87–94, 110–1, 114, 117–20, 128, 137, 151, 199–200, 241, 259, 265, 267
 context-independence of, 129
 lexical morpheme, 90, 95–96, 105, 108, 118, 119, 196, 248
 lexical semantics, 13
 lexical shift, 147
 lexical sign, 86–92, 111–15, 137, 142
 as directly interpreting reality, 248
 lexicon, xx, 13, 88, **108**, 107–11, 237, 240, 261
 limit object, 162–63
 linear adjacency of immediate constituents, 214
 linear order, 82, 213, 226, 239, 252, 265, *also see word order*
 linear representation of sentence structure, 111
 linear sequence of symbols, 16, 261
 linguistic analysis, xiii, xiv, xxiii, 74, 80, 82, 117, 143, 148, 172, 183, 247–49, 267, *also see semiotic a.*
 levels of, 172–74
 of meaning, 142, 165, 208
 semiotic, 61, 68, 89, 113, 248
 sentence-based, 209
 linguistic data, 24, 140, 157, 182–84, 186–87, 193, 265, 267, *also see text*
 averaging of, 150
 directly observable, 81, 187
 empirical, 81, 184
 experimental, 84
 level of, 193
 marginal, 150
 of individual languages, 33
 taxonomic, 184
 vs. linguistic facts, 263
 linguistic facts, 52, 89, 92, **172**, 174, 224, 251, 265, 267
 as inferred from principles of linguistic sign, 264
 classification-challenging, 198
 determination of, 28, 56
 discovery of, xv, 263–66
 empirical, 59–60
 explanation of, 25, 264
 governed by laws, 150, 185
 in support of innateness hypothesis, xx
 individual, 87, 150, 185
 reduction of to facts of other sciences, 25–6
 regular/irregular, 185
 vs. facts of other sciences, xxi, 28
 vs. linguistic data, 263
 linguistic form, 2, 59, 253
 in Langacker, 258
 in Saussure, 184
 of thought, 250
 semiotic concept of, 2–3

- linguistic reality, 183, 189–91, 205, 251
- linguistic theory, 179, 207
 based on Saussure's ideas, xx
 established, 61
 evaluation of, 179
 role of anomalies in, 61
 semiotic, 225
 subject matter of, 267
 vs. formalism, xxii
- linguistic value, *see value*
- linguistics, xiv, 26, 93, 122, 181, *also see cognitive theory of language, formalist l., linguistic theory, mathematical l., theory of grammar*
 and other sciences, xvi, xix, xxiii, 3
 and science & philosophy, 75
 as autonomous science, xi, xiv, xxiii, 1, 7, 8, 75, 78, 80
 as part of logic, 1
 as part of semiotics, 8, 9, 11
 as problem-solving activity, 176
 as science of linguistic sign systems, 264
 as Semiotic Linguistics, 11
 as theoretical enterprise, 265
 basic concept of, 251
 classical, methods of, 144
 cognitive, 259
 coincidence of discovery & explanation in, 264
 crisis of, xvii, xix, 252
 descriptive, xii
 disassociation of form & meaning in, 44
 domains of, 12–13, 15, 17
 goal of, 170, 182, 184, 188, 209, 218
 goal of, on generativist view, 186
 history of, xiv, xxiii, 258
 level of, xiv
 levels of, 252, 253
 mathematical, 2
 methodological provincialism of, 26
 Moscow school of, 82
 post-Saussurean, xxi, 1
 Prague school of, 82
 present-day, xiv, xix–xx, xxiii, xxvi, 3, 6, 33–34, 46
 reducibility of to biology of language, 24
 subject matter of, xix, xxii, 26, 28, 53, 75, 165, 182, 184
 subject matter of, in Sapir, 113
 theoretical foundations of, xxiv–xxvi
- literature, theory of, xii
- logic, xiv, 4, 26, 57, 80, 89, 92–93, 135, 140, 145, 187, 209, 218, 247
 as pillar of theory of language-thought continuum, 7
 contact of with linguistics, 7
 in Curry, 15, 16
 independence of linguistics from, xi, 2, 7, 78, 80, 117, 267
 laws of, 186
 level of, xiv
 mathematical, 94, 218, 252, 253
- logical analysis, xiv
 of meaning, 4, 80, 89, 92, 142–43, 165, 208
 of meaning, global, 249
 of meaning, pseudo-semantic, 92
- logical empiricism, 187
- logical form, mathematical notion of, 2–3
- logical meaning, 76, 132–44, 265
 as secondary linguistic meaning, 132
 level of, 79, 140
- logical positivism, 171, 172, 187
- lumping (of word classes), 207–8
- M
- mapping of syntactic functions, 232–33, 239
- margin, 202–4, 217–18, 221–23, 225, 254,
also see satellite
- marked term, 235
- markedness opposition, 220–21
- mastery of language, *see knowledge of l.*
- mathematical calculus, 253
- mathematical design, 186
- mathematical formalism, xxii, xxiii, 250
- mathematical linguistics, 184, 185
- mathematical model, 17, 152, 161, 184, 188, 253
- mathematical system, 2, 108, 161
- mathematics, xxvi, 2, 16, 131, 161, 187, 189, 253
- maximal distinction, 205, 245
- meaning, 46, 48, 52–54, 69, 122–24, 191,
and passim; also see basic m., lexical m., logical m., grammatical m., paradigmatic m., semantic m.,
 adjoined, 125, 129
 alternative, 98
 analysis of, 183

- apart from sign as phenomenon of thought, 18, 28
 apart from sound as psychological entity, 251
 as communicative form of information, 123
 as concept, 65
 as concept bonded to sign, 52
 as constant, 14
 as conventionalized representation of reality, 53
 as dependent on cultural organization of the world, 30
 as differential entity, 45
 as empirical object, 163
 as external to sign, 49, 50
 as fact of language, 15
 as form, 123
 as form of concepts, 122
 as function of information, 52
 as functional unit, 170
 as goal of communication, 14
 as implied by sign, 13
 as information considered in its relation to sign, 122
 as instrument of communication, 165
 as instrument of referent identification, 51
 as interpreted as such, 47
 as invariant of vocal form, 14
 as part of language, 51, 53, 140
 as part of relational network of linguistic oppositions, 85
 as physical or mental object, 30
 as referent, 49
 as relative to sign system, 9
 as sign attribute, 12, 13, 45
 as term of differential relation, 69
 as term of relation 'to be meaning of', 47
 as term of semantic opposition, 170
 as thing meant, 47
 assignment of, in logic, 94
 basic, 48
 centrality of, in Langacker, 257–59
 communicative form of, 142, 164
 complementary, 48
 complementary facets of, xvii
 complete, 210
 conceptual properties of, 64
 conceptually related, 60
 concrete, 150
 conflicting, 136
 congruity of, 110
 constant and specific, in Bloomfield, 148
 context-induced change of, 125
 conventionalized dimension of, 165
 diachronic change of, 145
 dimensions of, 75, 164
 direct, 148
 equivalent, 148
 essence of, 170
 figurative, 58, 148
 form of, 85
 function of, 10
 fundamental, 58, 59
 global, 89, 92–93
 grammatical, 79, 241, 254
 grammatical, change of, 146
 in a dictionary, 87
 in cognitive grammar, 259
 incomplete, 210, 213
 individual, 93
 inferential, 80
 informational properties of, 52, 81, 85
 informational property of, 265
 instrumental function of, 51
 interpreted/interpreting, 93
 linguistic, 80, 132, 250
 linguistic constituent of, 28
 linguistic, level of, 140
 logical classification of, in Peirce, 57
 logical constituent of, 28
 logical content of, 142
 logical dimension of, 76
 logical interpretation of, 142
 logical properties of, xvii, 69, 78, 79
 logically heterogeneous, 93
 logically related, xviii, 63, 72, 103
 material properties of, 81
 non-syntactic, 134
 of active/passive, 141
 of chess piece, 31
 of contensive autonomous word, 97
 of lexeme, 194
 of linguistic unit, 143
 of tense, 208
 properties of, 45
 quasi-grammatical, 117
 related, 63, 65, 68, 124
 semantic features of, 78

- semiotically identical/heterogeneous, 66
 shared, 34, 38, 133
 similarity of, 150
 superposed, 136
 syncretic, 148
 text-conditioned, 170
 underlying, 104
 undifferentiated total, 92
 unrelated, 72
 variation of, 48, 130
 meaning proper, 58, 68, 122, 127, 259, 265
 as meaning taken under its value, 69
 as semiotic class of meanings, 7
 meaning-changing context, 124–28, 130–31,
 134, 183, 265
 mechanics, xvii, xviii, 74, 264
 mechanism of language, xiii, xv, xvi, xvii,
 xix, 3, 32, 46, 66, 68, 71, 75, 76, 86, 131,
 192, 264
 meronymic categorial calculus, 254
 meronymic relation, 95, 213, 254
 metaphor, 127, 148, 260
 in theory construction, 158
 method, *also see dialectical m.*
 allowed in a theory, 18
 for communicating meaning, 10
 of establishing units, 42
 of linguistic research, 31
 of Semiotic Linguistics, 18
 scientific, 145
 methodological fallacy, 25
 methodological mistake, 245–48
 methodological postulate, 17, 18, 153
 methodological reductionism, *see r.*
 methodology of science, xiv–xxv, 152–53,
 164, 175
 middle diathesis/voice, 244
 mind, xvii, xxi–xxii, 1, 7, 18, 21–22, 25, 36,
 69, 77, 94, 117, 261, *also see social m.*
 model, 94, 158, *also see analogical m.,*
 formal m., mathematical m., philosophical
 m., subjectivist m.
 mechanical, Kelvin's, 159
 of grammar, 186
 of language, 187, 188
 of language, Saussure's, 74
 philosophical, 153
 scientific, xi, 160
 set-theoretical, 94
 model theory, 94
 modifier, 113, 114, 115, 197, 227
 modifier-relator languages, 115
 molecule as binary word combination, xv
 monophony, 68
 monosemy, 68, 104
 monosemy assumption, 58–60
 monotectonic representation, 252
 Montague grammar, xxvi, 153, 230, 251
 morpheme, xii, 80, 86, 91, 96, 100, 102, 105,
 108, 114, 118–19, 169, 193–98, **197**, 250,
 also see lexical m., structural m.
 as primitive, 194
 as word property, 197
 grammatical, 105, 113
 in generative morphology, 81
 inflectional, 119, 197
 syntactic, 196
 morpheme combination, 96
 morpheme level, 43
 morphological language subtype, 116
 morphological level of typology, 116, 206
 morphology, 3, 17, 96, 108, 135, 156–57,
 213, 220, 239, 240, *also see generative m.*
 agglutinative/inflectional, 116
 music, 10, 124
 as sign system, 10
 language of, 225
- N**
- negative analogy, **160**
 negative term of opposition, 220
 neutral analogy, **160**
 neutralization
 of difference between primary syntactic
 functions, 246, 248
 of opposition, 220, 221, 222
 neutral-negative term of opposition, 220
 nominalization, 4–5, 245, 246–48
 nomological core, 150
 non-isolation, *see isolation*
 notation, 174, 212, *also see sign correlator*
 bracket, 211, 212
 Fitch's logical, 49
 for predicate-argument symmetry, 230, 231
 mathematical, 250
 of genotype grammar, 256
 of subscripted types, 228
 parentheses-free Polish, 255

- noun, abstract vs. concrete, 247
- nucleus, 41, 202–4, **217–19**, **221–23**, 225, 243
- Nucleus law, **217–20**, 224, 230, 234–35, 238, 241, 243, *also see Generalized n.l.*
- null superposition, 236
- O**
- objectivism, 28–30, 32
- Obligatory subject law, **229**
- observation, xv, 162, 163, 265, 267
- as cognitive process, 84
 - direct, xix, 78, 82, 263
 - empirical, 178
 - in Bohr, 176
 - in phonology, 174
- observational level, 78, 157
- observational statements, **155**, 187
- one-to-one correspondence between phonemes, 167, 168
- onset, 203, 222–24, 223
- ontological postulate, 17, 18, 153
- operand, **210**, *ff.*
- operand type, 229, 255
- operator, **210**, *ff.*
- as configuration-forming device, 221
 - as means of adding constituents, 227
 - as syntactic class, 223
 - curried, 255
 - primitive, 227, 255
- operator type, 227, 254, 255
- opposition, xx, 37, 217, 220, *also see contradiction, contrast, derivation o., distinct o., markedness o., phonological o., privative o., proportion, relation, semantic o., syntactic o.*
- ACTIVE:BIPARTITE PASSIVE, 238
 - ACTIVE:TRIPARTITE PASSIVE, 244
 - ADJECTIVE:NOUN, 5, 202
 - ANIMATE:INANIMATE, 40
 - BIPARTITE:TRIPARTITE PASSIVE, 239, 241
 - DISCRETE:NON-DISCRETE, 88
 - EGO/TU:ILLE, 40
 - FORTIS:LENIS, 83
 - HERE:THERE, 41
 - HUMAN:NON-HUMAN, 40
 - INDIVIDUAL:GENERAL, 88, 92
 - LEXICAL:STRUCTURAL MEANINGS, 87, 91–92, 119
 - MASCULINE:FEMININE, 40
 - NEUTRAL-NEGATIVE:POSITIVE, 220
 - NOUN:VERB, 5
 - ONSET:CORE, 223
 - ONSET:NUCLEUS, 223
 - PERSONAL:IMPERSONAL, 40
 - PREDICATE:SUBJECT, 222
 - RELATION BETWEEN WORDS : INTERPRETATION OF REALITY, 92
 - SHORT:LONG, 82
 - SUBJECT:OBJECT, 248
 - SUBJECT:PREDICATE, 223
 - SUBJECT:PREDICATE GROUP, 223
 - SYNTACTIC:PARADIGMATIC MEANINGS, 91
 - TENSE:LAX, 83, 84, 85
 - VOICED:VOICELESS, 84, 172, 220, 222
 - WHERE:WHENCE:WHITHER:WHICH WAY, 41
- morphologically derived, 136
- of abstract & concrete nouns, 247
- of colors, 225
- of concrete units, 263
- of geometrical figures, 225
- of identity & difference, 77, 81
- of Latin verb forms, 147
- perception of, 84
- phonological, 84, 177
- phonological minimal, 73
- opposition between
- agglutination, inflection, & incorporation, 115, 206
 - dependent & independent contensive autonomous words, 206
 - language & thought, xxi, 7, 140
 - major & minor keys, in music, 225
 - structural & lexical constituents, 93
 - structural & lexical signs, universal, 112
 - synchrony & diachrony, 76, 80
 - voiceless aspirated & non-aspirated stops, 147
 - vowels & consonants, 202
 - worth & value levels, 78
- ordering
- non-linear, 252
 - of sentence terms, 235
 - structural, 265
- orientation of verb-derived nouns towards subject/object, 231

P

- painting, xii, 10
- paradigm, **153–54**
 generativist, 3, 251–52
 Saussurean, xxv, 262
- paradigmatic class of distinctive features, 173
- paradigmatic configuration, **221**
- paradigmatic function, 138, 194, 197
- paradigmatic meaning, 91, 94, **99**, 200
- paradigmatic passive, 238, 244
- paradigmatic relations, 95, **99–100**, 112–14, 173–74
- paradigmatic sign, **91**, 92
- paradigmatic structure of word, 116
- paradigmatic system of language, 91
- parallelism, *also see analogy, isomorphism*
- parallelism between
 deep-surface structure & primary-secondary function hierarchies, 6
 genotype system of linguistics & ob-system of logic, 17
 history of language & culture, 109
 language & social institutions, 34
 phenotype system of linguistics & concatenation system of logic, 17
 semiotic identity of meanings & sounds, 103
- paraphrase in language analysis, 79–80, 123
- part of speech, 5, 100, 102, 104, 114, **195**, 198–200, 205, 208, 245
- part of speech class, 104
- part-whole relation, 53, 95, 213, 228, 242, 254
- passive, 132, 138, 141–42, 148, 156, 232–44, 238, *also see bipartite p., tripartite p.*
- passive proper, 239, 241, 244
- passivization, 111, 156, 236, 240
 as structural test, 118, 119, 233
- patterns, *also see formal p.*
 generated by social mind, 82
 generated by thought, 85
 grammatical, 156, 157
 of explanation and discovery, 153
 of language, 82
 of productive structures, 106
 of word combination, 96
- perception, *also see reality*
 as cognitive process, 84
 empiricist theory of, 153
 of sound, 82
 of voicing, 83
 of words as signs, 36
 phonological, 84, 85
- periphery, 150
- PERSON, of dialogue relation, 37
- phenotype, 15
- phenotype grammar, 15–17, 157, 253
- phenotype system, 17
- philosophy, 23, 45, 67, 77–78, 145, 153, 171, 172, 175, 189, 250
 nominalist, 35
 of science, 78, 153
 of science, empiricist, 179
- philosophy of language, xiii, 29
 collective, xi
- phoneme, 68, 70, 73–74, 82, 99–100, 104, 122, 124, 129–31, 146, 147, 165–75, **166**, 177–78, 202–4, 220–24, 239, 259–61, 264–266, *also see dual p., duality theory of p., segmental p., also see dual p., duality theory of p., segmental p.*
 acoustic representation of, 84
 as basic unit of phonology, 175
 as central concept of phonology, 158
 as class of physically related sounds, 178–79
 as class of sounds, 158
 as communicative form of sound, 123
 as convenient term, 73
 as essential features of sound, 163
 as functional unit, 170
 as individual construct, 169
 as limit object, 163
 as linguistic value, 170
 as meaningless part of a symbol, 261
 as minimal segmentation element, 173
 as not deducible from physical properties of sound, 260
 as physical substance, 170
 as second-order communicative entity, 169
 as semiotic class of sounds, 6, 7
 as sign of a regular sign, 266
 as signifying ‘otherness’, 266
 as sound taken under its diacritic properties, 129
 as sound taken under its distinctive function, 122, 265

- as sound taken under its value, 70
- as successive & distinctive unit, 11, 73
- as systemic unit, 170
- as unity of contradictory properties, 170
- as unity of functional value and physical properties, 170
- as value class of sounds, 191
- autonomous, 124, 130
- conceptual shift from sound to, 165–69
- concrete, 167, 172, 178, 260
- context-conditioned, 169
- controversy over concept of, 171–75
- diacritic function of, 261
- from epistemological standpoint, 170
- function of in a syllable, 202–3
- functionally identical/different, 167–68
- homonymous, 130
- in Hjelmslev, 191
- in Sullivan, 171–74
- in Twaddell, 171
- marked/unmarked, 221–22
- nonsyllabic, 203
- physical form of, 143
- physical properties of, 74, 170–71, 178
- physical variation of, 168
- physicalist vs. semiotic view of, 158
- physically identical/different, 167–68
- physically related, 68
- positional variation of, 167
- quarrels over definition of, 158
- secondary, 130
- segmental property of, 82
- sound properties of, 170
- theory of, 177
- variation of phonetic properties of, 130
- vs. sound, 169, 181
- phoneme classes, 70, 104, 202
 - phonological vs. phonetic definition of, 202
 - relational structure of, 167
 - universal phonological definition of, 202–3
- phoneme inventory of a language, 11
- phoneme level, 173
- phoneme proper, 130
- phoneme-changing context, 124–25, 130, 183
- phonemic overlapping, 178–79
- phonemic plane of language, 202, 220
- phonemic system, 266
- phonetic classes of signs, 68
- phonetic context, 166–68
- phonetic level, 238
- phonetics, 82–85, 181
- phonological context, 124, 144
- phonological phenomenon, 85, 178
- phonological structure, 85, 160, 260–61
- phonological system, 73, 95, 129, 145, 147, 151, 160, 169–70, 265
- phonological theory, *see phonology*
- phonological vs. phonetic description, 84
- phonology, xx, 12–3, 17, 67, 69, 82–84, 124, 143, 158, 172, 175, 177–78, 181, 183, 191, 202, 220, 223–24, *also see generative p.*
 - levels of, 238
- physical form, 47, 52, 54–55
- physical level of speech flow, 84, 260
- physics, xiii, xxvi, 18, 33, 122, 131, 144, 153, 175, 224, 265
 - as basis for the study of nature, 7
 - explanation in, 153
 - laws of, 155
 - of elementary particles, reductionism in, 25
- polarity of persons, 37–38
- political economy, 76
- political theory, 23
- polysemy, 102, 125–28, 133, 150, 201
- Port-Royal grammarians, 117
- position
 - functional, 134
 - of consonant, marginal, 202
 - of part of speech, 6
 - of phoneme, 130, 167, 169, 204
 - of sound, 79, 166–69, 177, 221–22, 260
 - syntactic, 87, 91, 97, 128, 134–36, 196, 246
- positive analogy, **160**
- positive term of opposition, 220
- positivism, 180
- pragmatics, 13
- predicate
 - as constitutive element of sentence, 223
 - as minimal requirement for sentence, 222
 - linguistic vs. logical concept of, 217–18
- predicate class, 104
- predicate group, 217, 223
- predicative articulation, 4, 217–18, 227–28
- predicative frame, 235
- predictive power, 177–81
- primary form, 97, 135, 141, 232
- primary function, 7, 48, 97, 125, 131, 134–36, 141, 146, 151, 203, 221, 232, 245

- primary meaning, 7, 48, 58, 124–27, 131, 135, 142, 208
- primary syntactic function, 4–5, 108, 128, 133, 136, 200, 202, 204, 207, 209, 232, 236–37, 246–48
- of accusative, 233
- of adjective, 5–6, 128, 137, 201–2, 204, 232, 245–46
- of adverb, 128, 232
- of *by*-phrase, 132
- of contentive word class, 200–1
- of direct object, 233
- of genitive, 247
- of instrumental, 233
- of intransitive verb, 141
- of noun, 128, 141, 201–2, 204, 207, 232, 245
- of oblique, 233
- of passive predicate, 132, 141
- of phoneme, 202
- of prepositional phrase, 233
- of sentence member, 232
- of transitive verb, 141
- of verb, 5, 128, 137, 208, 219, 232, 245
- primary-secondary function shift in diachrony, 147
- primary-secondary syntactic function distinction, 5, 97, 134, 136, 200
- Principle, *also see Generalized p. of differences, Transfer p.*
- Principle of complementarity of form and meaning, **44**
- Principle of diachronic differentiation, **146**
- Principle of differences, xvi, xviii, 61, **63–66**, 68–79, 86, 90, 103, 106, 112–13, 131, 143–44, 146, 150, 155, 182–83, 250, 264–65, *also see Generalized p.o.d.*
- and abstraction in linguistics, 64, 164, 183
- and anomalies, 65
- and arbitrariness of sign, 70, 71
- and concept of relevance, 123
- and dimensions of meaning, 75, 122
- and homonymy, 71–72, 107
- and language dualities, 75
- and linguistic inference, 183, 251
- and linguistic relativity, 65
- and typology, 112
- and value, 64, 75, 121
- as characterizing linguistic reality, 183
- as constraint, 267
- as following from analysis of sign, 61
- as indefeasible, 74, 155, 260
- in phonology, 69, 74
- significance of, 183
- Principle of duality of categorization, **69**, 131, 144, 155
- and dimensions of meaning, 75, 121–22, 164, 265
- and value-/worth-changing contexts, 143
- in phonology, 69, 74, 81
- principle of inertia, 74
- Principle of maximal distinction, **205**, 241, 243, 245–46, 248
- Principle of phonological differences, **73–74**, 260
- Principle of phonological duality of categorization, **74**, 163
- Principle of superposition, 6, **131**, 144, 155
- and antinomy of meanings, 141–42, 151, 204, 265
- and hierarchy of functions, 201, 260
- and meaning-/information-changing contexts, 143, 183
- and Nucleus law, 219
- and phonological context, 144
- in diachrony, 144, 145, 146
- Principle of the arbitrariness of the sign, 10, 61–**62**, 70–71, 155
- Principle of the contrast of structural and lexical signs, **86**, 90, 240, 267
- Principle of the conventionality of the sign, **62**
- principle of the rectilinear propagation of light, 155, 157
- principles, 152, **155**, 157
- as high-level statements, 155
- generative, 185
- in atomic physics, 176
- level of, 157
- of linguistic sign, 34, 263, 264
- semiotic, 62, 155
- system of, 252
- principles and laws
- general semiotic, 225
- of language, 11, 158
- of linguistic sign, xx, 10
- semiotic universal, xviii, xix
- universal, xvii

- privative opposition, 220
 problem-blindness, xvii, 20
 problems under discussion, 156
 production rules, 94, 161
 proof theory, 94
 proportion, 105–6, 122, 129–30, 221, *also see*
opposition
 Proportionality law, **105**, 106
 prosodeme, 248
 prototype, 126, 260
 psychological analysis, 248, 267
 psychological reality, in Chomsky, 181
 psychologism, in Sapir, 113
 psychology, xxi, 8, 25–26, 175–76, 209–10,
 261, *also see individual p.*
 psychology of language, xxii, 26
- Q
- quantum mechanics, 26, 224
 quantum, dialectical concept of, 19
- R
- range of occurrence, 134–35, 141, 203, 220,
 235
 Range-content law, 7, **134–35**, 141, 220, 235
 rational abstraction, 162, 163
 reality, xiii, 11, 28, 51, 56–57, 85, 88, 118,
 120, 187, 189, *also see linguistic r.,*
psychological r.
 analysis of into classes, xvi, xxi
 analysis of, in Sapir, 198–99
 as blend of irregular and regular, 150
 as constant, xiii
 as discriminated by a language, 250
 as essential existence, 163
 as independent of observers, 29
 description of, 186
 external, xvi
 extralinguistic, 38, 91
 knowledge of, 150
 levels of, 172, 191
 perception of, xi–xiii, xv, 45–46, 84
 physical, 30
 stratification of, xxiv, 25, 78, 172
 understanding of, 19, 253
 virtual, 77
- reduction
 of non-linguistic oppositions, 225
 of n-place operator, 211
 of structure to its nucleus, 225, 243
 of theoretical problems to ontological
 postulates, 18
 of unit to its constituents, 43
- reduction abstraction, 169
 reductionism, xxiv, 25, 26
 referent, 37, **51**, 53
- relation, *also see binary r., causal r., constit-*
uency r., converse r., dependency r., de-
rivation r., dialogue r., distributive r., in-
tegrative r., meronymic r., opposition,
paradigmatic r., part-whole r., sign r.,
structural r., subject-object r., syntactic r.,
syntagmatic r.
 as term in Relational Grammar, 158
 conventionalized, 62
 extralinguistic, 91, 99
 motivated, 56
 OPERATOR:OPERAND, 213, 232
 vs. term of relation, 46
- relation between
 adjective & noun, 245
 agent & patient, 148
 basic & derived words, 222
 commodity & human needs, 190
 concepts & reality, 192
 conjunction & its operands, symmetrical,
 212
 language & reality, xiii, 45, 71
 language & thought, xiii, 27, 31, 45, 71, 74,
 79, 137, 140
 language units, 42
 nucleus & margin, 222
 passive & middle diatheses, 244
 sentence & its logical content, 140
 sign & meaning, 52, 54, 57, 66, 79, 112,
 121, 142
 sign & referent, 29
 sign's meanings, 72
 sound & meaning changes in diachrony,
 145
 structural & lexical constituents, 240
 structural & lexical signs, 93
 tripartite & bipartite passive, 241
 unmarked & marked phonemes, 222
 word & its meaning, 57
 word class & its syntactic function, 39
 word's meanings, 59
 words in a word combination, 211

- words vs. relation between words as parts
of sentence, 42
- relational grammar, xxvi, 158
- relativism, linguistic, 39
- relativity principle, in physics, 18
- relativity, linguistic, xii, 39, 65
- relator, 182–83, 197
- relator languages, 115
- representation, xi, 30, 159–61, 195, *also see*
collective r., formal r., linear r., monotec-
tonic r., sign r.
- representational function of words, 95, 195,
197
- representative language sample, 34
- research program, 6, 57, 150, 152–53, 189,
262
- semiotic, 2, 17, 28, 113, 117, 189, 259
- resultant, **210**, *ff.*
- resultant type, 255
- rules, *also see formal r., production r.,*
transformation r.
- as empirical dependencies between basic
and derived linguistic structures, 186
 - as language-specific conditions, 154, 156
 - for generating an infinite set of signs, 10
 - form of, 156, 157
 - generative, 81, 185
 - in chemistry, 224
 - of communication, 24
 - of constructing composite sign types, 254
 - of game, 24
 - of grammar, 24, 48, 110–11, 156, 158
 - of inferring composite sign types, 255
 - of passivization, 156, 238, 240
 - of sentence derivation, 186
 - of word order, 111
- S
- satellite of syllable nucleus, 202–4, *also see*
margin
- science, xxvi, 67, 78, 145, 154–55, 161–62,
164, 172, 181, 189, 193, 253, 263
- as art of separating regular from irregular,
150
 - causation in, 145
 - goal of, 19, 163
 - history of, 55, 154, 179
 - progress of, 19, 192, 258
 - vulgar, 163
- scientific debate, 179–80
- scientific revolution, 154, 192
- sculpture, xii, 10, 30
- secondary form, 97, 135, 141, 232
- secondary function, 48, 125, 130–32, 134–36,
141–42, 146, 151, 203–4, 207, 232
- secondary meaning, 48, 58, 125–27, 131–32,
135–36, 141–42, 208
- secondary syntactic function, 5–6, 97, 108,
128, 133, 136, 200
- as derived through superposition, 128
 - derivation of, 206
 - in neutralizing context, 246, 248
 - of accusative, 233
 - of adjective, 5–6, 137, 201–2, 204, 207–8,
245–46
 - of adverb, 207, 208
 - of adverbial, 141
 - of appositive noun phrase, 246
 - of *by*-phrase, 142
 - of combination, 4
 - of contensive word class, 201
 - of genitive, 141
 - of instrumental, 233
 - of intransitive verb, 141
 - of noun, 128, 135, 201–2, 204, 208, 245–6
 - of passive verb, 141
 - of phoneme, 202
 - of prepositional phrase, 233
 - of verb, 5, 137, 207, 245
 - of word class, 202, 204–5, 207, 232
 - represented by syntactic position, 97
 - successive, 232
 - theoretical role of, 232
- segmental phoneme, 171–75
- segmentation, 172, 173
- semantic affinity, 60–61, 66–68
- semantic analysis, 58, 80, 92–93
- semantic class of phonemes, **166–68**
- semantic component, 257, 259
- semantic context, 124, 129
- semantic heterogeneity, *see h. of meanings*
- semantic level of diathesis, 238–39
- semantic opposition, 170, 220, 239
- ACTIVE:BIPARTITE PASSIVE, 238
 - ACTIVE:MIDDLE, 244
- semantic shift, 146
- semantic sign type, 117
- semantic structure, in Langacker, 258, 260–1

- semantic system, 73, 91, 95, 145, 151, 160, 170, 265
of typology, 117
- semantics, xx, 12–15, 58–59, 79, 123, 143, 223, *also see generative s., grammatical s., lexical s., syntactic s.*
logical, 13, 94, 253
- semiotic class, *see class*
- semiotic constraints on grammar, 252
- semiotic difference, *see difference*
- semiotic fact, xxi, 64, 103, 251
- semiotic grammar, 4–6, 90, 143, 231, 260
- semiotic identity, *see identity*
- Semiotic Linguistics, xi–xx, xxiii, xxvi, 3–4, 31, 64, 118, 135, 148, 230–34, 244–5, 253
and anomalies, 19, 259
and applicative grammar, xxii
and language universals, 34, 155
and linguistic-logical meaning distinction, 142
and Nucleus law, 217
and phonology, 266
and Principle of differences, xviii, 155, 250, 260, 264
and principles of linguistic sign, 263
and semiotics, xviii, 8, 225, 264
and structural-lexical meaning distinction, 110
and value, 79
as basis of theory of mind, 7, 18
as pillar of theory of language-thought continuum, 7
as theory of linguistic invariants, 144
conceptual apparatus of, 144, 155–57
explanatory advantage of, 266
formalism of, xxiii, 161, 250
goal of, xvi, 6
mathematical framework of, 253
methodological postulate of, 18
structuralist roots of, xii
subject matter of, xviii, 153
universality of, 145
use of isomorphism in, 160, 266
vs. cognitive grammar, 257–62
vs. contemporary linguistics, 20, 117
- semiotic point of view, 12, 71, 103, 143, 248
- semiotic system, *see sign system*
- semiotic value, *see value*
- semiotics, xviii, 7–11, 56–57, 224–25, 264
- sentence, 205, 211, 220–21, 223, 228–230, 235, 239, 247, 251, *also see impersonal, active, passive, syntactic class*
as basic communicative unit, 226
as basic language unit, on logical view, xiv, 209, 265
as basic structure of semantics, 223
as basic syntactic structure, 247
as central unit in modern linguistics, 3, 266
as deep structure, 4, 244
as fundamental unit of field tier, 48
as fundamental word combination, 217
as message-carrying unit, 226
as non-sign, 48, 209, 265
as primitive type, 227, 254
as privileged word combination, 95, 99, 209, 226, 232
as subclass of general semiotic class of word combinations, 4
as syntactic combination, 4, 249
as syntactic primitive, 4, 5
as unit of highest level, 43
as whole, 42
as word combination, xv, 209, 226
as zero-field sign combination, 48, 209
- binary components of, 218
complete, 218, 224
functional unit of, 228
iterative analysis of, 212
logical concept of, xi, 4
logical content of, 140
meaning and form of, 27, 138
minimal, 223
nominal, 245
one-word, 219
semiotic concept of, 4
simple, 230
subjectless, 219, 224, 230
- sentence articulation laws, 228–30, 235
- sentence compression, 247
- sentence level, 42, 43, 173
- sentence member, 141, **209**, 217–8, 232, 237
- sentence structure, 89, 98, 111, 140, 188, 222–23, 237
complex, 230
non-associative, 188
reduced, 224, 243
syntactic, 116, 248
syntactic-functional, 226

- sentence type, 227, 229, 254
 separability condition, 107
 sequencing as coding device, 261
 sign, 26, 30, 46, 52–54, 61, 69, 94, 151, 182, 255–56, *also see atomic s., basic s., closed s., composite s., derived s., lexical s., structural s., syntactic s., zero s., zero-field s.*
 apart from meaning as physical phenomenon, 18, 28
 as attribute of meaning, 45
 as binary relation ‘to be sign for’, 46
 as conventional phenomenon, 50
 as differential entity, 30, 31, 32, 45
 as external to meaning, 49
 as fundamental unit of language, 12
 as instrument of communication, 14
 as key to discovering linguistic facts, 264
 as means of communication, 15, 36, 62
 as name, 32
 as non-primitive, 46
 as one, 100
 as physical entity, 49
 as physical thing interpreted as sign, 47
 as *raison d’être* of sound, 123
 as representing a thing for consciousness, 9, 38, 45
 as ruling concept of linguistics, xviii, xx
 as sequence of sounds, 47, 96
 as sound in its relation to meaning, 251
 as surrogate of a real thing, 28
 as technical term, 61
 as term of relation ‘to be sign for’, 47
 as variable, 14
 as vocal form, 47
 composite, 254
 considered apart from its form, 15
 diachronic change of, 145–46
 discrete character of, 172
 dual interpretation of, in Aristotle, 30
 essential aspect of, 9, 62
 functioning of, 137, 209
 general, 88
 generalized concept of, 266
 homonymous, 130
 in Deleuze, 77
 in everyday language, 9, 50, 61
 in Langacker, 258
 in Martinet, 113
 in Peirce, 57
 in Saussure, xix, xx, 52–56
 in the arts, 264
 individual, 87, 88
 interchangeable function of, 137
 intrinsic nature of, 20
 linguistic, 47, 264
 material form of, 55
 meaning capacity of, 9
 minimal, 194
 objectivist notion of, 31
 of grammatical class, 146
 of syntactic field, 97
 physical characteristics of, 69
 properties of, 45
 regular, 266
 tripartite structure of, 17
 universal principles of, 263
 vocal property of, 69
 with a more complicated structure, 136
 sign combination, 10, 113–14, 140, 232, *also see basic s.c., also see basic s.c., derived s.c.*
 sign correlator, 43, 44, 95
 sign device, xviii, 14–15, 80, 114, 119, 157, 239
 sign form, 14, 17, 72, 125
 sign mold, 23
 sign relation, 46, 49–50, 56
 sign representation, 14–16, 160
 sign series, 102–4, 106–7
 sign system, 9–11, 13, 27, 48, 225, 264, 266
 sign tier, 48
 sign type, 254, 255, *also see semantic s.t.*
 sign-cum-field system, 48, 53
 signifier, 53, 55
 sign-meaning, 18, 28, 47, 99
 sign-meaning link, 62
 simple modifier-relator languages, 115
 simple relator languages, 115
 Snell’s law, 155, 157
 social coercion, 11, 21–24
 social consciousness, 261
 social contract, 62
 social fact, xxi, 22, 25
 social mind, xxi, 22–25, 81–82, 85, 261
 society, 7, 12, 23, 37, 38, 62, 76, 265, *also see human community, collective*
 sociology, 23, 175–76, 209

- sound, xvi, 53, 62, 75, 122–23, 129, 165–67, 191, 251, 265
 acoustic properties of, 82
 acoustically related, 158
 apart from meaning as acoustic fact, 251
 as complex auditory-articulatory unit, 75
 as diacritic, 177
 as empirical object, 163
 as first-order physical entity, 169
 as functional unit, 166
 as instrument of communication, 165
 as instrument of thought, 75
 as means of expressing pre-existing thought, 31
 as member of minimal opposition, 73
 as phoneme taken under its vocal properties, 122, 265
 as physical class of sounds, 6, 7
 as physical entity, 73
 as term of differential relation, 69
 as term of distinctive opposition, 166, 168
 as variant of phoneme, 130
 complementary facets of, xvii
 existence of, 75
 extraneous properties of, 178
 functional essence of, 163, 178
 in Hjelmslev, 191
 material properties of, 81
 musical, 10
 notion of, 165
 physical properties of, xvii, 70, 78–79, 81–82, 177, 191, 260
 physically related, 103
 semiotic properties of, 82, 179
 stratification of, xvi
 substance of, 253
 used to encode meaning, 251
 vs. phoneme, 68, 73, 169, 181, 260
 sound proper, 70, 122, 259, 265
 sound type, 165
 sound-changing context, 124–5, 129–30, 183
 sound-thought, 75
 sound-thought duality, 32
 speech community, *see language community*
 speech situation, xxii, 36, 40, 41
 splitting (in word classification), 208
 splitting of the concept
 of heat, 122, 265
 of meaning, 69, 122, 259, 265
 of phonological context, 124
 of semantic context, 124
 of sound, 69, 122, 259, 265
 structural class, 93, 100–107, **103**, 208, 217
 structural constituent, 86, 89–90, 92–93, 100–103, 107, 137, 142, 240, 247
 structural meaning, 87–88, 91–93, 101–3, 110–11, 114, 118–20, 128–29, 133, 137–39, 141, 146, 151, 210, 265, 267
 structural meaning shift, 146
 structural morpheme, 95, 96, 106, 248
 structural relations between signs and meanings, 31
 structural series, 101–3, 107
 structural sign, 86–89, 92–93, 96, 101, 105, 112–14, 137, 142, 248–49
 structuralism, xii, 89, 184, 259
 structure, 86, *also see applicative s., basic s., binary s., communicative s., constituent s., deep s., derived s., genotype s., grammatical s., paradigmatic s., phonological s., semantic s., sentence s., surface s., syllable s., symbolic s., word s.*
 as form of mental and communicative processes, 76
 in transformational grammar, 244
 molecular, xv
 morphological, 96, 108, 210
 of active/passive, 141
 of adjective, 129
 of language, 10, 145
 of linguistic perception, 84
 of linguistic unit, 242–43
 proportionally analogical, 105
 structured whole, 22, 25, 209, 242
 subject, *also see dummy s., zero s.*
 as consciousness of oneself, 37, 39
 as continuum of descriptive notions, in Keenan, 164
 as logical meaning, 132, 138
 as margin of sentence, 218, 223
 as universal concept, 149, 164
 linguistic vs. logical concept of, 217–18
 subject group, 217, 223
 subjectivist model of the world, 39
 subjectivity, 36–38, 40–41
 subject-object asymmetry, 231
 subject-object relations, 14
 subphonemic level, 173

- substitution, 96, 172–73
 subsystemic context, 183
 superposition, 125–38, 157, 183, 219
 and alternation, 130
 and antinomies, 136, 151
 and field, 151, 265
 and polysemy/synonymy, 127, 148, 150
 as assigning secondary function, 246
 as global principle, 144
 as objective criterion for word
 classification, 205
 as universal process, 137
 entailment of, 235
 in derived word, 134, 137
 in diachrony, 146–47
 in diathesis, 235–37
 in metaphor, 126, 260
 in passive, 237
 in phonology, 129
 non-syntactic, 136
 null, 237
 of actor's personality and his roles, 131
 of adjective with noun, 219
 of deep & secondary language strata, 7
 of functions, 135
 of meanings, 127, 208
 of opposition terms, 222
 of passive predicate, 132
 of predicate with sentence, 219
 of structural meanings of word classes, 137
 of tense meanings, 208
 of term functions, 237
 of types, 230
 of voiced & voiceless stops, 144
 of word classes, 128
 of word classes with sentence class, 219
 origin of the term, 131
 promotion/demotion in, 236
 semantic, 148
 successive, 232
 syntactic, 128, 134
 superposition constraint, 235–36, 256
 superposition hypothesis, 148
 surface classes of sounds/meanings, 6–7, 70
 surface structure, 3–7
 syllable, 99–100, 104, 202, 220–24
 as privileged phoneme combination, 95, 99
 syllable structure, **100**, 222–23
 symbolic structure, in Langacker, 260–61
 synchrony, xx, 3, 33, 76, 80, 145, 241, 264–7
 level of, 144
 synonymy, 125–28, 136, 148–50
 as asymmetrical relation, 126–27, 136
 structural, 128, 133
 syntactic class
 of isolation/non-isolation, 116–17
 of passive, 239
 of sentence, 219, 223
 of words, 202
 syntactic combination, 4, 5, 119, 245
 basic, 247, 249
 syntactic configuration, **221**
 syntactic context, **129**, 131, 246, 248
 syntactic field, 131, 204, 208, *also see field*
 as fundamental word property, 207
 of contensive autonomous word, 96–7, 116
 structure of, 116
 syntactic function, 91, 96, 128, 135–36, 138,
 194, 201, **205**, 227
 acquired, 6
 as basis of word classification, 91, 104, 197
 as foremost sign property, 204
 as property of word class, 97
 change of, 134
 of abstract noun, 247
 of accusative, 233
 of contensive autonomous word, 95, 197,
 205
 of formal patterns, 200
 of independent word, 196
 of phoneme, 100
 of word, 108, 195
 of word class, 5, 207, 234, 245
 syntactic level
 of transformation, 238–39, 244
 of typology, 115–16, 206
 syntactic meaning, **91–92**, 94, **99**
 syntactic opposition, 136
 •ACTIVE:PASSIVE, 244
 •ISOLATION:NON-ISOLATION, 116–17, 206
 of parts of speech, 5
 syntactic phenomenon, 232–4, 238, 244, 246
 syntactic relations, 48, 91–92, 95, **98–100**,
 112–15, **113**, 212
 between morphemes, 96
 between phonemes, 100
 expressed by word order, 97, 128, 135
 linguistic vs. logical concept of, 218

- of independent word, 196
 - of passivization, 111
 - syntactic semantics, 13
 - syntactic sign, 91–92
 - syntactic system
 - in logic, 94
 - of typology, 116–17
 - syntactic theory, *see syntax*
 - syntagmatic relations, 113, 173–74
 - syntax, xiv, xv, xx, 3, 13, 96, 108, 117, 209, 232, 266, *also see generative s., government & binding s.*
 - as autonomous, 12, 111
 - as part of grammatical semantics, 12
 - as theory of combinations, 202
 - as theory of word combinations, 4, 209, 266
 - higher level of, 244
 - linguistic vs. logical concept of, 3–4, 218
 - logical, 13, 94
 - of morpheme combinations, 96
 - system, *also see applicative s., communicative s., conceptual s., formal s., genotype s., grammatical s., hierarchical s., innate s., interpretive s., language, mathematical s., paradigmatic s., phenotype s., phonemic s., phonological s., semantic s., sign s., syntactic s.*
 - logical, 13, 94
 - of cases, xxii, 41, 233, 246
 - of collective representations, 82
 - of coordinates of speech situation, 34
 - of general concepts, 157
 - of language, 31, 36, 39, 53, 63, 69, 105, 107, 169, 249, 265
 - of meanings, 14, 15, 30, 113
 - of rules of communication, 24
 - of sign devices, 15, 113
 - of structural signs, 88
 - system level, 169, 170
 - systemic context, 183
- T
- taxonomic description, 33, 238, 253
 - taxonomic generalization, level of, 34, 81, 184
 - technical term, 23, 152, 161, 254
 - term of sentence, 227–29, 235–37, 254, *also see zero t.*
 - term type, 227, 254
 - Term uniqueness law, 230, 237
 - terminology, conflict over, 158
 - text, xxi, 26–28, 107, 169–70, 172
 - text level, 169–70
 - theoretical construct, 111, 181
 - theoretical inquiry, art of, 184
 - theoretical statements, 152, 243
 - theory, 152–61, 187, *also see syntax*
 - as hierarchy of empirical statements, 155
 - conceptual clarity of, 181
 - correct/false, 19, 187
 - development of, 17, 153, 159
 - dimensions of, 152
 - empirical content of, 155
 - empirical problem-solving ability of, 179
 - entities allowed in, 18
 - established part of, 156
 - evaluation of, 179, 180
 - generative, 185
 - levels of, 155, 157, 193
 - resulting from transformation of
 - anomalies, 18, 19
 - rival, 180, 181
 - stratification of, 156
 - structure of, 155, 160
 - value of, 266
 - vs. formalism, 250
 - vs. taxonomy, 150
 - theory of chess as system of rules, 26
 - theory of diatheses, 234, 243
 - theory of evolution, 33
 - theory of grammar, 109, 119, 156–57, 160, 240–41, 253, 258, 267
 - Chomsky's, 153
 - condition of adequacy of, xxiii
 - formal, 185, 186
 - laws of, 224
 - mainstream, 119, 151, 230
 - Martinet's, 194
 - predictive power of, 179
 - proper subject matter of, 240
 - vs. logic, 117, 253
 - theory of language, *see linguistics, linguistic theory*
 - theory of paradigms, 153
 - theory of special relativity, 19, 192

- thought, xiii–xvi, xxi, 11, 30, 77, 82, 89–90, 117, 121–24, 137, 140, 164, 248, 265, 267, *also see form of t., language-t.*
 abstractness of, 89
 as constant, xiii
 as content, 123
 as content of communicative form, 1
 as content of language, 27, 123, 140
 as content of language-thought continuum, xxi, 89
 as not directly observable, xxi, 27
 as preceding language, 29, 31
 as represented by language, xxi, 27
 as substance of language, 191
 as theoretical object, 27
 classes of, xvi
 communicative form of, 142
 dimension of, 76, 164
 fact of, 52, 89, 92
 general study of, 90
 individual expression of, 23
 laws of, 92
 stratification of, xvi
 thought-sound, in Saussure, 74
 Transfer principle, 14, 15
 transformation, 4, 232, 234–40, 244–49
 transformation rules, 94
 transformational grammar, *see generative t.g.*
 transitivity, 132, 138–41
 tree diagram, 195, 211–12, 214, 216
 tripartite passive, 238–43
 type, 229, 234, 254–56, *also see adjoined t., grammatical class, language t., operand t., sign t., sentence t., term t.*
 type class, inductive, 255
 type constructor, 227, 255
 type derivability, in Moortgat, 188
 type system, 256
 type-assignment axiom, 254–55
 typology, xxvi, 15, 112–17, 197, 206–7
 Jakobsonian, 224
 laws of, 144
 of genotypes, 16
- also see articulation, basic u., binary u., sentence, word*
 articulation of, 142
 as linguistic value, 76
 as sign, 10, 44, 80
 complex, 108, 242
 concrete, 263
 form and meaning of, 43–44
 functional properties of, 242
 in cognitive grammar, 260
 integrative function of, 43
 morphological, 42
 of deeper order, 172
 of higher level, 19, 42, 43
 phonological, 95, 104
 replaceable, 220
 semantic, 95, 220
 simple, 242
 syntactic, 220, 243
 well-formed, 221, 225
 unit delimitation, 74, 75, 263
 unit of language use, 266
 unity, *also see dialectical u.*
 of commodity & human needs, 190
 of language & thought, 27, 164
 of material content & linguistic form of meaning, 85
 of opposites, 175, 176
 of physical content & phonological form of sound, 85
 of sound & meaning, 53, 56
 of sound & thought, 31
 of theoretical conception, 160
 universal grammar, xviii, xxii, xxiii, 24, 117, 157, 253
 semiotic, 39, 267
 universal linguistic classes, 40
 universal principles of arranging signs into combinations & classes, 114
 universals of language, xvi–xix, 33–36, 39–41, 97, 112, 137, 145, 149, 154, 157, 184, 202, 221, 224, 231, 252–53, 263
 unmarked term of opposition, 220–21

U

- unit, 10, 263
 unit (linguistic), xiv, xv, 42–44, 143, 165, 209, 220–21, 242–43, 251, 263–64, 266,

V

- value, xvii, 30, 64, 69, 74, 160, *also see grammatical v.*
 abstraction of the concept of, 165
 as communicative form of thought, 75

- as linguistic fact, 264
 - in Saussure, xii
 - linguistic, 75, 76, 170
 - of commodity, 170, 190
 - of meaning, xvii, xviii, 64, 69, 70, 72–73, 75, 78–79, 121, 157, 164, 165
 - of phoneme, 74, 170
 - of sign, 64, 69, 70, 75, 165
 - of sound, xvii, xviii, 73, 78–79, 157, 170
 - of vocal expression/meaning, 69
 - semiotic, 70
 - value classes
 - of commodities, 191
 - of meanings, 68–69, 191
 - of phonemes, 74
 - of signs, 68
 - of sounds, 69, 191
 - value level, xiv, 78, 79
 - value-changing context, 125, 130, 143
 - variability/variety of languages, *see diversity of natural l.*
 - variant, 68, 125, **130**
 - combinatory, 126, 244
 - contextual, 143, 169
 - linguistic, 244
 - logical, 144
 - of meaning, 63, 65–66, 68, 72, 106, 143–44, 170, 183
 - of phoneme, 68, 104, 143, 169, 177–8, 181
 - of sign, 63, 107, 183
 - of sound, 73, 144
 - phonetic, 124, 130
 - physical, 144
 - stylistic, 241
 - variation context, **130**
 - very large system, 150
 - vocabulary (theoretical), 158, 185
 - vocabulary of a language, 109, 198
 - vocal affinity, 68
 - vocal form, 52, *also see derived v.f., zero v.f.*
 - as sign attribute, 12
 - as subordinate to meaning, 14
 - as worth of sign, 69
 - vocal form series, 102, 103
 - vocal relativity, 165, 167
 - vocative function, 195
 - voice, in phonetics, 174, 202, 220, 222
 - voice, syntactic, *see diathesis, active, passive, middle*
 - vowel, 202–3, 220, 223–24
 - as constitutive element of syllable, 223
 - degree of openness of, 168
 - vowel class, 202
- W
- well-formedness, 155
 - word, 86, 104, 135, 169, 194, 210, 221, 232, 250, *also see autonomous w., basic w., derived w., lexeme*
 - affixed, 108
 - affixless, as neutralized opposition, 222
 - and non-word, 88
 - as atom, 108
 - as atomic sign, 254
 - as basic language unit, xv
 - as central language unit, 3, 28, 108, 192, 196, 197, 209, 265
 - as central to theory of grammar, 194
 - as discrete entity, 197
 - as fundamental unit of sign tier, 48
 - as means of expression of thought, 31
 - as minimal discrete sign, 88, 107, 194, 195
 - as minimal free form, in Bloomfield, 192–94
 - as minimal sentence unit, 197, 198
 - as morphological & syntactic object, 108
 - as name, 29, 30
 - as privileged sign, 232
 - as sentence component, 42, 194
 - as sign, 57
 - as syntactic atom, 108, 196, 209
 - as syntactic primitive, 4, 5
 - as word combination, **210**
 - borrowed, 109, 147
 - compound, 108
 - defined by its differences from all other words, 69
 - defined in terms of its syntactic relations, 197
 - explication of the concept of, 192–94, 197
 - functional capacity of, 207
 - functional definition of, 197
 - functioning as a sentence, 219
 - grammatical, 113
 - in Saussure, 192
 - independence of from secondary function markers, 207
 - individual, 240

- lexical properties of, 37
 non-autonomous, 128, 135, 195–97
 possible, 108
 single-morpheme, 198
 word class ambiguity, 201
 word class change, 249
 word class subclass, 39, 40
 word classes, 5, 39, 59, 65, 87, 128, 195, 202, 204, 206, 234
 as bundles of primary/secondary functions, 204
 as paradigmatic transpositions of syntactic function, 91
 defined by primary syntactic function, 209
 determination of, 91, 208
 in Sapir, 198, 204, 205
 in Tongan, 207
 laws of construction of, 108
 main, 97, 211, 232, *also see c. of contensive w.*
 reassignment of, 129
 syntactic behavior of, 201
 theory of, 207
 word combination, xv, 86, 104, 169, 209–13, 215, 217, 229, 250, *also see derived w.c.*
 applicative, 226
 as composite sign, 254, 255
 as generalized term, 210
 as gestalt, 210
 as privileged sign combination, 232
 as syntactic binary unit, 221
 invariant structure of, 239
 structural complexity of, 4
 structure of, 86, 88, 95, 97–98, 142, 213, 248, 254
 syntactic laws of, 3, 5
 Word combination law, 210, 212–15, 218, 226–27, 230
 word combination tree, 211, 215
 word form, 122, 136, 193, 206
 in Bloomfield, 193
 inflectional, 194
 morphological, 196
 word level, 42–43, 173
 word order, 14, 47, 97, 111, 118–19, 128, 135, 254
 canonical, 256
 linear, 15, 156–57, 214, 240
 word stem, 119
 word structure, 86, 88–89, 100, 104–5, 108, 137, 140, 142, 222
 as crystallization of syntactic function, 96
 semantic characteristics of, 104
 world, *see reality.*
 worth
 in political economy, 69
 informational, 69
 of commodity, 190
 of meaning, 69, 121, 157
 of phoneme, 74
 of sign, 69
 of sound, 124, 157
 vocal, 69
 worth classes
 of commodities, 191
 of meanings, 68–69, 191
 of phonemes, 74
 of signs, 68
 of sounds, 69, 191
 worth level, 78, 79
 worth-changing context, 125, 130, 143
- Z
- zero sign, 47, 101
 zero subject, 230
 zero term, 230
 zero vocal form, 106
 zero-field sign, 48
 zoology, 178, 263

