

TOWARDS AN EMPIRICAL FOUNDATION OF MEANING

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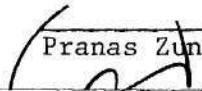
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ERRATA

Page 81a appears between page 81 and page 82.

Page 128a appears between page 128 and page 129.

Page 319 omitted from pagination; the text goes directly from page
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SUMMARY

The study of communication and messages is an integral part of information and computer science and an understanding of the nature of meaning is pertinent to this study of communication and messages. But our understanding of the nature of meaning is hampered by the inadequacies of our languages for analyzing meaning phenomena. Therefore, this thesis attempts to develop a language, called the language of menetics, for analyzing meaning phenomena and the nature of meaning.

The language of menetics is developed using a methodology suggested by Ogden and Richards in their well known book The Meaning of Meaning. This thesis appears to be the first known attempt to apply this methodology, which consists of three steps:

- 1) Conduct a literature search to determine all of the senses of the principle words.
- 2) Base any study of meaning on the concept of *symbol*, and the semiotic point of view.
- 3) Define a terminology with a unique symbol for each concept.

This methodology is discussed in the thesis.

The language of menetics includes a terminology, a semiotic point of view, a grammar for using the terminology with this point of view, a decision as to what kinds of problems are important for the study of meaning, what kinds of phenomenas are important for understanding these problems, and what kinds of methods are useful for analyzing these phenomenas for the purpose of solving the problems of choice. The

terminology, the point of view, and the grammar are presented in Chapter III, The Language of Menetics, while the decisions concerning problems, phenomenas, and methods are exemplified in the following two chapters showing the language in use.

Thus the purpose of the two chapters of examples is three-fold:

- 1) to show by example how the language of menetics may be used to discuss the data, the laws, and the theories of menetics;
- 2) to show by example how one could assemble enough empirical data to motivate a menetic theory of words that requires word meaning to have each of the nine components of meaning provided for in the language; and
- 3) to show by the same examples some of the various empirical methods that are available to meneticists for discovering menetic laws and developing menetic theories.

Most of these examples have previously been discussed only in some narrow language of a particular discipline such that it was not possible to compare and combine data, laws, theories, etc. from different phenomenas from differing disciplines. By being able to discuss these within one unified, integrated, and systematic language for the first time, the relationships between various aspects of meaning phenomena can be seen. Not surprisingly, some of the phenomenas turn out to be the same as other phenomenas, but discussed in a different one of the many narrow languages used previously.

The elementary qualitative theories presented here are not intended to be completely developed scientific theories, but to serve only as examples of how the language can be used to develop theories of meaning

and to discuss theoretical aspects of meaning. They are therefore referred to as prototheories. The examples do show, however, that the language of menetics has all three powers attributed to language by Chomsky: 1) observational adequacy; 2) descriptive adequacy; and 3) explanatory adequacy.

Altho these theoretical results must be considered preliminary only, the suggested structure for the symbolic rheme and the ensuing explication of 'syntactics', 'semantics', and 'pragmatics', are major results of this work.

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CHAPTER I

INTRODUCTION

Imagination, creative imagination, is an action of the mind that produces a new idea or insight.

R. W. Gerard

The study of communication and messages is an integral part of information and computer science, and an understanding of the nature of meaning is pertinent to this study of communication and messages. Some viewpoints regard information science as the study of knowledge utilization, [82]. This, in turn, is dependent upon our understanding of communication processes and the process of decoding the meaning of messages. Fundamental to this viewpoint is classification of knowledge. It then follows that the meaning of words and terms, used in these classification processes, is crucial to an analysis of knowledge and its classification.

Our understanding of the nature of meaning is hampered by the inadequacies of our languages for analyzing meaning phenomena. Therefore, this thesis attempts to develop a language, called the language of menetics, for analyzing meaning phenomena and the nature of meaning.

The variety of senses of a word suggests that, in a work depending on the meaning of words as much as this one does, one specify to some degree how the term will be used. On the other hand, a range of senses permits one to see relations among them which a restricted use would not permit. The word 'meaning' is itself a word which is used in a large variety of senses. Therefore any study of the nature of meaning is immediately faced with this dilemma.

In this thesis I attempt to solve this dilemma by a compromise that will achieve the advantages of both of these approaches. I first survey the various senses of the word 'meaning' and then design a language that will allow both the use of, and the discussion of, these senses in a controlled, or systematic, manner. In order to do this I have adopted a methodology suggested by Ogden and Richards* in their well known book The Meaning of Meaning**, [213]. This thesis appears to be the first known attempt to apply this methodology, which consists of three steps:

- 1) Conduct a literature search to determine all the senses of the principle words.
- 2) Base any study of meaning on the concept of *symbol* , and the semiotic point of view.
- 3) Define a terminology with a unique symbol for each concept.

Briefly, the principle directions of the current investigation are:

- 1) Discovery of a fundamental set of terms by which one can describe the observable regularities of meaning in natural language.
- 2) Development of a unified and systematic language by which one can ask questions about meaning phenomena, design experiments for answering these questions, and describe the observed results of these experiments.
- 3) Show how use of this language can lead easily to the abduction of simple theories that begin to explain the observed regularities.

A. The Nature of Meaning: Its Study and Systematization

Polonius: What do you read, my lord?
Hamlet: Words, words, words.

Shakespeare: Hamlet

*Henceforth O & R.

**Henceforth M of M

1. The Complexity of the General Problem of Meaning

When two words are synonymous they are said to have the same meaning. What is this meaning that both words share? For many purposes 'dog' and 'canine' have the same meaning. In some situations -- when asked -- we say that 'canine' means 'dog'; and in other situations we are likely to say that 'dog' means 'canine'; but it is easy to see that this will not suffice for answering the philosophic question "what is the meaning of 'dog'?". The above is readily seen to be circular in the first place, and in the second, not susceptible to generalization. What, then, is the general nature of the meaning that two synonyms share in common?

However, this work is not intended to explore the question: 'what is meaning?' in any absolute sense. This is too metaphysical for any work attempting to be scientific. It confounds all of the complexities of the ontology of meaning with those of the epistemology of meaning that are normally present in any investigation of science. Rather, the questions addressed are: 'What are the fundamental properties for describing the observable regularities associated with meaning?', 'How can we model the phenomenas involving meaning?', and 'How can we design theories that explain and predict these phenomenas?', and the like.

Thus I intend to examine some of the fundamental criteria for describing the regularities of meaning. Altho a great deal of progress has already been made in this direction, I do not believe it has ever been systematized. The reason for this may be due in part to the lack of a unified language for talking in a uniform way about diverse meaning phenomenas. I shall say more about this in section B.2 and Chapter II

since this point plays an essential role in my methodology.

The general problem of meaning is further complicated by the large number of senses the word 'meaning' itself bears in the scientific and philosophical literature. I shall therefore be asking questions such as: by what aspects of meaning does the meaning of each of the following words or phrases differ from the meaning of each of the others.

- 1) one ... two ... three ... testing ...
- 2) a cheap and chippy chopper on a big black box
- 3) the slithy toves
- 4) Albert Einstein
- 5) brown
- 6) knowledge
- 7) paddled, (as a translation of the perfective aspect of the Trobriand verb 'tawoulo')
- 8) one volt
- 9) beauty

Each of these words or phrases is from some natural language; each bears a different burden of meaning; and any theory of meaning for natural language must encompass all of these burdens.

Additional complexities of meaning stem from the dynamic nature of meanings and their interaction with the static nature of concepts, which are themselves, in some sense of the word, part of meaning. These and other complexities of meaning not addressed in this work are discussed by Cohen in his book 'The Diversity of Meaning', [76], itself an updating of M of M.

Still another, but perhaps not final, complication of meaning

involves the different modes of sign phenomena. The meaning of sentences is different from the meaning of words, while the meaning of paragraphs and complete discourses is different from either of these. These problems are discussed in III.C.2.b, but only for the purpose of restricting the scope of the present work to the design of a language for the empirical discussion of the meaning of words in natural language.

2. The Importance of Systematizing our Knowledge about Meaning

Many facts are known about meaning but very few of them are systematized and the relations between them are poorly understood, if understood at all. Almost no knowledge of meaning is formalized and symbolized. We can look to Aristotle's and Boole's systematization of logic for examples of the kind of benefits that can accrue from the systematization of a known body of related facts.

However it is also instructive to list some of the specific results we might hope to achieve by systematizing our knowledge of meaning. For this purpose I divide the question of systematization into two parts:

a) motivation, and b) payoff.

a) motivation

Some motivational considerations would include the following:

- i) Need to understand the problems and recent research into natural language meaning.
- ii) Need to increase the scope of empirical support for isolated facts about meaning.
- iii) A desire to satisfy our sense of order.
- iv) Past and current linguistic literature presents no systematic approach to the investigation of meaning

in natural language.

v) Need to unify the insights into meaning presented in the linguistic, psychological, information theoretic, logical, and philosophical literature.

b) payoff

If we succeed in systematizing our knowledge of meaning phenomena we might expect to receive some of the following payoffs:

- i) a reorientation and unification of the study of meaning in natural language.
- ii) a tool for use in further study and acquisition of knowledge about meaning.
- iii) an understanding of semiotic structure.
- iv) an understanding of the semiotic foundations and basic relationships of information science.
- v) a unification of the semiotic sciences including: information science, linguistics, psychology, sociology, esthetics, theology, historiography, logic, economics, and philosophy.

3. The Word 'Semantics' and the Science of Meaning

I have carefully avoided using the word 'semantics'. It once was universally claimed that 'meaning' was so misused that it had no meaning and for this reason 'semantics' began to come into vogue. However, even tho 'meaning' in a technical sense may have become overused and even meaningless, it retains its ordinary, popular, and intuitive sense while 'semantics' has now become ambiguous.

Linguists have used 'semantics' for the 'science of meaning';

logicians for the study of 'denotation'; semioticians have defined 'semantics' as the study of the relations between the sign and its object; while philosophers have used it for 'cognitive meaning'. Some philosophers have included within semantics only extension; Carnap, both extension and intension; others would include intension only; while still others would include syntax, intension, and extension. Even others would include none of these, reserving this word for what most of us loosely refer to as 'pragmatics'.

Bonfante reports that:

The word semantics, created by Breal, is used in three senses. In the first sense, for which Locke and De Saussure used the term *semiology* and the Americans rather *semiotics*, it is the study of signs in general, such as writing the alphabet of mutes, symbolic rites, heraldics, military signals, etc. In the second sense (in which L. Bloomfield uses it), it is the study of *meaning* in language; that is, of the semantic value of grammatical and lexical units. In the third sense (which is the traditional one, starting with Breal, *Revue des Deux-Mondes*, June 15, 1897), it includes only one section of language; that is lexicon. [426, p838].

However, for the rigorous development of science of meaning for natural language, it is this 'ordinary' intuitive, or 'folk' meaning sense of 'meaning' that must be explicated. For this reason I will refrain from using the word 'semantics' in this work (except in quotations from other sources), until much later when I can give it an explicit definition in terms of concepts that are useful for the study of natural language meaning.

When I use the word 'meaning' it will always be in this vague and intuitive "ordinary language" sense. Lacking the word 'semantics', I shall need a word to name the science of meaning and I shall simply coin the word 'menetics' for this purpose. It is desirable to introduce

it at this point to avoid what would otherwise be several long and awkward phrases. Later we shall see that 'menetics' can also be used to name the science of internal semiotics: the study of meaning and the study of internal sign structure being the same. Since we can have a menetics for any kind of language, and even any kind of sign system, we shall have to refer to natural language menetics, or NL menetics, when this is our intention.

4. Types of Systematization: Divisions of Menetics

a) Systematizing the Data: Menetics and the Structure of Meaning.

There are various ways we might begin to systematize menetics. At this point I simply present them in isolation and discuss their relationship to menetics under the following headings: i) properties and laws; ii) theories; and iii) mathematical models.

i) properties and laws; observational or experimental menetics

One way of systematizing menetic phenomena is to observe meaning in its natural setting, classify its properties, and describe any general regularities observed among these classifications. Any science which follows these procedures is called an observational or experimental science. I therefore call this 'experimental menetics' (which does not at all rule out the possibility that an experiment may consist of simply observing). This task is a logically necessary one for any science and must have priority over any of the other methods to be discussed.

The properties of meaning listed in all current philosophic catalogs, for example [245; 153], are those which arose originally in the study of the so-called "anomalies" of natural language by logicians whose interest in logic pertained to its application to the science of reasoning

or by philosophers interested in creating a more perfect language for science and reasoning. Such properties include all well known ones, such as vagueness, ambiguity, opacity, etc.

Even when these are not viewed as anomalies, there is no guarantee that they are the important properties for the proper study of meaning in natural language.

A scientist, interested in the phenomena of natural language meaning, should undertake to construct a new catalog of the properties of meaning in natural language. These properties should be the critical ones pertinent to an analysis of meaning in natural language rather than logic and/or philosophy. These might include the various functions of language, the various modes of meaning, an analysis of their power to carry various burdens of meaning, and an analysis of their abilities to interchange these powers.

So far as this writer knows, no such catalog has ever been constructed, or even formulated. One purpose of the present work will be to begin such a catalog and to develop some of its outlines.

As Katz has pointed out, traditional grammar books are catalogs of types of linguistic phenomena, but unfortunately not meaning properties or laws:

They state their observations about such phenomena in the form of paradigms with informal commentary on the nature of the phenomena exhibited by the paradigm, leaving it to the reader's judgement to supply the extension to similar cases and the relation of such cases to others. Such treatment is nowhere near exhaustive, nor is any conception offered that might explain what an exhaustive treatment would be, because there is no notion of rule that could be used as a means of expressing general facts about the language. Traditional grammars also lack a notion of a system of linguistic rules. As a consequence,

they must remain, regardless of how far they are expanded, mere catalogues of types of linguistic phenomena, with no systematization in terms of underlying structure that cuts across the types and with no generalizations that succeed in stating what is true about every case of a type.[143, p106]

Chomsky was talking about grammar when he said, "To me it seems that current research is not hampered significantly by lack of accurate data, but rather by our inability to explain in a satisfactory way data that are hardly in question.", [67, p186]; but I believe that menetics suffers from both of these problems. We need more observational data, but we have not systematized that which we already have and do not understand how to explain it.

ii) explanations; theoretical menetics

In the more highly developed sciences, it is very unusual for a new law to be discovered or suggested simply by making experiments and observations and examining the results (altho cases of this character occur from time to time); almost all advances in the formulation of new laws follow on the invention of theories to explain the old laws. This genesis is especially likely for the great breakthroughs in science. Conant in [518] states "the history of science demonstrates beyond a doubt that the really revolutionary and significant advances come not from empiricism but from new theories".

The process of systematizing menetic explanation I call 'theoretical menetics'. Theory must be founded on observation and is shaped by the nature of the observed regularities. Hence theoretical menetics is logically subsequent to experimental menetics.

As may be expected, the study of theoretical menetics is not as well developed even as experimental menetics. No complete catalog of

menetic theories has been given altho several partial ones have appeared as exemplified by Cherry [51] and Parkinson [216, plff and pl83ff]. None of the extant theories has been tested against all of the known menetic laws to see if they 1) predict those laws, 2) say nothing about the laws, or 3) contradict the laws.

Ullmann has claimed that the central problem with which theoretical menetics is faced today is how far, and by what methods, is the vocabulary amenable to a structural treatment,[295, p306]. By a structural treatment, Ullman was referring to the development of explanatory theories that are amenable to mathematical analysis. He describes four structural approaches: 1) the statistical method, such as Zipf's law of meanings which describes the statistical regularity between the number of meanings possessed by a word form and the frequency with which that form is used. The law is given by

$$\bar{m}_r = \sqrt{f_r}$$

where \bar{m}_r is the average number of meanings of the word forms of rank r , and f_r is the frequency of those word forms.* 2) the study of characteristic tendencies (Ullmann's description indicates that this is similar -- if not the same as -- the statistical method). An example of a characteristic tendency would be the ratio of noun to verb tokens in characteristic samples of a language text. 3) theories of the linguistic field, such as Jost Trier's conceptual network theory, and 4) the structure of the vocabulary -- similar to the field methods, with the possible distinction

*It should be noted that this law is completely independent of the Estoup-Zipf rank-frequency law of words and holophrases which is often erroneously referred to thruout the literature as Zipf's law.

of concentrating on verbal networks, for example Roget, rather than conceptual networks.

This is probably a fair assessment of linguistic menetics prior to the great upsurge of transformational work. But later transformationism was very much involved with meaning. Ullmann also did not mention the many methods of structural menetics developed by the various schools of formal logic, including both the model theory of the Polish school and the applicational theory of functionality developed by Schönfinkel and the λ -calculus developed by Church as well as the theory of combinatoric logic which includes both of these latter two [525].

Within the last decade explicit work in structural theories of linguistic menetics have been begun by Katz [143], Lakoff, Fillmore, and Bierwisch, among others. A second purpose of the present work will be to begin to lay a foundation for the empirical development of this program and in a later work, by examining the failures of current theories, to invent a new one more satisfactory in all respects to the known facts.

iii) mathematical models; mathematical (or applied) menetics

When we attempt to apply our menetic knowledge to achieving some human oriented goals we must have some technique for converting our theories and/or laws (depending on the levels of application) into forms that can be used as tools and manipulated in pursuit of these goals. One of the most useful techniques discovered for this purpose is mathematics. If we can formulate mathematical models of our laws and/or theories then all of the tools of mathematics are available for applying these towards the pursuits of technology. The development of mathematical models of menetic laws and theories is called mathematical menetics.

I know of no results of mathematical menetics today, except Knuth's use of the rank-frequency law of Zipf and Estoup for evaluating retrieval algorithms, unless we view the model theory of Polish logic as a limited step in this direction.

A third goal of my effort will be to make some preliminary explorations in this direction that are more related to natural language than model theory. However, it is not planned to develop any actual applications.

b) Systematizing the Science: Metamenetics and the Structure and Methodology of Menetics. In this subsection I mention several approaches that have been made to the study of menetic phenomena and the ways these have been classified.

Ullman [294; 295; and 296] divides the various approaches to menetic problems into three groups which he calls 1) philology, 2) general semantics, and 3) philosophical or logical semantics. To these I add one further classification: 4) linguistic or empirical menetics.

i) philology

Philology is concerned with historical studies of language, especially style. Philological menetics has been called 'etymology' by most philologists; however, Stern calls this same approach 'semasiology'. The names of Darmesteter, Bréal, Erdmann, Jaberg, and Meillet are most often associated with philological menetics. Ullman employed the term 'panchronic' to apply to the integration of diachronic and synchronic menetics. This work is not concerned with diachronic menetics. The reasons for the necessity of analyzing structural or synchronic aspects of language before the diachronic were given by de Saussure and are

repeated in most textbooks of linguistics.

ii) general semantics

General semantics was adumbrated by Lady Victoria Welby and firmly founded as a separate discipline by Count Alfred Korzybski. C. K. Ogden, I. A. Richards, and S. I. Hayakawa are other names often associated with this school. (I shall have more to say about O & R's famous book The Meaning of Meaning in Chapters II and III.) General semantics is characterized by the attempt to apply knowledge of meaning to the human goal of effective communication and interaction -- not by the attempt to discover new menetic knowledge -- hence I classify it as a branch of menetic engineering or using a word that has recently come into vogue, menetic architecture. I shall not be concerned with general semantics as such, except that the general semanticists have stated many of the regularities observed in menetic data, and some of these will be mentioned in Chapter IV.

iii) philosophical semantics

Philosophical and logical menetics, or menetics of formal languages, has a long and honorable history going back to the Sophists of Hellenic Greece. However, in contemporary times, we can consider John Stuart Mill to have initiated the active interest among philosophers and logicians in theories of meaning. Other philosophers have taken up this study (Frege, Peirce, Meinong, and others) and four major schools of twentieth century philosophy can be considered to be devoted to the analysis of meaning in philosophy and logic. These include American Pragmatism, (Peirce, James, Dewey, and others); Viennese Positivism, (Carnap, Morris, Reichenbach, Schlick, and others); British Analytic

Philosophy, (Ryle, Russell, Wittgenstein, Austin, and others); and Polish Analytical Philosophy, (Tarski, Lukasiewicz, Adjukiewicz, and others).

Philosophical menetics has concentrated on the meaning of highly formalized languages such as various formal logics, and meaning analysis relevant to untangling certain philosophic problems, but has not treated meaning as a kind of natural phenomena to be studied for its own sake as an empirical fact. However many of the insights, techniques, requirements of philosophical menetics would be very useful to such a study. This research will attempt to unify these aspects of philosophical menetics into a more fundamental study of menetics in its own right.

iv) linguistic menetics

The words 'linguistic semantics' and 'empirical semantics' have been used interchangeably in the literature despite the obvious disparity in their meaning. Linguistic menetics studies the meaning phenomena of natural language and tends to rely on empirical methods.

Chomsky, Katz, Lakoff, and Fillmore are names often associated with linguistic menetics. The few results achieved by linguistic menetics so far, are highly relevant to the goal of this project. My aim therefore will be to integrate these results along with the insights of philosophical menetics into a fundamental study of menetics.

v) summary

We can summarize the observations of this subsection by means of Figure 1 which shows both the structure of metamenetics as well as the divisions and methods of menetics.

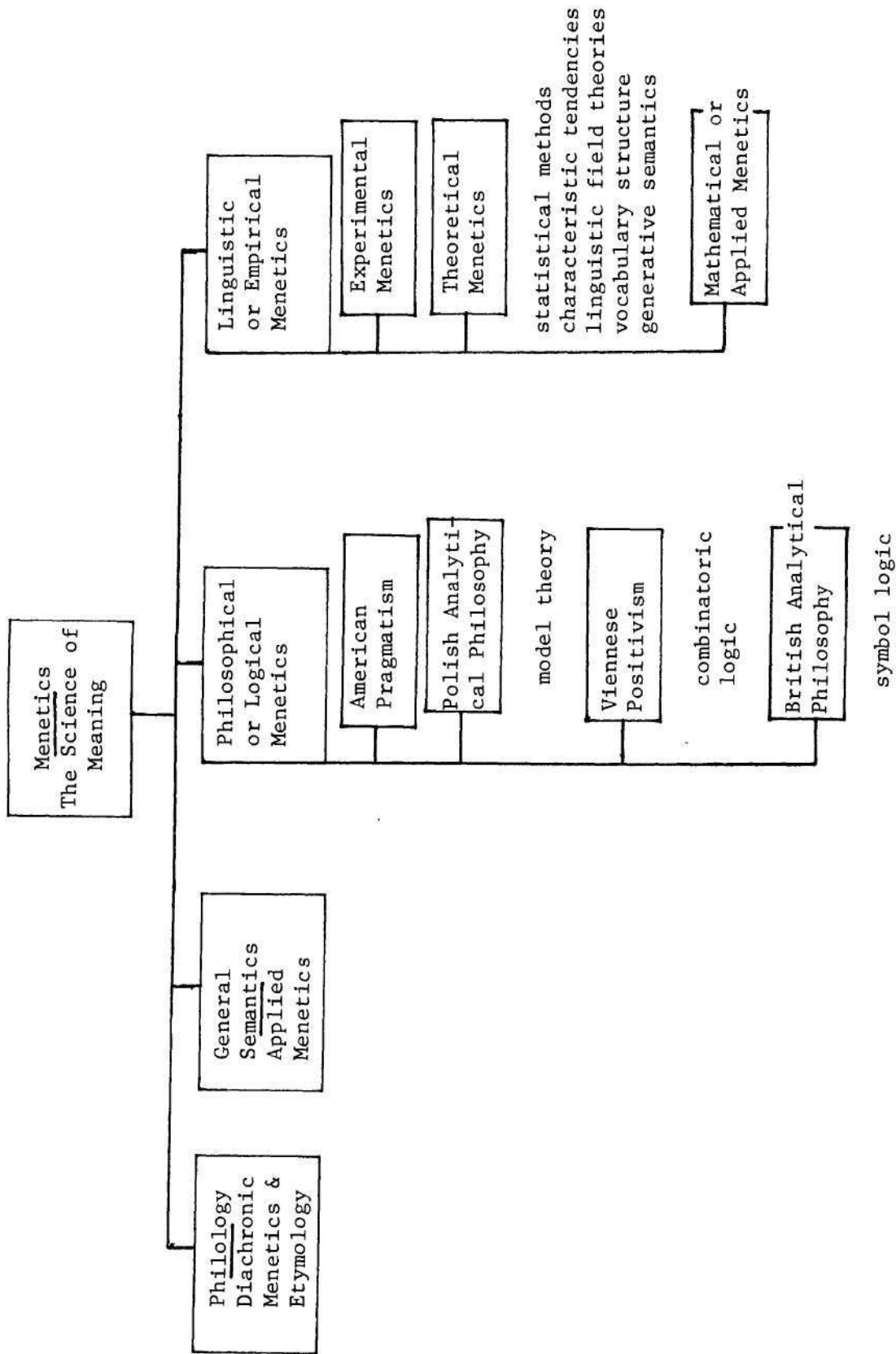


Figure 1. Metamenetics

B. Problem Statement and Scope of Work

A thinking man is always striking out something new.

Edward Young

1. Problem Statement and Thesis Goals

Because our understanding of the nature of meaning is hampered by the inadequacies of our languages for analyzing meaning phenomena I have attempted to develop in this thesis a language for the empirical analysis of the meaning of words in natural language. A methodology employing three suggestions by O & R was adopted for developing the language.

The goals of this thesis are therefore to develop a language that is capable of being used to empirically analyze the phenomena of meaning in natural language. This language should be:

- a) versatile enough so that all of the empirical menetic phenomenas which are now presented in various individual narrow languages can be discussed and analyzed in the same unified language;
- b) observationally adequate in Chromsky's sense;
- c) descriptively adequate in Chomsky's sense;
- d) explanatorily adequate in Chomsky's sense.

In addition it should be possible to use this language to achieve several subsidiary goals:

- e) to begin assembling a new catalog of the properties of meaning in natural language and to develop some of its outlines.
- f) to begin to lay a foundation for the empirical development

of structural theories of menetics.

g) to make some preliminary explorations in the direction of formulating mathematical models of menetic laws and theories of natural language.

2. Scope of Work and Summary of Following Chapters

The overall approach of this research is from the standpoint of empirical menetics. Menetic phenomena of natural language is observed in its natural setting using a language designed specifically for this purpose. The main thrust of the dissertation is the development of the Language of Menetics. Examples from both experimental and theoretical menetics are given to show the usefulness and power of the new language.

a. Methodology: the Prescientific Development. In order to form a foundation for developing the new language, certain prescientific developments are necessary. Three suggestions by O & R for organizing the prescientific work are followed. These suggestions are not unique. They are similar to suggestions made by Peirce, Jakobson, and other pioneering scientists stemming back to Aristotle. The advantage of the O & R formulation is that they are stated together in one place; they were formulated in connection with the problem of meaning; and they appear in a setting that is important to the study of menetics for other independent reasons. O & R's prescientific suggestions are discussed in section II.B. Other aspects of my methodology are discussed in II.C, D, & E.

b. Development of the Language. The actual development of the language, and hence the most important part of the thesis, is contained in Chapter III. I follow each of O & R's three suggestions in carrying

this out. In III.B I report on my primary methodological literature search. One of the principle goals of this search was to identify the various senses of the word 'meaning' thought important by linguists, scientists, and philosophers of the 20th century. Various senses of many other important word forms for menetics were also recorded. In addition to the word 'meaning', this investigation included such other forms as 'semiotic dimension', 'action of the sign', 'logic', 'understanding', 'intelligence', 'wisdom', 'reasoning', 'value', and 'valuation'. The most important point made in this section is that nine distinct senses of the word 'meaning' were found in the literature, that each of these senses is important for a study of menetic phenomena, and that enough of the literature was surveyed to lend credence to the supposition that all of the important senses of the word were found that are necessary for an analysis of the meaning of elementary words and morphemes.

At the time the literature search was conducted it was thought that a complete crossection of the entire literature had been made. Since that time I have become aware of some glaring gaps in this search. It is a defect of III.B but one which I hope will not detract from its purpose that I do not report on menetic studies by any philologist, stratificationalist, Polish logician, British analytical philosopher (other than Russell and Wittgenstein), tagmemicist, or any post Chomsky transformationalist (eg. Fillmore, Lakoff, Weinreich, McCawley, or Bierwisch).

In section III.C, I explicate a concept of *symbolic rheme* starting from Peircean and Morrisean views of semiotics. The concepts of *sign*

and *symbol* in particular are treated as theoretical concepts rather than observational ones. These concepts are analyzed in some detail with the view of purposely designing them to be useful tools for the analysis of menetic phenomena. The distinction between external and internal semiotic structure is created and it is suggested that meaning is related to the internal semiotic structure of signs. An important relation is noticed between the senses of the word 'meaning' and the external components of the symbolic rheme as explicated for this purpose and each sense of 'meaning' is identified with an internal component of the symbol that is related to one of the external components. This introduces talk of nine components of meaning. Nine dimensions of symbol semiosis are hypothesized in order to keep talk of each of these effects from becoming confused with each other. This is done with the deliberate intention of being complete and systematic and with the realization that later results might show that much of this machinery is redundant or completely useless. Nevertheless, I preferred to risk verbosity rather than second-guess nature before the facts were in.

Finally in Section III.D the terms of the language are defined and examples on which to model the syntax are introduced. Only those terms actually exemplified in the examples of Chapters IV and V are defined within III.D; the other definitions required to complete the language are given in Appendix C.

c. The Language of Menetics. The language of menetics includes a terminology, a semiotic point of view, a grammar for using the terminology with this point of view, a decision as to what kinds of problems are important for the study of meaning, what kinds of phenomenas are

important for understanding these problems, and what kinds of methods are useful for analyzing these pheomenas for the purpose of solving the problems of choice. The terminology, the point of view, and the grammar are presented in Chapter III, The Language of Menetics, while the decisions concerning problems, phenomenas, and methods are exemplified in the following two chapters showing the language in use.

Thus the purpose of the two chapters of examples is three-fold:

- i) to show by example how the language of menetics may be used to discuss the data, the laws, and the theories of menetics;
- ii) to show by example how one could assemble enough empirical data to motivate a menetic theory of words that requires word meaning to have each of the nine components of meaning provided for in the language; and
- iii) to show by the same examples some of the various empirical methods that are available to meneticists for discovering menetic laws and developing menetic theories.

Most of these examples have previously been discussed only in some narrow language of a particular discipline such that it was not possible to compare and combine data, laws, theories, etc. from different phenomenas from differing disciplines. By being able to discuss these within one unified, integrated, and systematic language for the first time, the relationships between various aspects of meaning phenomena can be seen. Not surprisingly, some of these phenomenas turn out to be the same as other phenomenas, but discussed in a different one of the many narrow languages used previously.

The elementary qualitative theories presented here are not intended

to be completely developed scientific theories, but to serve only as examples of how the language can be used to develop theories of meaning and to discuss theoretical aspects of meaning. They are therefore referred to as prototheories. The examples do show, however, that the language of menetics has all three powers attributed to theoretical language by Chomsky: 1) observational adequacy; 2) descriptive adequacy; and 3) explanatory adequacy.

Altho these theoretical results must be considered preliminary only, the suggested structure for the symbolic rheme and the ensuing explication of *syntactics*, *semantics*, and *pragmatics*, are major results of this work.

d. Some Empirical Laws of Meaning. In Chapter IV, some empirical laws of meaning and observations about the nature of meaning are discussed in order to illustrate the use of each of the principle terms in the language, motivate the empirical reality of each of the nine components of meaning, and to illustrate some of the wide variety of empirical methodologies applicable to menetics.

e. Some Preliminary Theoretical Results. In Chapter V, I idealize a concept due to O & R and a relation due to Frege and Carnap in order to arrive at an elementary qualitative theory of the symbolic rheme and thereby show the power of the new language for theoretical analysis. In this chapter I also am able to explicate Morris' three dimensions of semiosis, in terms of the new language using the above theory. This results in a better understanding of the nature of syntactics, semantics, and pragmatics, than ever before and also leads to the identification of a subtle confusion.

f. Summary and Suggestions for Further Study. Finally in Chapter VI, I summarize all my results, review the history of this research, and make suggestions and recommendations for further research.

g. Bibliography. Since a major portion of this work was a four-year search of the literature on meaning, a very comprehensive bibliography has been included as Appendix B. However, even with close to 1500 entries this does not represent one percent of all the literature on meaning, even within the twentieth century.

3. Varia

Because of the large number of concepts employed in carrying out this development and the need to define each one, I have attempted to make it easy for the reader to check back to find a definition of a term that may have been forgotten, altho I have also attempted to make the terminology as transparent as possible. I have found in typescript material that no one device stands out and hits the eye as bold-face type does in printed material. However, it seems to me that a combination of caps and underline do enable the eye to find a particular reference point during a high-speed scan. Therefore I have adopted this device for all my definitions. In addition, I have distinguished between 'definition by use' and 'definition by mention' by employing single quote marks for the latter. Thus in the former a term is used to define a concept; in the latter the name of a term is used to define the term. For example we have: a stand with three legs is a TRIPOD; while, a stand with three legs is *called* a 'TRIPOD'.

Finally, a word needs to be said about the orthography used in the thesis. Because this thesis shows that meaning, and hence language

itself, encompasses far more of life than most linguists have been willing to admit, it is necessary later on to draw a sharp distinction between the British and the American languages. This distinction is similar to the one drawn by historians of language. As one example, pragmatic meaning encompasses both social customs and behavioral conventions and both of these are decidedly different between the British and American languages. The orthography used in the thesis is one associated with the American midwest and has sometimes been called "Chicago Tribune Stylebook Spelling". It is characterized by such spellings as 'thru' for 'through' and 'nite' for 'night'.

CHAPTER II

METHODOLOGY

A. Introduction to Prescientific Methodology

Speak clearly if you speak at all;
Carve every word before you let it fall.

____ Oliver W. Holmes

In every science there reaches a point at some time when a radical restructuring of its worldview is required. Thomas Kuhn in The Structure of Scientific Revolutions calls this the establishment, or the change, of paradigms. Many semioticians have discussed the need for establishing a paradigm for the study of semiotics and meaning [205; 206; 1263; and 1266] however they speak in terms of establishing a *language* for the study of meaning and signs [139; 665]. In this usage the term 'language' has a meaning similar to that of 'paradigm', or 'worldview'.

The change in paradigms by a science brings about what Kuhn calls a scientific revolution. This is accomplished only by the greatest practitioners of a discipline and only once every few hundred years or so. However, the methodology for creating such a change is not part of the established methodology of science. In fact, as Kuhn remarks, it is directly antagonistic to it, serving to overthrow an established methodology and to establish a new one, altho perhaps not fully developed at the time of its establishment. Never-the-less, the empirical nature of science and the goals and objectives of a science under one paradigm help to ease the transition from one paradigm to its replacement. Compare

for instance the replacement of Newtonian physics by its relativistic counterpart as compared to the replacement of the Aristotelian paradigm by the Galilean paradigm. It may have been difficult for most physicists to understand that Einstein was trying to change the paradigm rather than work within the old* but at least Einstein knew what he had to do to justify his change.

On the other hand, the creation of a *Weltanschauung* by a discipline that has had no prior paradigm is a prescientific task. The methodology for such creation is even less well understood than that required for the change of paradigm (perhaps can never be understood) and the basis for justifying such establishment is often as controversial as the paradigm itself as for instance in the case of Copernicus. Often, only the results achieved long after the creation of the language, or worldview, can justify the adoption of that language. In Copernicus's case this came with Kepler's analysis of Tycho Brahe's observations which themselves were made using Ptolemy's language of epicycles instead of Copernicus's language of circles, and served to extend that language into a language of conic sections.

What I am saying is that in science, the language, paradigm, or worldview, of the scientist serves essentially the same function as a coordinate system in mathematics and can greatly simplify or overly complicate the analysis of data.

Semiotics, information science, and the study of meaning and other sign phenomena may now be ripe for the creation of such a paradigm which

*The experiments and mathematical analysis were certainly not difficult to understand.

unifies the study of all sign phenomena and simplifies the task of analysis rather than hiding the details to be analyzed from the eyes of the analyst. Following the tradition of the semioticians I call the worldview I develop in this thesis a language and because the purpose of the language is the empirical study of meaning, I call it the language of 'menetics'. For additional comment on this word, see Section I.B.3.

Even tho there is no generally accepted prescientific methodology for the creation of an initial worldview, there have been suggestions from time to time. Ogden and Richards suggested such a prescientific methodology specifically for the purpose of studying meaning, in their famous book The Meaning of Meaning, published in 1923. It is to these suggestions I now turn.

B. Ogden and Richards' Three Suggestions for a Prescientific Methodology

"Begin at the Beginning", the King said, very gravely
"and go on till you come to the end: then stop."

_____ Lewis Carroll: Alice's Evidence

1. Introduction to *The Meaning of Meaning*

In 1923, in an attempt to draw attention to the importance of explicating the notion of *meaning* for natural language and to point out the role of semiotics in such an effort, C. K. Ogden and I. A. Richards brought out the first edition of The Meaning of Meaning [213], which was a major rewriting into book form of some of their journal articles which appeared for the most part during 1920-22, but some of which were written as long ago as 1910.

While this was not by any means the first major work on the nature of *meaning* in natural language, it did seem to mark an important turning point in the systematic study of such problems. Indeed serious study of *meaning* occurred as early as Plato, and was attempted by almost every major philosopher since then including Aristotle, Peter of Spain, Duns-Scotus, Occam, Hobbes, Bacon, Locke, DesCartes, Leibniz, Hume, Kant, Schopenhauer, Mill, Peirce, Frege, and Russell.

Peirce may, in fact, be considered to have spent his entire professional life engaged in analyzing the notion of *meaning*, for which he founded the sciences of semiotics and phenomenology. American Pragmatism, the school of philosophy founded by Peirce, is usually regarded as a philosophy of *meaning*. But even Peirce regarded himself as a logician primarily and only "a pioneer, or rather a backwoodsman, in the work of cleaning and opening up what I call semiotic, that is, the doctrine of the essential nature and fundamental varieties of possible semiosis", and he found "the field too vast, the labour too great, for a first-comer", [1109, 5.88].

However, since publication of *M of M*, at least four major schools of philosophy, American Pragmatism (including Peirce, James, Dewey, and others), [109]; British Analytical Philosophy (including Moore, Wittgenstein, Ryle, Austin, and others), [49]; Polish Analytical Philosophy (including Tarski, Ajdukiewicz, Łukasiewicz, and others), [1284]; and Viennese Positivism (including Schlick, Carnap, Neurath, Hempel, and others), [92], could all be considered as attempts to explicate the notion of *meaning* whether for philosophy, natural language or logic. In addition, almost every current writer on *meaning* includes a citation

to M of M.

One of the overlooked, but very important contributions of this book was a suggestion for a prescientific methodology for the study of meaning. This suggestion contained three parts. Two of these concerned prescientific methodology in general while the third was specific to the study of meaning. The suggestions are 1) make a complete list of the different uses of the principle terms concerning meaning; 2) base any study of meaning on the notion of *symbol*; and 3) define a different symbol for each of these different uses. While each of these suggestions have been made individually before, their occurrence together in a unified context and in the setting of a work that has been so important for the study of meaning makes it appropriate to refer to them in the fashion used for the title of this section. The quotation following the title, tho not pertaining directly to the nature of meaning, is from those two famous works which are so heavily laden with references to meaning that I may be perhaps forgiven for using these most pertinent lines from the most menetic of humorists for starting my actual development.

The beginning, then, will be to follow O&R's three suggestions for a prescientific methodology.

2. List All Senses of Principle Words

Since I plan to place so much reliance on these three suggestions it might be well to look at their original words.

...with sciences in their initial stages, before they have developed into affairs for specialists, and while they are still public concerns the resistance to new terms is very great. ...The result of this scarcity of terms is that any reference whatever made to these symbolically starved topics is forced

to make use of the few words which are available, no matter how distinct its referents may be from those other references which also use the same words. ...We have here a cause for the extravagant ambiguity of all the more important words used in general discussion; one which supplements and reinforces the process of metaphorical shift just considered.

At the beginning, then of any serious examination of these subjects we should provide ourselves with as complete a list as possible of different uses of the principle words. The reason for making this list as complete as possible, subject of course, to common sense and ordinary discretion, is important. It is extraordinarily difficult in such fields to retain consistently what may be called a 'sense of position'. The process of investigation consists very largely of what, to the investigator, appear to be flashes of insight, sudden glimpses of connections between things and sudden awareness of distinctions and differences. These in order to be retained, have to be symbolized, if, indeed, they do not, as is not often the case, originally occur in an already symbolized state.

Without such a map of the separable fields covered by the investigation any *constatation geniale* is liable to be confused with another, to their common detriment, or to yield an apparent contradiction of purely verbal origin. If, however, we are able at once to locate the idea in its proper province, the accident that we have to use the same words as totally distinct symbols is deprived of its power to disturb our orientation. The mere *ad hoc* distinction between two or perhaps three senses of a word made in response to particular exigencies of controversy is insufficient. We can never foretell on what part of the total field light will next be vouchsafed, and unless we know in outline what the possibilities are we are likely to remain ignorant of what it is into which we have had insight [213, p131f].

3. Base Study of Meaning on the Concept of *Symbol*

As mentioned in II.B.1, one of the original purposes of [213] was to emphasize the role that semiotics (or as they called it variously: the theory of Signs; or the science of Symbolism) played in the study of meaning. They felt that there was an intimate relation between a science of meaning and a science of Symbolism. O & R were able to successfully advance the understanding of the nature of meaning using only pre-Peircean concepts of sign and symbol structure.

In my development I will continue to emphasize the role of semiotics in the understanding of meaning, but will use a much more refined notion of the term 'sign', which is an outgrowth of the work of Peirce and Morris. By using the Peircean concept of *sign categories* I will be able to distinguish six different levels of meaning and will thereby be able to restrict the scope of the dissertation proper to the meaning of words which I associate with the structure of Peirce's *symbolic rheme*. By treating the notion of *sign* as a theoretical rather than observational concept (thereby opening this concept to deliberate design so as to increase the utility of theory) I create several additional concepts, principal of which is the distinction between external and internal semiotic structure. Using the concept of internal structure I associate the concept of meaning components with the concept of internal sign components, thus opening up a way for investigating the relationships between different senses of the word 'meaning'. My main purpose in relating meaning to semiotics is to develop a language (as per O & R's third suggestion) that is fine enough to express all the distinctions of meaning that might ultimately be necessary.

4. Define a Unique Symbol for Each Concept

O & R's third suggestion is nowhere made explicit, but it is implied in their discussion of the first suggestion.

...if a symbol is long or awkward to use, or likely to be misunderstood, we take a new convenient symbol and use it instead [213, p91]. ...the first thing to do when a disputed symbol is encountered is to expand it, if possible, to its full form --- to such form, that is, as will indicate the sign-situations behind the reference it symbolizes [213, p93].

C. Development of a Language of Meaning

"You seem very clever at explaining words, Sir," said Alice. "Would you kindly tell me the meaning of the poem called 'Jabberwocky'?"

"Let's hear it," said Humpty Dumpty. "I can explain all the poems that ever were invented --- and a good many that haven't been invented just yet."

Lewis Carroll: Humpty Dumpty

As the first phase of my methodology, I have used O & R's three suggestions to develop a language of meaning, which I call menetics. It is this development and the calling of it a language that will probably be the most misunderstood portion of my work and yet this development is the most crucial and the most important step in my whole methodology; and the results I achieve in Chapters IV and V are in many ways merely examples of the power of this new language. I shall therefore use the efforts in the next few paragraphs to further motivate the idea and importance of scientific languages.

1. The Languages of Science

Languages are to scientists as coordinate systems to mathematicians. There are no right or wrong ones, only better or worse ones for particular purposes. And a good one can work wonders for creativity while a bad one can block even the most powerful thinker.

Many of our most important scientific results are expressed not in the form of quantitative laws, but only qualitatively in the adoption of a system, or language. There is no law of Copernicus, for example, only the Copernican system, or heliocentric language of astronomy and yet this one change in language has often been credited with enabling all of the results of modern astronomy. To come closer to home, I will give

a linguistic example. We never talk of Boas's law, for instance, we just use the language of phonemics and structural linguistics which Sapir was able to develop based on Boas's results. And the structuralist worldview and the DeSaussurian discussions out of which it arises are regarded by many as the beginning of modern "Scientific" linguistics.

In discussions of scientific methodology we are often instructed to choose an appropriate notation. But this is only an approximation to the true problem, that of choosing a good language. A system of notation is not a language --- it is a small, but important part of a language. A language includes a notation, as well as a terminology, a viewpoint, a selection of which observable phenomena to be interested in, and an approach to integrating all of this. In fine, a language is nothing short of a complete *Weltanschauung*. Kuhn in his discussions of the role of paradigms indicates an understanding of both the nature and role of languages in science. In all cases of creativity, one of the first steps is to use the imagination to construct, out of data supplied by memory and observation, a framework of ideas that will serve as a foundation for further work. This framework with its attendant terminology and notation is the language of the investigation.

As an example of the confusions that can arise in discussions of this topic, I have been asked how one could characterize Newton's laws of motion as a linguistic development. The answer, of course, is that one would not normally do so. Newton's work was a piece of pure science carried out primarily in the language of the Copernican system as modified by Kepler and Galileo. Newton did, however, modify the language he received by augmenting it with the terminology for "action at a

distance" and adding a whole new notation system, that of the "fluxions".

In order to see the development of language at work in physics, we must look about 150 years earlier to Copernicus's development of the heliocentric system. In fact, this is such a good example that I shall sketch briefly the history of astronomical languages to show better the role played by Copernicus's system.

2. The Language of Astronomy

Astronomy begins in the old Babylonian, or Mesopotamian, period (1800 - 400B.C.) if we are not to count the mythology and denomination of prominent stars and constellations contained in the natural history which prevailed in the earlier Egyptian and Sumerian civilizations as astronomical science. The few tablets from this period that have been interpreted show a language that is highly observational. It is used primarily to record isolated periodic phenomena, actual observations such as the appearances and disappearances of Venus and other horizon phenomena, location of fixed stars, and a discussion of elementary astronomical concepts. This was primarily a language for recording data; as O. Neugebauer, to whom we owe most of our knowledge of Babylonian astronomy, states, this language was:

...quite descriptive in character ... The data on risings and settings, though still in a rather schematic form, are our main basis for the identification of the Babylonian constellations [211, p101].

Ptolemy stated that practically complete records of eclipses were available to him since the reign of Nabonassar (747 B.C.).

The next period of astronomy is the late Babylonian, or Seleucid, period (500 B.C. - 100 A.D.). Neugebauer describes this as a language of

mathematical astronomy, fully developed by about 300 B.C. at the latest. Period relations of a type which states that s intervals of one kind equal t intervals of another kind form the backbone of this syzygetic language. During this period the zodiac was invented, purely for mathematical purposes. It was a great circle which measured the progress of the sun and the planets with respect to exactly 30° long sections. Indeed, the zodiac was hardly ever more than a mathematical idealization, needed, and used, exclusively for computing purposes. Arithmetic progressions were skillfully utilized for the prediction of lunar phenomena, with an accuracy of a few minutes. And interpolation algorithms involving finite difference operators using second and even third order polynomials were invented for the calculation of the daily motion of the planets. Incidentally the fact that one particular morning star and one particular evening star jointly constituted the planet Venus, was already known by the beginning of this period. The famous morning and evening star identity was probably discovered during the Mesopotamian period.

Many thousands of astronomical tablets from the Seleucid period are extant; however, only about 300 of these have been translated and properly interpreted. These show a highly descriptive language, used for describing general regularities among the syzygetic phenomena and for predicting the occurrence of such phenomena. The primary advance over the older language, was the realization that there were regularities, the adoption of this as the general viewpoint, and the use of mathematics to achieve general descriptions of these regularities and to make these descriptions useful for prediction. The regularities were general relationships of a purely mathematical nature holding between observable

horizon phenomena, and no explanations for these regularities could be devised within the language. There were no traces of kinematic or geometric models, or orbital, or other theoretical concepts such as was to appear in the later, Ptolemaic language. It was not a theoretical language and contained no theoretical terms. It consisted only of the concepts of generality and regularity, along with certain mathematical methods in addition to the older, observational language. Neugebauer characterizes the calculation of the lunar ephemerides of the Seleucid period as "... one of the most brilliant achievements in the exact sciences of antiquity ..." [211, p108]. However, purely mathematical considerations often exercised an essential influence on the details of the language behind which the original observational data and general concepts were veiled from sight. We note also that there were actually two dialects in use simultaneously: one, called System A, involving constant velocities and discontinuous changes; the other, called System B, involving linear zig-zag functions. Negative numbers were unhesitatingly introduced into the language by the Seleucids for purely mathematical convenience, in principle very much the same as the use of complex numbers in modern mechanics; thus showing a remarkable abstract attitude by the Babylonians toward the Seleucid language of Astronomy.

The Babylonians were primarily interested in the appearance and disappearance of the planets in analogy to the first and last visibility of fixed stars. --- eg. Sirius --- and of the moon. It was the periodic recurrence of these phenomenas and their fluctuations which they primarily attempted to determine.

Whatever phenomena the Seleucid astronomers wanted to predict had

to be determined within their existing lunarsynodic language. Suppose it was determined that a plant would reappear 100 days from a given date. What date should be assigned to this event? One needs to know whether the three intermediate lunar months were, perhaps, all only 29 days long, or all were 30 days long, or somewhere in between. This question could be answered perfectly well by lunar ephemerides whose goal it was to determine whether a given month was 29 or 30 days long. But planetary phenomenas proceed very slowly. A single table for Jupiter could easily cover 60 years or more. To determine calendar dates so far in advance would have meant the computation of complete lunar ephemerides for several decades. Furthermore, the actual computation of the planetary motion had to be based on a uniform time scale rather than the synodic scale used in the lunarsynodic language. All these difficulties were overcome within the language by a very clever device. They used the mean synodic month as the unit of time and divided it into 30 equal parts which modern astronomy calls 'lunar days'.

The fact that the Babylonian calendar was strictly lunarsynodic has the effect that the total duration of a number of calendar months will not deviate cumulatively from the corresponding total of mean synodic months. Dates expressed in lunar days will seldom be more than one day off from real calendar days. Thus the Babylonian astronomers in their computations simply identified the results given in lunar days with the dates in the real calendar. It is obvious that the Babylonians did not try to attain the same accuracy for planetary phenomenas as they obtained in lunar calculations.

The Mesopotamian period used the Egyptian calendar consisting of

12 months of 30 days each with 5 epigomenal days at the end of each year. A fixed time scale without any intercalations was exactly what was needed for astronomical observations and calculations. The strictly lunar calendar of the Babylonians with its dependence on all the complicated variations of the lunar motion, was obviously far inferior to the invariable Egyptian calendar. It is a serious problem to determine the number of days between two given Babylonian New Year's days, say 50 years apart. With the Egyptian calendar, this interval is simply 50 times 365. No wonder the Egyptian calendar became the standard astronomical system of reference which was kept alive thru the Middle Ages and was still used by Copernicus.

Ptolemaic theory uses a geometric, or kinematic, model phrased in the kinematic language of epicycles. The epicycles represented planetary orbits which was perhaps the greatest departure between the kinematic language of epicycles and the syzygetic language of the Seleucid era. In this language kinematic concepts such as the planetary orbits could be discussed geometrically. Altho the theory itself is often called the 'geocentric theory', it is the fact that the epicyclic language itself allows the consideration of such kinematic concepts as orbits in geometric terms which marks the biggest advance in Ptolemaic astronomy over Seleucid astronomy.

Popular scientific history has made much of the "scientific" value of the heliocentric theory and criticized the geocentric theory as patently unscientific. This, of course, is absurd. The inauguration of Ptolemy's theory is one of the greatest scientific advances of all time and the Almagest one of the greatest scientific works ever written.

It is only a matter of mathematical convenience (but indeed a very important one as I shall argue a few paragraphs hence) whether one computes first the longitudes of the earth and the planets heliocentrically and then transforms to geocentric coordinates, or whether one carries out this transformation first and then operates with epicycles. There is no empirical distinction possible, and the only scientific distinction is one of practicality (again a very important consideration as it eventually turned out). The only difference is a transformation of coordinate systems.

It is in his approach to the planets that the contrast between Ptolemy's kinematic language as presented in the Almagest and the syzygetic language of the Seleucid era becomes most visible. In the Ptolemaic *theory* a theoretical construct, a definite kinematic model, is assumed, based on epicyclic motion, which then can be manipulated by geometric operations and translated into statements about the observational regularities. The late Babylonians were primarily interested in the direct description of these observational regularities themselves: the appearance and disappearance of the planets; the last visibility of the old moon, and the first visibility of the new moon. It was the periodic recurrence of these phenomenas and their fluctuations which they primarily attempted to observe and describe.

When Ptolemy developed his planetary theory, he had already at his disposal the geometrical methods by means of which the solar and lunar anomalies were explained very satisfactorily, and similar models had been used also for an at least qualitative explanation of the apparent planetary orbits. Thus it had become an obvious goal of theoretical

astronomy to offer a strictly geometrical theory of the planetary motions as a whole and the synodic and horizon phenomenas lost much of their specific interest, especially after the Greek astronomers had developed enough observational experience to realize that horizon phenomenas were the worst possible choice to provide the necessary empirical data.

Ptolemy, in 150 A.D., lives close to the end of the Hellenistic age, and his language encompasses all observational achievements which could be reached with the astronomical methods of antiquity. Ptolemy's work is exclusively concerned with the development of one unified language for the observation, description, and explanation of the celestial phenomenas. On the basis of the Almagest we would have no idea about the existence of totally different languages, such as the syzygetic language described above, which preceded and occasionally even survived the Almagest. Ptolemy's language is probably built to a large extent on goemetric results obtained 300 years earlier by Hipparchus, who in turn was influenced by both Greek and Babylonian ideas.

Our problem in understanding ancient astronomical treatises is that they use languages which are no longer familiar in our time: Terminology, problems, observational methods, and mathematical methods are alike equally strange. In contrast ancient mathematical studies are directly intelligible to a modern mathematician.

By what combinations of uniform circular motions centered in the earth may the movements of the planets in the sky be represented? This problem was proposed in ancient Greece not to explain celestial motions but to describe them by geometrical methods. A successful result could predict the places of these bodies among the stars at any time and also

the times of eclipses of the sun and moon.

Ptolemy achieved a uniform language for all celestial motion using eccenters and epicycles. And the main principle, the fundamental role of circular motion, seemed to have been splendidly vindicated.

In principle, however, ancient astronomers pretended only to describe the observations, not to explain them. All that was actually observable was the angular motions, the only exceptions being the distances for the sun and moon obtainable by means of parallax. For the planets, however, neither theory nor observations were accurate enough to obtain reliable information as to their distances. The language describes the motion of the bodies, but only the direction is translated into observational terms. But otherwise all our conclusions remain valid. Thus we can say that the angular motion of an inner planet is described by an epicyclic motion such that the direction from earth to the center of the epicycle coincides with the direction from earth to the sun. An outer planet moves on its epicycle in such a way that the line between the planet and the center of the epicycle is always parallel to the direction from earth to the sun. This theory is a correct description of the appearances so far as the angular motion is concerned and it would be a correct heliocentric theory if the correct scale were chosen. Second-order deviations from this first-order approximation could be explained by added eccentricities and similar devices which were brought to perfection by Ptolemy. Only greatly refined observations could eventually disclose the defects of the hypothesis of strictly circular motions.

The Seleucid language, on the other hand, is known to have reached about equally accurate observational results --- by means of mathematical methods which nowhere point to an interpretation thru a combination of circular motions or any other theoretical model. Indeed, zigzag and step functions practically exclude any such attempt. Nevertheless, Babylonian influence is visible in two different ways in kinematic astronomy: first, in contributing basic observational material for the geometrical methods; and secondly, in a direct continuation of arithmetical methods which were used simultaneously with and independently of the geometrical methods. Exactly the same constants which determined the periods of several of the most important zigzag functions in the Seleucid system are attested as the relations from which the mean motions were derived in the geometric system.

Not only does the Almagest contain a great number of numerical tables, which in turn are based on an enormous amount of numerical computation, but the first goal of the Almagest is exactly the same as that of the Seleucid system, namely, to provide numerical data for the observable celestial phenomenas. But the Almagest is unique in its desire to explain the empirical foundations and the theoretical reasons for its procedures. And the way always leads first to a definite kinematic model, from which the resulting geometric consequences are then derived and finally translated arithmetically into observational terms. All methods in the Seleucid language, however, proceed on exclusively numerical grounds directly from observational data to observational prediction.

The Babylonian origin of geocentric astronomy is quite obvious

in the arithmetic treatment of such syzygetic problems as ascensions and length of daylight. Essential parameters ascribed by Ptolemy to Hipparchus are identical with the corresponding parameters of the Seleucid system.

To Greek philosophers and astronomers, the universe was a well defined structure of directly related bodies. The concept of predictable influence between these bodies is in principle not at all different from any modern mechanistic theory.

Ptolemaic astronomy contains much more than the syzygetic horizon phenomenas of interest to the Babylonians. It contains sections on longitude and latitude; stationary points; first and last visibilities; parallax, distance, and size of sun and moon; and the computation of eclipses. The new language was used to describe observational instruments and to devise mathematical tools as the old language was not. Solar apogee, equation of time, precession, fixed star coordinates and their connection with lunar positions are important questions in the kinematic language which later became a center of interest for Islamic astronomers.

Once the Ptolemaic language had been developed and his system of astronomy worked out, the explanatory power of the language made it practically mandatory to conclude a corresponding theory of celestial motion. The corresponding theory of course was that the sun, moon, and planets, moved in kinematic orbits, best described by the geometry of epicycles, around the earth as center, which remained fixed and did not move. We thus distinguish very sharply between the Ptolemaic theory and the Ptolemaic language. Ptolemy was of course aware of the work of Eudoxus and the possibility of stating competing theories within his own language. Indeed, he stated a version of a heliocentric theory within

the epicyclic language and attempted to work out the empirical consequences of such a theory. However, because of the primitive level of dynamic theory at the time, he concluded that the geocentric theory fit the empirical facts better than the heliocentric theory.

The language developed by Copernicus is not the revolutionary departure from Ptolemy's language that we might expect, even tho the theories it leads to are. In fact, the Copernican language may be hailed as returning to the basic concepts and philosophy of the Ptolemaic language. It represents a return to the concept of simple kinematic orbits described by the most perfect of all geometric figures --- the circle. However, the major difference between the two --- a shift of coordinate systems --- leads to a drastically different "obvious" theory --- celestial bodies move in kinematic orbits, best described by the geometry of circles, around the sun as center, which remains fixed and does not move. Today we consider both theories equally wrong.

Despite the fact that their theories diverge, the empirical consequences of the theories do not, wherever they may both be stated. As stated previously, it makes no difference which language is used to calculate an orbit, only a transformation of coordinates is involved. However, there is one drastic difference between the two languages. The Ptolemaic language was complete in the sense that *all* known astronomical phenomena could be discussed within it, no matter how awkwardly at times. The Copernican language was *incomplete* in this sense. The solar anomaly, for instance, which was well known by Copernicus, in fact was well known by the Seleucid era, and was fully explained and described within the Ptolemaic language could not even be mentioned in the Copernican

Language. It was not just that Copernicus did not mention it (in fact he mentioned it many times, using the Ptolemaic language); the Copernican language was *inherently incapable* of mentioning such phenomenas. What a courageous step backwards!

Thus it is evident that kinematically the two languages are hardly different except for Copernicus's insistence on using circles for every partial motion where Ptolemy had already reached much greater freedom of approach.

The popular belief that Copernicus's heliocentric language constitutes a significant simplification of the Ptolemaic language is obviously wrong. The choice of the coordinate system has no effect whatever on the structure of the model, and the Copernican models themselves require about twice as many circles as the Ptolemaic models and are far less elegant and adaptable. In fact the importance of the Copernican language lies in a totally different direction than generally preceived. The language allows:

- 1) A return to a strictly Ptolemaic way of thinking which made all steps from the empirical data to the parameters of the model perfectly clear and opened the way to a refinement of the basic observations which eventually led to the proper generalization of the Ptolemaic methods, (not without a further change in language however), discarding the concept of *iterated epicycles* which was introduced by Copernicus himself.
- 2) The insight that we can obtain information about the actual planetary distances if we assume that all planetary orbits have essentially the same center, namely, the sun. Then the radiuses

of the epicycles of the inner planets may be interpreted directly as their distances from the sun in terms of the distance from earth to the sun; for the outer planets the reciprocals of the radiuses of the epicycles must be interpreted as the heliocentric distances. Again the question of which body is supposedly at rest is of no scientific interest whatever.

3) The assumption of a common center of the planetary orbits also suggests the proper solution of the problem of latitudes, namely, that the inclined planes of the planetary orbits pass thru that common center. Unfortunately the language of circles forced Copernicus to use the mean sun instead of the real sun as common center and thus resulted in a theory of latitude which labored under as many complications as Ptolemy's theory. Nevertheless, this modified theory of latitudes helped Kepler find the proper modification to the language and thus lead to the real solution which then permitted the computation of heliocentric coordinates in a uniform fashion and the finding of the geocentric coordinates thru an independent procedure.

Later, the enormous increase of observational data accumulated by Tycho Brahe and his collaborators finally convinced Kepler that a return to the Ptolemaic language with equants, or even a return to the Ptolemaic way of thinking with philosophically perfect geometrical orbits, could not properly describe the observations and thus led him to abandon the language of circularity altogether and the discovery of the proper geometrical concepts.

There is no better way to convince oneself of the similarity

between Ptolemy's language and Copernicus's than to place side by side the Almagest and De Revolutionibus. Chapter by chapter, theorem by theorem, table by table, these works run parallel. With Tycho Brahe and Kepler the traditional language was abandoned. The very style in which these men write is totally different from the classical prototype.

As mentioned, Copernicus's language was extremely fruitful for solving the problem of latitudes and Brahe was able to use these insights to design ever more accurate and precise observations even tho the true solution of this problem was not possible within the Copernican language as Brahe's observational results soon told him. Brahe was able to use the insights of the Copernican language and apply these, using the Ptolemaic language to think out the details, record the observations within the Ptolemaic system, and then determine that the results were more accurate than the tolerances allowed by the Copernican language. The Copernican system was contradicted by the facts which it generated! Other observations altho based on grossly false assumptions about the distance of the fixed stars confirmed for Brahe the impossibility of the Copernican system. But still the language of Copernicus led to fruitful insights! It was Kepler who finally resolved the paradox of a language which led to fruitful insights into the solution of problems which could not be solved in the language, whose facts contradicted the basic tenets of the language, and which in some cases (viz. solar anamoly) could not even be mentioned within the language. Again by using insights gained thru the aid of the Copernican language but thinking out the details within the much more tolerant and flexible Ptolemaic language, Kepler was able to show that the orbit of Mars around the sun was elliptical

rather than circular. Moreover, the ellipse was not just an approximation to the orbit, it was exact within the tolerances of Brahe's recent observations which were much more accurate than ever before possible. The linguistic revisions to Ptolemy's system were now both clear and simple. Copernicus had erred in adopting a *circular* geocentric reference system. The philosophic ideal of perfect geometrical figures could not be maintained in the new language. Kepler had only to adopt an elliptical heliocentric coordinate system for all the pieces of the puzzle to fall in place. With Kepler, the language of astronomy and dynamics was virtually complete. Isolated concepts were added to the language from time to time. Galileo added the concept of *inertia* and Newton added the concepts of *mass*, *action at a distance*, and the *calculus of fluxions*. But these were isolated ammendments, not a complete restructuring of the language. No wonder we do not think of Newton's scientific achievements as being "merely linguistic developments", he was working within a relatively fixed linguistic framework and his language accomplishments were minor compared to the sum total of all his discoveries. But this scientific endeavor would have been impossible without the linguistic advances made by the Mesopotamians, Seleucids, Ptolemy and the Greeks, Copernicus, and Kepler. And we *can* think of Ptolemy's and Copernicus's scientific achievements as being primarily linguistic.

A syzygetic language is one which refers primarily to the syzygetic phenomenas: times between repeatable, periodic occurrences, such as conjunctions, oppositions, risings, settings, etc.

The importance of the linguistic framework is beginning to be recognized even among the applied investigators of our own field. Newell

and Simon in a discussion of the nature of computer science, for instance, say:

All sciences characterize the essential nature of the systems they study. These characterizations are invariably qualitative in nature, for they set the terms within which more detailed knowledge can be developed. Their essence can often be captured in very short, very general statements. One might judge these general laws, due to their limited specificity, as making relatively little contribution to the sum of a science, were it not for the historical evidence that shows them to be results of the greatest importance. [1437, p115].

3. Chomsky's Three Powers of Adequacy for a Theoretical Language

In the above example of astronomical languages I have distinguished between three levels of scientific language: observational languages; descriptive languages; and theoretical languages. The Egyptian calendar represented a purely observational language. The language of the Mesopotamian astronomers was primarily observational altho it began to develop some very minor descriptive capabilities. The syzygetic language of the Seleucide astronomers was a purely descriptive language. The kinematic languages of Ptolemy, Copernicus, and Kepler were theoretical languages, as were also the mechanical languages of Galileo and Newton. Altho these three language concepts may now be considered somewhat superficial, the use that I make of them in this thesis will not push them to the point where they break down. In Chapter IV, I will talk about a related set of language concepts which Chomsky introduced for discussing the languages of science. He initially introduced them (and I treat them) in the context of linguistic theory. These are the three powers of adequacy for theoretical language. Theoretical languages may have 1) observational adequacy; 2) descriptive adequacy; and 3) explanatory adequacy. Observationally adequate theoretical languages are able to discuss and explain

the actual recorded observations but cannot explain any regularities, or empirical generalizations, among the data. Descriptively adequate theoretical languages suffice for the statement of theories which can explain the empirical laws of the discipline but not necessarily in any systematic or unified way; i.e., they cannot explain the basic structure of the theories themselves which are stateable in the language.

Explanatorily adequate theoretical languages allow the statement of theories which can explain the empirical laws in a systematically unified way and lead to the understanding of the structure of these theories themselves.

Altho I do not discuss these concepts in detail until Chapter IV, I will borrow them here to discuss my methodology following the development of my language of menetics. This further methodology is based on my claim that the language of menetics is an explanatorily adequate theoretical language for studying meaning.

4. The Power of the Language of Menetics

In summarizing this section: I state that in Chapter III, I follow O & R's three suggestions for prescientific methodology and use these to develop a Language of Menetics for the purpose of studying meaning. My aim in this development is to achieve what Chomsky calls an explanatorily adequate theoretical language. In Chapter IV, I use the language to discuss some empirical laws of meaning describing observed regularities in the mentic data, thus motivating the claim that my language has achieved at least the power of descriptive adequacy. My methodology for this is described in the next section. In Chapter V, I use the elementary insight into the taxonomy of mentic theories given by

the language of menetics, thus motivating the claim that my language has achieved the full power of explanatory adequacy. My methodology for this is described in Section E.

D. Use of the Language of Menetics to Analyze Empirical Laws of Meaning

The purpose of Chapter IV is four-fold: 1) to show by example the nature of menetic data, and hence by inclusion, the nature of semiotic data; 2) to show by example how the language of menetics may be used to discuss the data, the laws, and the theories of menetics; 3) to show by example how one could assemble enough empirical data to motivate a menetic theory of words that requires word meanings to have each of the nine menetic components discussed in Chapter III; and 4) to show by the same examples some of the various empirical methods that are available to meneticists for discovering menetic laws and developing menetic theories.

A word of warning is necessary concerning the third of the above purposes. It will not be possible within the scope of a thesis to assemble enough data and laws to actually motivate the suggested theory. In a search for such laws, conducted in conjunction with the literature survey of Section III.B, more than a hundred were found before I realized that each new book I examined would continue to have new laws and data that could be added to such a catalog. The scope of work intended for the thesis research would not allow time for the examination, analysis, and systematization of all these laws. Accordingly I have given just a few examples for each concept of the language to motivate the expectation that such empirical bases may be established for each concept.

It would probably never be possible to complete such a catalog because of the open texture of nature [298, p37]; no astronomer ever regards star catalogs as complete. However, it is necessary to begin this task in order to actually carry out the design and analysis of menetic theory, and it is my intention to do so once this thesis has been defended.

E. Use of the Language of Menetics to Motivate Taxonomic Insights Into Elementary Menetic Theory

The purpose of Chapter V is four-fold: 1) to give examples showing that the Language of Menetics is also adequate to the task of discovering insights into the nature of empirical theories of meaning in natural language; 2) to adumbrate a menetic theory and a suggested structure for the symbolic rheme; 3) to explicate Morris's concepts of *syntactics*, *semantics*, and *pragmatics* within the new language; and finally 4) to identify a subtle confusion that is often made in using the terms 'syntactics', 'semantics', 'pragmatics', 'meaning', 'form', and 'content'.

These last three purposes may be regarded as major "scientific" results in their own right, apart from the revolutionary linguistic nature of the work as a whole leading to the most crucial result of this thesis, the development of the Language of Menetics. By accomplishing these purposes, I hope to thereby motivate the claim that the Language of Menetics has explanatory adequacy.

There are three specific methodological issues raised by the work of Chapter V and these are addressed in detail within the chapter where they can be understood in context, since much of the understanding of these issues depends on the results of prior chapters. These three issues

concern 1) the question of how scientific theories are developed, leading to a discussion of abduction vs induction and deduction; 2) the question of how to use or present terminology *in vivo*, that is, while the terminology itself is being developed; and the question of the nature of semiotic experiments and their role in theory building. The continued amplification of these methodological details in Chapter V also contributes to several of the purposes of Chapter IV, namely the illustration of the nature and flexibility of methodology within this new language.

CHAPTER III

THE LANGUAGE OF MENETICS

Expression is the dress of thought.

_____ Edward Young

A. Introduction

For one word a man is often deemed to be wise and
for one word he is often deemed to be foolish. We ought
to be careful indeed what we say.

_____ Confucius

In this chapter, the language for the empirical analysis of meaning, called 'The Language of Menetics' is developed, following Ogden and Richards' three suggestions for a prescientific methodology as outlined in the last chapter. In Section B, I describe a survey of the twentieth century literature on meaning and the nine senses of the word 'meaning' I found there. In Section C, I explicate the semiotic structure of the symbolic rheme starting from a Peircean viewpoint and a motivation due to Frege. I use this explication to restrict my analysis to the meaning of natural language words only, thereby eliminating the meaning of sentences, paragraphs, and whole communications from the scope of this work. In this section, the form of the language begins to precipitate as I identify the internal semiotic components of the symbolic rheme with the nine senses of the word 'meaning'. Finally, in Section D the terms, structure, and usage of the language are defined. Only that part of the language which is actually used

subsequently in Chapters IV and V is presented in the body of Section D, the rest appearing in Appendix C.

B. Nine Meanings of Meaning

Philosophical questions, as compared with ordinary scientific problems, are always strangely paradoxical. But it seems to be an especially strange paradox that the question concerning the meaning of a proposition should constitute a serious philosophical difficulty.

Moritz Schlick: Meaning
and Verification

1. Introduction

In this Section I describe a survey of the literature on meaning which I did in carrying out O & R's first suggestion. Because of the vast number of works dealing with meaning over the last two and a half milleniums it would be impossible to analyze each one of these. I have accordingly limited the scope of this survey to a sampling of the various major schools of menetic thought in the twentieth century Western world. This is roughly the time elapsed since O & R first did their own analysis. These schools include: General Semantics; Viennese Analytical Philosophy, (logical positivism); British Analytical Philosophy, (ordinary language philosophy); Symbolic Logic; Transformational Grammar; and American Analytical Philosophy, (pragmatism). While this is not a complete list of modern schools of menetic thought, it is hoped that it is extensive enough to have caught all the senses of the word 'meaning' currently deemed of importance.

At the time this survey was being performed, I was not aware of the importance of the menetic thought taking place in tagmemics, strati-ficational grammar, Polish Analytical Philosophy (logical semantics),

and French Analytical Philosophy (structuralism, existentialism). Had I realized it at the time, I would have preferred to have included samples of writings from these schools in the survey. However, my readings in these areas since the survey was performed give a preliminary indication that these writers do not use any additional senses of the word 'meaning' not already discovered in the original survey.

Nine distinct senses of the word 'meaning' were isolated by the survey. To list, describe, and include the analysis of every work surveyed which touched on one or more of these senses would place a severe cognitive load on the reader* and it is felt that it would not add that much to the reader's understanding of the major point of this section: an inventory of the principle senses of the word 'meaning' in current menetic literature. I have therefore listed the nine senses of 'meaning' isolated by the survey in Table 1, for reference purposes, and organized the following discussion around these individual senses. Rather than list every author who used 'meaning' in a given sense, I have given for each sense only a few examples which give the clearest illustration of that particular usage. Appendix B gives some idea of the extent of the survey and the works listed there do not begin to approach one percent of the total literature on the subject of meaning.

Examples of the use of each one of these nine senses will be given in the following sections. In succeeding chapters it will be argued that each one of these senses is a vital component in the overall total sense of 'meaning' for natural language.

*Unfortunately, this appears to be the nature of most research in semiotics, [103].

Table 1. Senses of 'Meaning' as Used by Philosophers and Linguists in the Twentieth Century.

Meaning is related to the: _____	
1.	Linguistic medium
2.	Linguistic shape
3.	Linguistic context
4.	Class of things denoted by the word
	a) Way the class of things denoted by the word is given by the word (such as by essential properties)
	b) Relation between the class of things denoted by the word and the other
	i) things
	ii) words
6.	Mentalistic symbol, for instance, by intensional-structure
7.	Behavioral and/or social context
8.	Way that the word is used by the interpreter
9.	Mental feelings and emotions

2. Meaning is Related to the Linguistic Medium

In their discussion of 'levels of interpretation' and 'modes of failure of understanding', O & R distinguish a sense of 'meaning' related to the linguistic medium. They call this "sensory recognition", [213, p209]. A person fails to understand part of the meaning of a word when he fails to recognize the linguistic vehicle of the word, when he fails to sense (perceive) the physical medium of communication. A person interprets a communication at the level of the medium when he senses the medium of the communication and recognizes it as intended communication.

Similarly, in what O & R describe as an independent development, Malinowski distinguishes a sense of 'meaning' related to the linguistic medium without giving this sense a specific name. In a discussion of the various functions of communication he allies specific senses of the word 'meaning' with the specific functions of communication. At one point in this discussion he says that the medium functions in a manner parallel to the other senses of meaning to 1) express certain psychological states; 2) expend energy; 3) indicate healthiness; and 4) give a form of indispensable exercise, [213, p318]. Further discussion of this sense of 'meaning' will be found at III.D.3; IV.F; V.B.1; and V.C.1.

3. Meaning is Related to the Linguistic Shape

Several writers have used 'meaning' in a sense that appears to be related to the linguistic shape, but their explications have not been clear enough to make this obvious without some amount of interpretation. O & R's use of 'meaning' in this sense is typical. In their discussion of 'levels of interpretation' and 'modes of failure of understanding' they distinguish a level (sense) of meaning which involves the psychological context of the sign, [213, p210]. Altho the term 'psychological context' is used frequently thruout the book, it is nowhere explained until this passage on p220, clarifies their intention somewhat, and makes it almost obvious that by 'context', they mean 'the semiotic shape of the sign' as this concept is explicated in section III.C.3.d.

...for what is involved in interpreting a complex symbol is that the contexts of the component symbols should, together with the whole symbol, form a context of higher type. [213, p220].

Abraham Kaplan in his attempt to explicate the concept of esthetic meaning has written that the meaning of poets and artists consists in large measure of a judicious relationship between the various parts of the shape of a sign and the medium in which the sign is embodied, [139], thus recognizing both this sense and the previous sense of meaning. Further discussion of this sense of 'meaning' will be found at III.D.3; IV.G; V.B.2; and V.C.2.

4. Meaning is Related to the Linguistic Context

In Readings in Philosophical Analysis which he edited jointly with Sellars [92], Feigl presented many analyses of meaning by the logical positivists. In the "Introduction" Feigl attempted his own analysis. He recognized the confusion present in much philosophical discussion over the meaning of 'meaning' and attributes it to the various functions of language which meaning must serve:

Granting that language as used in common life serves in a fusion or a combination of various function, it would seem imperative that some sort of theoretical separation of functions be undertaken for the sake of greater clarity and the avoidance of confusion. [92, p7].

The result of his analysis is presented as a list. He mentions that he encountered dozens of meanings of 'meaning' but he listed only the six he thought important for philosophy. One of these is a sense of 'meaning' that is related to "the way in which signs are used". He calls this "formal meaning". From his discussion we see that by 'the way in which signs are used', he means the conditions that govern the linguistic context in which the signs are used. Thus Feigl's formal meaning is related to the linguistic context.

In Logical Syntax of Language Carnap thought that by designing

an artificial language with the proper syntax he could capture the notion of 'empirical meaning' and eliminate any possibility of meaningless statements such as the metaphysicians were accused of making. His failure to achieve this goal, Goedel's proof of the incompleteness theorem, and several other events led him to see that there was a need for a specific theory of meaning. By the word 'syntax', Carnap meant the rules governing the linguistic context of the word. Later he said he could determine logical truth on the basis of tagmatic rules alone without either meaning postulates or rules of designation; we need only know the contextual meaning of the logical constants and recognize contextual form, [45, p224].

Perhaps the modern linguist who has written most on the subject of 'meaning' is the transformationalist, Katz, who follows rather closely the thinking of Chomsky in regarding meaning as a mentalistic phenomena. However, in contrast to Chomsky, he has said enough about his concept of 'meaning' to show that it is a two component theory corresponding to a sense of 'meaning' related to the linguistic context and a more mentalistic sense of 'meaning'. The former sense Katz calls 'functional meaning', or 'syncategorematic meaning'.

The meaning of 'good', as we have seen, does not have the kind of structure that the meanings of most other English words do. Whereas the meaning of words such as 'bachelor', 'honest', 'hard', 'cuts', 'liquid', etc., is made up of component elements that are attributes in their own right, the meaning of 'good' is a function which operates on other meanings, not an independent attribute. ...Since the meaning of 'good' cannot stand alone as a complete concept, we shall say that the meaning of 'good' is *syncategorematic* [143, p312].

Further discussion of this sense of 'meaning' will be found at III.D.3;

IV.H; V.B.3; and V.C.3.

5. Meaning is Related to the Class of Things Denoted by the Word

This is a classical concept of meaning and has been studied extensively ever since Aristotle. It has been called variously 'extension', 'denotation', 'supposition' (*suppositio*), 'nominatum', etc. I give here only a few examples of its use in the literature.

Altho this sense of the word 'meaning' does not appear in O & R's famous list, they do use it in their analysis of *connotation*. They define after Mill, the DENOTATION of a symbol is the set of things to which it can be correctly applied. Because of their desire to emphasize thought processes and the mentalistic senses of 'meaning', they concluded that denotation is "highly artificial" and "ludicrous".

One of Feigl's list of six senses of 'meaning' mentioned earlier is one that consists in the way words are related to the objects of experience. By 'the way in which signs are related to objects of experience' he means the items outside of language which are connected with signs, as for instance by ostension. This is what he calls 'empirical meaning' and represents scientific, factual, or denotative meaning.

Studies in Semantics contains Carnap's first attempts to develop a theory devoted specifically to the concept of *meaning*. This was a one-component theory similar to Russell's and based primarily on denotation. This of course corresponds to the class of things denoted by the word. Again, he was not able to satisfy himself that he had captured a satisfactory theory of meaning. In his later attempt to develop a new method for analyzing and describing the meanings of linguistic expressions

reported in Meaning and Necessity [45, piii], Carnap again employed the concept of *meaning* related to the class of things denoted by the word. This time he called this concept '*extension*'.

Hayakawa discusses this sense of 'meaning' within the context of verbal and physical contexts. He says "*The extensional meaning of an utterance is that which it points to in the extensional (physical) world*". [123, p52]. Further discussion of this sense of 'meaning' will be found at III.D.3; IV.I; V.B.4; and V.C.4.

6. Meaning is Related to the Way the Class of Things Denoted by the Word is Given by the Word or Related to Other Words or Things.

O & R lump connotation and essences together, because, as they say, essences "may best be regarded as Connotation hypostatized", [213, p187]. This is the first category of meaning in their inventory that they give serious attention to. This is because it is the *meaning* of traditional logic. But if *denotation* gets shabby treatment from them, they dismiss the case for *connotation* as "still worse". They conclude that the impossibility of applying *connotation* to proper names shows the artificiality of this method. Their concept of *connotation* is sense 5.a) of Table 1.

Another one of Feigl's senses of meaning consists in "the way words are connected with other words," [92, p8]. This is more closely related to sense 5.b) in Table 1 than sense 5.a). By 'the way in which signs are connected to other signs' he means their interrelationships i.e. the respect by which they determine their referents and/or how they are related to other signs and this is what he calls 'logico-arithmetical meaning'. Hence logico-arithmetical meaning is connotative meaning and corresponds to sense 5.b) of Table 1.

The second component of meaning developed by Carnap in Meaning and Necessity he calls '*intension*'. He uses this and *extension* to explicate the distinction between *denotation* and *connotation* made by John Stuart Mill.

To underscore the idea that the intensional component of meaning is objective, nonmental, etc., he uses the word 'concept' as a common designation for all intensions except propositions and takes pains to warn the reader that:

For this term it is especially important to stress the fact that it is not to be understood in a mental sense, that is, as referring to a process of imagining, thinking, conceiving, or the like, but rather to something objective that is found in nature and that is expressed in language by a designator of nonsentential form. (This does not, of course, preclude the possibility that a concept -- for example, a property objectively possessed by a given thing -- may be subjectively perceived, compared, thought about, etc.), [45, p21].

Hayakawa introduces a concept of intensional meaning which he calls '*informative connotation*' to distinguish it from simple *connotation* which is mentalistic and altogether different. He explains:

The informative connotations of a word are its socially agreed-upon, "impersonal" meanings, *insofar as meanings can be given at all by additional words*. For example, if we talk about a "pig," we cannot give the extensional meaning of the word unless there happens to be an actual pig for us to point to. But we can give its informative connotations: "pig" for English-speaking people means "domesticated mammalian quadruped of the kind generally raised by farmers to be made into pork, bacon, ham, lard...". [123, p63].

This is the meaning in the sense 5.b.ii).

Further discussion of this sense of 'meaning' will be found at III.D.3; IV.J; V.B.5; and V.C.5.

7. Meaning is Related to the Mentalistic Symbol

Altho Ogden and Richards inventoried the major senses of 'meaning' current in the literature and gave an analysis of most, they gave their serious attention to only one. This is listed as XIII(c) in their table: "That which a sign is Interpreted as being of". They explain that:

According to this the meaning of A is that to which the mental process interpreting A is adapted. This is the most important sense in which words have meaning. [213, p200].

This corresponds to sense 6) of my Table 1.

The reason for this singularity of interest was their avowed purpose of studying the influence of language on thought. This is shown not only by the subtitle of the book, but is stated explicitly in the first paragraph of the preface:

The following pages,...arise out of an attempt to deal directly with difficulties raised by the influence of Language upon Thought. [213, pv].

A large part of The Meaning of Meaning is an attempt to explain in semiotic terms the notion of 'interpretation' needed for this definition. Very basically, interpretation is what happens in the mind of the interpreter, [213, p21fn]. O & R found it necessary to divide their mentalistic, or interpretational concept of meaning into two parts; the symbolic or cognitive, and the emotive, thus getting senses 6) and 9), and because of the importance of symbolic meaning for intellectual thinking, they concentrated their attention on this aspect. This is pointed out most clearly by the following passage:

Words, as everyone now knows, 'mean' nothing by themselves,... It is only when a thinker makes use of them that they stand for anything, or, in one sense, have 'meaning'. ... But besides this referential use which for all reflective, intellectual use of language should be paramount, words have other functions which may be grouped together as emotive. These can best be examined when the framework of the problem of strict statement and intellectual communication has been set up. The importance of the emotive aspects of language is not thereby minimized, and anyone chiefly concerned with popular or primitive speech might well be led to reverse this order of approach. Many difficulties, indeed, arising through the behavior of words in discussion, even amongst scientist, force us at an early stage to take into account these 'non-symbolic' influences. But for the analysis of the senses of 'meaning' with which we are here chiefly concerned, it is desirable to begin with the relations of thoughts, words and things as they are found in cases of reflective speech uncomplicated by emotional, diplomatic, or other disturbances; and with regard to these, the indirectness of the relations between words and things is the feature which first deserves attention [213, p9f].

In discussing symbolic interpretation, O & R say we must recall the account of interpretation which they gave:

All thinking, all reference, it was maintained, is adaptation due to psychological contexts which link together elements in external contexts. However 'universal' or however 'abstract' our adaptation, the general account of what is happening is the same. In this fashion we arrive at a clear and definite sense of 'meaning'. According to this the meaning of A is that to which the mental process interpreting A is adapted. This is the most important sense in which words have meaning. [213, p200].

O & R state that the final two senses of their inventory, (XV), 'That to which the user of a symbol Believes himself to be referring', and (XVI), 'That to which the interpreter of a symbol Refers, Believes himself to be referring, or Believes the user to be referring', arise thru the difficulty in the control of symbols as indications of reference, and these are rich in opportunities for misunderstanding. These also are related to sense 6) of Table 1.

Further discussion of this sense of 'meaning' will be found at III.D.3; IV.K.; V.B.5; and V.C.6.

8. Meaning is Related to the Behavioral and/or Social Context

Malinowski regarded language as one of the active modes of human behavior. He regarded the most important components of meaning as the mode of action and the behavioral context associated with using the word properly. These correspond to senses 8) and 7) of Table 1.

We first must understand when Malinowski uses the phrase 'CONTEXT-OF-SITUATION' that he means the behavioral context of the sign rather than the semiotic context. The following quotation should make this clear:

Now if the listener, whom we suppose acquainted with the language, but unacquainted with the culture of the natives, were to understand even the general trend of this statement, he would have first to be informed about the situation in which these words were spoken. He would need to have them placed in their proper setting of native culture. ... To the meaning of such words is added a specific emotional tinge, comprehensible only against the background of their tribal psychology in ceremonial life, commerce and enterprise. [213, p301].

The following quotation then shows the importance that he placed on the meaning of the behavioral context:

A statement, spoken in real life, is never detached from the situation in which it has been uttered. ... In each case, therefore, utterance and situation are bound up inextricably with each other and the context of situation is indispensable for the understanding of the words. ... the utterance has no meaning except in the *context of situation*. [213, p307].

Hayakawa alludes to the meaning of the social and behavioral context in his discussion of *allusion*:

Allusions work as an affective device only when the hearer is familiar with the history, literature, people, or events alluded to. Family jokes (which are allusions to events or memories in the family's experience) have to be explained to outsiders; classical allusions in literature have to be explained to people not familiar with the classics. Nevertheless, whenever a group of people -- the members of a single family or the members of a whole civilization -- have memories and traditions in common, extremely subtle and efficient ... communications become possible through the use of allusion.

The foreigner, however, well he may have studied English before coming to America, will fail to detect the sources of the allusions in such expressions as, ... "He communicates good, like a semanticist should." The number of times we find it necessary to stop and explain things when we converse with foreigners indicates the degree to which we rely upon allusions in everyday discourse. [123, p109].

Further discussion of this sense of 'meaning' will be found at III.D.3; IV.L; V.B.8; and V.C.7.

9. Meaning is Related to the Way that the Word is used by the Interpreter

Similarly, when Malinowski uses the phrase 'MODE OF ACTION' he means the behavior of the interpreter of the sign. In a rather lengthy passage he cites his reasons for believing this to be the single most important meaning of the word 'mean'. The following is abstracted from that passage:

We find thus that an arrangement biologically essential to the human race makes the early articulated words sent forth by children produce the very effect which these words *mean*. Words are to a child active forces, they give him an essential hold on reality, they provide him with the only effective means of moving, attracting and repulsing outer things and of producing changes in all that is relevant. This of course is not the statement of a child's conscious views about language, but it is the attitude implied in the child's behavior. ... In all the child's experience, words *mean*, insofar as they act and not insofar as they make the child understand or apperceive. ... The meaning of the thing is made up of experiences of its active uses and not of intellectual contemplation. ... Thus, when a savage learns to understand the meaning of a word, this process is not accomplished by explanations, by a series of acts of

apperception, but by learning to handle it. A word *means* to a native the proper use of the thing for which it stands, exactly as an implement *means* something when it can be handled and means nothing when no active experience of it is at hand. Similarly a verb, a word for an action, receives its meaning through an active participation in this action. A word is used when it can produce an action and not to describe one, still less to translate thoughts. The word therefore has a power of its own, it is a means of bringing things about, it is a handle to acts and objects and not a definition of them. [213, p321f].

He also emphasizes the importance of both this and the previous senses of 'meaning' and the interplay of the two:

For technical language, in matters of practical pursuit, acquires its meaning only through personal participation in this type of pursuit. It has to be learned, not through reflection but through action. ... The study of any form of speech used in connection with vital work would reveal the same grammatical and lexical peculiarities: the dependence of the meaning of each word upon practical experience, and of the structure of each utterance upon the momentary situation in which it is spoken. ... language in its primitive forms ought to be regarded and studied against the background of human activities and as a mode of human behavior in practical matters. [213, p311f].

And finally he reemphasizes this:

The real knowledge of a word comes through the practice of appropriately using it within a certain situation. The word, like any manmade implement, becomes significant only after it has been used and properly used under all sorts of conditions. [213, p325].

We can sense the influence of Malinowski on Quine's concept of *meaning*. "Words being social tools, objectivity counts toward their survival." [245, p7]. Here we find that the important function of words is their use as social tools, a person understands the meaning of the verb 'to fish' when he can correctly perform out the activity

of fishing.

Further discussion of this sense of 'meaning' will be found at III.D.3; IV.M; V.B.7; and V.C.8.

10. Meaning is Related to Mental Feelings and Emotions

In discussing mentalistic kinds of meaning Malinowski distinguished one sense of 'meaning' related to mental feelings and emotions:

It is only in certain very special uses among a civilized community and only in its highest uses that language is employed to frame and express thoughts. In poetic and literary production, language is made to embody human feelings and passions, to render in a subtle and convincing manner certain inner states and processes of mind. [213, p316]

It was pointed out in 7. that O & R divided their interpretational meaning into two mentalistic components and that one of these which they called 'emotive' meaning corresponds to mental feelings and emotions which they distinguished from the 'symbolic' meaning. They include this sense in their famous inventory as number XI and claim:

It is a definite sense of meaning which except amongst men of letters is not likely to be brought in to confuse other issues [213, p198].

They devote an entire chapter to an analysis of emotional meaning. They regard some words, such as 'good', as purely emotive:

...and on these occasions, if the writer is what is known as a stylist, will have no substitute nor will a sensible reader attempt a symbolic definition. [213, p199].

W. M. Urban also recognizes this sense of 'meaning' which he calls 'emotional connotation', and says:

We may quite properly speak of the emotional connotation of such words as the funded meaning of previous emotional reactions and the affective abstracts which constitute the physical correlates of this meaning as the survivals of former judgment-feelings [1425, p133].

Further discussions of this sense of 'meaning' will be found at III.D.3; IV.N; V.B.6; and V.C.9.

11. Summary

Father! These are terrible words, but I have no time now for Meanings.

Melmoth the Wanderer

I have attempted to show in this section that Table 1 is a fairly accurate catalog of the major senses of 'meaning' that have been explicated -- or seriously used without explication -- by the major philosophers and linguists of the twentieth century. I have shown that each of the senses listed in Table 1 has received serious attention from one or more major writers. What cannot be proven conclusively in a short work of this type is that every sense of the word 'meaning' that has received serious attention in the 20th century literature is listed in Table 1. However, I believe that by showing both the number of writers and the range of views that I have, that I have given some indication that this is so. This literature survey is summarized in Table 2.

Many of these writers have treated meaning as being a multicomponential kind of thing rather than a single holistic entity and I have begun to treat it this way myself. More will be said about this in the next section when I discuss the number and kinds of components in more detail after explicating my concept of structure of Peirce's concept of symbolic rheme.

C. The Symbolic Rheme and its Semiotic Structure

The object of symbolism is the enhancement of the importance of what is symbolized.

Alfred North Whitehead

"In winter, when the fields are white,
I sing this song for your delight--"

...

"In spring, when woods are getting green,
I'll try and tell you what I mean:"

...

"In summer, when the days are long,
Perhaps you'll understand the song:
In autumn, when the leaves are brown,
Take pen and ink, and write it down."

Lewis Carroll: Humpty
Dumpty.

1. Introduction

a. O & R's Second Suggestion. We turn now from consideration of Table 1 and the inventory of senses of the word 'meaning' to the second suggestion of Ogden and Richards: that an adequate understanding of meaning can only be based on the concept of *symbol*. They felt that there was an intimate relation between a science of meaning and a science of symbolism. That this is so will be the principle thesis of this section. The principle result will be the establishment of Table 5, listing the external components of a symbolic rheme.

I shall assume Peirce's well-known concept of *sign* and especially the three principle trichotomies and the ten sign categories belonging to his science of 'semiotic', [32, Chapter 7]. However, I shall review some of his more important concepts and classifications.

b. An Internal Semiotic Approach to Meaning. In describing Meinong's theory of meaning, Russell said it appeared as if he had attempted to develop several senses of the word 'exist' [261, p106]. The object of a sign has several existential properties, namely: existence, subsistence, etc.* Now the sign mediates the object for the interpreter, Fig. 2, and 'meaning' is 'of signs', that is we have the 'meaning of a sign' not the 'meaning of an object', or the 'meaning of the interpreter'; hence Meinong may have felt the empirical evidence demanded these multiple existential properties of the object since the object of the sign was for him the meaning of the sign, and it is fairly certain he felt a need for more than one component of meaning. Russell's version of Meinong's theory can be illustrated by Figure 3, which I call the 'external interpretation of meaning'.

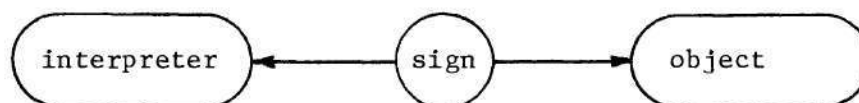


Figure 2. The Basic Concept of *Sign*.

Now, if we believe Russell [261, p106], we know that Meinong's approach was insufficient. Russell's approach consisted of denying meanings to the signs which gave Meinong the most trouble, but Russell also has his problems. Frege's approach is to change the outlook. Instead of assigning components of meaning to the existential properties of objects of signs, he assigned components of meaning to the components of signs themselves. We can illustrate this idea by Figure 4, which I

*It has been claimed that Russell incorrectly attributed this view to Meinong because he did not understand Meinong's theory. Whether Meinong ever held this viewpoint or not is irrelevant to this development. I am using the example purely for the insight it provides into an examination of sign structure.

call the 'internal interpretation of meaning'.

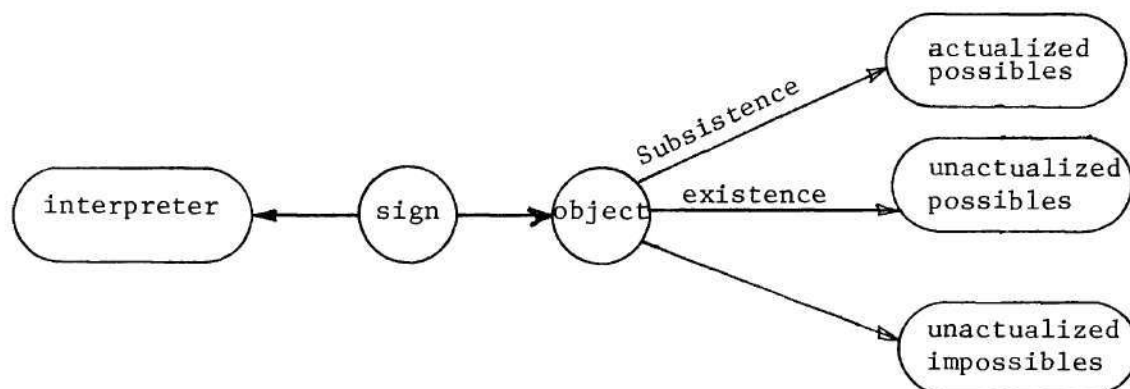


Figure 3. Meinong's External Interpretation of Meaning.

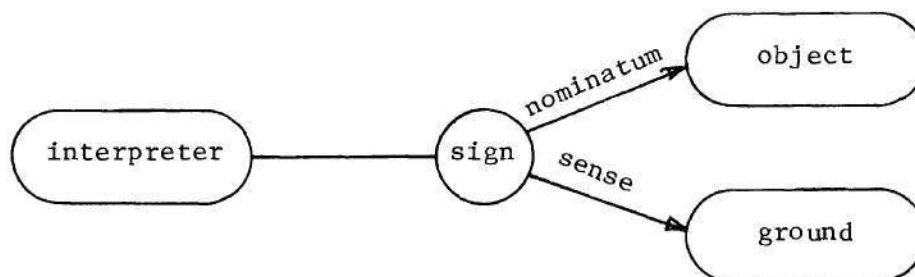


Figure 4. Frege's Internal Interpretation of Meaning.

Altho it appears that Frege developed this viewpoint independently, it is not original with him. It is a return to the outlook and world view of the scholastics. As discussed in Chapter II, a scientific language contains a *Weltanschauung* as well as a terminology. This shift from a point of view exemplified by Figure 3 to one exemplified by Figure 4 represents a crucial transition in modern studies of meaning and is the starting point for the development of the language of menetics. Carnap, for instance, adopted Frege's renewed internal viewpoint to great advantage [45, p66], and it will enable me to explain each and every use of 'meaning' of Table 1 as a component of meaning associated with a

particular component of the sign. We can illustrate this by Figure 5. This is called the internal semiotic, or menetic, approach to meaning.

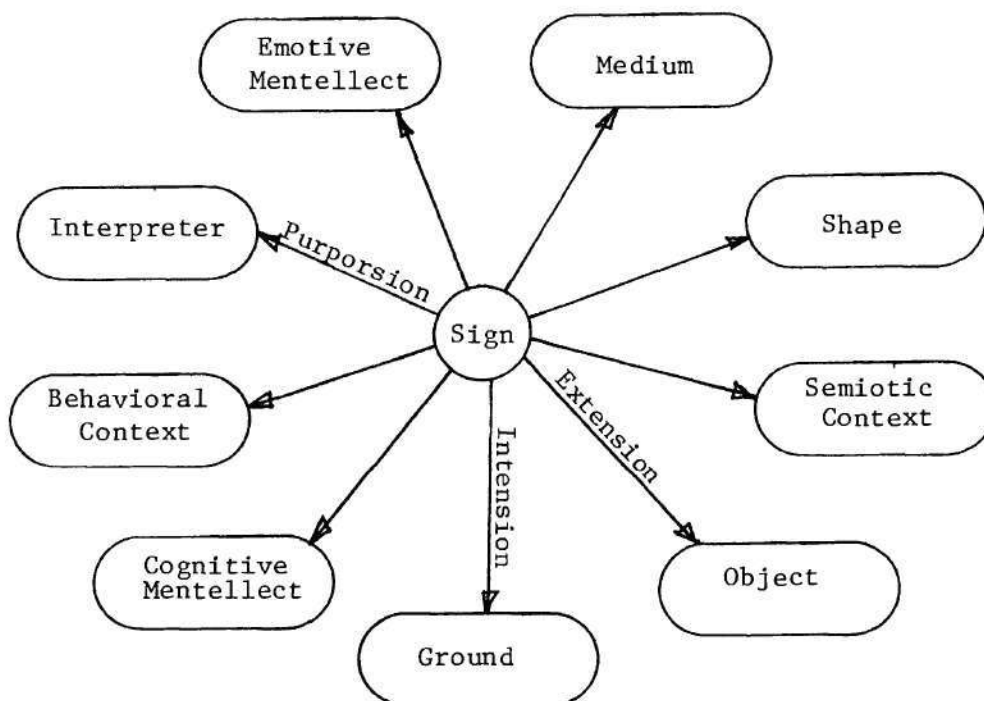


Figure 5. The Internal Semiotic (Menetic) Approach to Meaning.

It thus becomes of interest to discuss in some detail the notion of *signs* and *sign components*. However, as we now proceed to discuss, for our limited purposes of analyzing meaning in natural language, we only need to analyze the restricted category of *sign* designated by 'symbol', that is we only need to treat those signs which are symbols. This will be further restricted to the notion of symbolic rheme. In the next subsection the meaning of NL words will be identified with the internal structure of symbolic rhemes. This will require explication of the distinction between external and internal semiotic structure, distinguishing six levels of meaning, and the identification of NL signs

with symbols. The simplest way to begin the study of meaning is to limit ourselves to the meaning of the elementary units such as words and/or morphemes and this in essence will restrict us to the study of the structure of symbolic rhemes.

The external components of symbolic rhemes are explicated in subsection 3 with the notion of *symbolic rheme* being defined in 3.k. In subsection 4, a componential approach for meaning is suggested and each of the senses of 'meaning' listed in Table 1 is allied to a component of the symbolic rheme. The concept of *dimensions of semiosis* is developed in subsection 5, starting from Morris' three dimensions which are derived from Peirce's more fundamental triadic relation.

2. The Meaning of NL Words and the Internal Structure of Symbolic Rhemes

a. Internal vs. External Semiotic Structure. The first semiotic distinction I want to introduce is that between what I call 'INTERNAL-STRUCTURE' and 'EXTERNAL-STRUCTURE'. The internal structure of signs appears to be related to the problem of how signs bear meaning, what meaning is, and to the manner in which signs can be combined to form messages, etc. The external structure of signs appears to be related to the measurable properties of signs and their relation to information meaasures. The problems related to the study of internal and external structure of signs have a critical bearing on many branches of the semiotic related technologies, particularly information technology and communication.

There is a distinction between the way some semiotic entities are related to the sign itself and the way others are. The concepts of *internal* and *external* sign structure are an attempt to capture this

distinction. The external structure of signs concerns the relationships between signs and non-sign entities, such as objects of signs, interpreters of signs, and mediums of signs.

When I throw an eraser at an inattentive student, I have not hit him with the word 'eraser', or even part of the word. Nor have I hit him with the meaning nor even so much as a part of the meaning of the word. He awakens with a start because he hurts. And he hurts because I have hit him with a non-sign entity.

If I argue that I can use signs to hurt, as when I "hurt" a student with my remark, "You are stupid!", I reply that this is not the meaning of 'hurt', but only a metaphor. I might hurt a student with my words if I shout them so loud that the sound pressure pains his eardrums, but then this would not be my words but only my accoustical energy that is hurting him, and accoustical energy, like the eraser is a non-sign entity. Even so, it is hypothesized that the above remark is uttered in a normal tone of voice. But when I throw the eraser, there is no metaphor involved, he actually hurts. And etc.

Yet by all accounts the eraser is related to the word 'eraser'. We often say that the object is the referent of the sign. It is simpler and means the same to say that the eraser is the OBJECT of the word. Since the object is not an intrinsic part of the sign itself and is yet related to it, it is part of what I am calling the external structure of the sign.

Similarly, to utter the word 'eraser' does not make me part of the word itself. When I say 'eraser' and then walk across the room, the sign has not followed me somehow perambulating like a disembodied

shadow -- a ghost -- or a member of a family of ghosts that will hover around me to haunt me forever after a single utterance. I was born. Signs are not born. I may die and become a ghost but the sign may not. The interpreter cannot be part of the sign. But yet the interpreter could not exist qua interpreter without signs to interpret. He could not be an interpreter without at least the possibility of interpreting. Hence because of the close but distinct relationships between the sign and interpreter I say that the interpreter is part of the external structure of the sign.

Again, when you complain that because we call Latin a dead language, some signs must be born and die, I defeat your argument by pointing out your metaphorical use of the words 'dead', 'born', and 'die'; hence etc.

Now I believe it is an important observation (and I believe one that has never been made before)* that not all entities associated with a sign behave in the manner of external structure. Altho the extension of a sign is related to the object of the sign I cannot throw the extension at you. It somehow, quite unlike the object, is an intrinsic part of the sign itself. An arbitrary set of entities (if indeed extensions are sets) is not automatically an extension. It is part of the way we use 'extension' that an extension does not exist until there is a sign to denote the members of the set, to designate the set. If somehow it were possible to destroy a sign -- not just a token of it -- then the extension would be destroyed simultaneously, but not the object, or set of entities making up the extension. Something is not a sign unless it stands for some other entity. That entity may exist or not

*I have since been informed that Peirce made the same distinctions.

in a physical sense. It may be particular or general, trivial or profound, concrete or abstract, but there must be an extension of every sign. The extension is an inherent part of the sign. I classify extensions as part of the internal structure of signs.

Likewise, what logicians have called 'intensions' are also part of the internal structure of signs for very similar reasons. We talk about the meaning of a sign in ways that resemble talk of extensions and intensions. In fact many modern philosophers, logicians, and linguists have equated meaning (at least in part) with extensions and intensions [45; 71; 100]. It appears then that the meaning of a sign is also part of its internal structure or at least that it might be advantageous to speak in this manner. Thus any study of menetics will be concerned with internal semiotic structure.

This distinction explains Wittgenstein's paradox which is discussed in detail in Section IV.C. The object of a sign cannot be part of its meaning because the object is part of the external structure of the sign while its meaning is part of its internal structure. However, the meaning can still be related to the object -- and other parts of the external structure -- if it is abstracted from it in the same way as the internal structure is abstracted from the external.

Peirce analyzed the logical relationships of what I am calling the 'external' structure of signs (or the relationships between signs and non-sign entities, such as objects of signs and sign interpreters) and thereby arrived at what is regarded by many workers in the field as the most useful classification of signs for most technical purposes. Altho Peirce developed several successive classification schemes, each

involving the external structure of signs, and each involving successively more refined analysis, the best-known scheme and the one that has to date proven the most useful is also the least complex, involving a three-way analysis into ten sign categories. One other scheme of his, involving a ten-way analysis into sixty-six sign categories, has received some attention in the literature [300] but has not been extensively developed. The categories of this latter scheme do not conflict with the simpler scheme, being only refinements of its categories.

Signs were classified by Peirce according to their three modes of existence into tones, tokens, and types; according to their three modes of reference into icons, indexes, and symbols; and according to their three modes of interpretation into rhemes, phemes, and dolemes*. This could yield $3^3 = 27$ sign categories, except that certain combinations, such as symbolic tones, were ruled out by Peirce, so that only ten possible combinations result.

Table 3 defines the nine sign classifications. The ten categories that this classification scheme results in are shown in Figure 6. As examples of the utility of this scheme for information science I may point to Brillouin's distinction between absolute and distributed information [29, p265f] which corresponds to Peirce's distinctions between types and tokens. The referential classification provides a useful scheme for categorizing computers. Digital computers are symbol processors; simulators are index processors; and analog computers are icon processors. In logic, terms are examples of rhemes; statements are examples of phemes; and completed arguments are examples of dolemes.

*Peirce's actual word was 'deloam' which I have changed in order to make it sound right to the standard American ear.

Table 3. External Structure of Signs: Peirce's Definitions

Classification	Definition and Example
<u>TONE</u>	A sign which has a potential mode of existence embodied in a sheer quality. Example: any quality insofar as it is a sign.
<u>TOKEN</u>	A sign whose existence is a single actual instance. Example: any actual existent thing or event which is a sign.
<u>TYPE</u>	A sign whose existence is in the abstract via a general law. Example: all conventions are types.
<u>ICON</u>	A sign which represents its object via a similar quality. Example: a paint chip.
<u>INDEX</u>	A sign which represents its object via a single causal connection. Example: smoke as a sign of fire.
<u>SYMBOL</u>	A sign which represents its object via a general convention. Example: natural language signs.
<u>RHEME</u>	A sign whose interpretant is determined by a qualitative possibility. Example: words or logical terms.
<u>PHEME</u>	A sign whose interpretant is determined by an actual existence. Example: sentences or logical statements.
<u>DOLEME</u>	A sign whose interpretant is determined by a general law. Example: extended discourse or logical argument.

Mode of Representation

Relation Between Sign and Object is	Similar Quality	Actual Direct Relation	General Law
Category	1st	2nd	3rd
Name	Icon	Index	Symbol

REFERENCES

Peirce
Buchler
Goode
Burks
Alston
Morris

TERMINOLOGY

Original	→	Final
Qualisign		Tone
Sinsign		Token
Legisign		Type
Likeness		Icon
Sign		Index
Symbol		Symbol
Rheme		Term
Dicisign		Proposition
Argument		Argument
Representamen		Sign

Mode of Existence of the Sign

Category	1st	2nd	3rd
Name	Tone	Token	Type
Existence of the Sign is	Potential	Actual	Abstract
	1.	2.	5.
		3.	6.
		4.	7.
			8.
			9.
			10.

Mode of Interpretation	Category		
	1st	2nd	3rd
Determina- tion of In- terpretant	Qualitative Possibility	Actual Existence	Law General
Name	Rheme	Pheme	Dolème

Figure 6. Peirce's Ten Fundamental Sign Categories

Structural linguists are much more familiar with Saussurian semiotics than Peircean semiotics, so it may be of interest to note that Chomsky says DeSaussure drew an analogy between *Langue* and a symphony, and *Parole* and a particular performance of it. I.e. *Langue* is language type and *Parole* is language token.

In summary we may say that all non-sign components related to the sign and their relations including almost all semiotic relations studied by Peirce are part of the external structure of signs. That is, they form what is called the external semiotic structure.

I have found some use for the more refined ten-way analysis of external structure, but a more critical problem appears to involve an entirely different structure than the one Peirce devoted his attention to. Since this problem seems to involve the basic structure of the sign itself, as opposed to the relationships between the sign and its external components, I have called this structure 'internal' to distinguish it from Peirce's external structure.

In the Aristotelian-Galilean worldview embodied in the language of physics we are most interested in the external structure of signs while in the semiotic outlook embodied in my language of menetics we are most interested in the internal structure of signs. Quine adumbrated this when he said:

Things had essences for Aristotle, but only linguistic forms have meanings. Meaning is what essence becomes when it is divorced from the object of reference and wedded to the word.

For the theory of meaning a conspicuous question is the nature of its objects: what sort of things are meanings? [240, p22].

While the vehicles and interpreters of signs are actual concrete things, and the objects of signs can be concrete, the meaning of signs is always abstract and related to the internal structure. Therefore NL menetics in many ways represents the ideal tool for the study of internal sign structure. The notion of *sign* is an abstraction that is useful for studying many different types of phenomena. Each of these types of phenomena can in turn be used as empirical data for refining our notions about signs. The major point to be realized in this process is that being a theoretical construct, our concept of *sign* is free to be created in as useful a manner as possible, consistent with the known empirical data. Thus within the scope of this thesis, the concept of meaning in NL and the concept of internal sign structure will be developed hand-in-hand.

b. Six Modes of Meaning. The next distinction I want to make bears a very close relationship to Peirce's distinction between rhemes, phemes, and dolemes. Meaning can be stratified into six levels, or what I call 'MODES' of meaning, corresponding to six ways, or modes, of understanding the signs of NL. We can distinguish between six sub-processes within the process of understanding the meaning of NL. Various of the first few modes have been distinguished by previous authors but I believe I am the first to distinguish modes 4, 5, and 6 and the first to draw the complete systematic distinction in a semiotic way.*

The first mode consists of the meaning of the elementary menetic atoms. Unless I state explicitly otherwise, I shall use the word 'WORD'

*Tagmemicists have distinguished modes 4, 5, and 6, but have not systematized their findings nor related them to semiotic structure.

interchangeably with 'MORPHEME' for this concept without in any way implying that these are the words and morphemes of structural linguistics. Words have meanings and we understand the meaning of words. Any process of understanding consists in part of a subprocess of understanding the meanings of the elementary atomic units. This process fails in so-called "lexical aphasia".

(1) dog

*(2) The grimfol suddenly appeared.

*(3) The rabbit hopped radongly.

(1) might seem to be an example which demands that words have meanings inasmuch as 'dog' is a word and we understand it and feel intuitively that it has a meaning. However, many philosophers have argued that (1) is in fact a sentence [245], and that we understand its meaning because we understand its sentential meaning. However the situation is different with (2) and (3). We fail to understand the meanings of forms (2) and (3) not because of any inability to handle sentences but because we do not know the meanings of the two underlined morphemes. If we knew the meaning of 'grimfol' we could combine the meanings of all the words in sentence (2) to obtain its meaning. Similarly with 'radong' and sentence (3). Failure to understand has occurred in mode 1, or what I call the 'LEXICAL' mode. We need to be supplied with the meanings of the elementary atoms. The application of our knowledge of the lexical mode of meaning to a particular NL in order to construct a grammar component results in what Katz has called a 'DICTIONARY' [143, p154] and what other linguists have called a 'LEXICON'. Lexical meaning, or the meaning of the menetic atoms, is

related to the internal structure of rhemes. Words are practical tools of human use. We use words to build phrases with in order that a final goal of communicating may be achieved.

The second mode consists of the meaning of word combinations, or menetic radicals, below the clause level. These are called 'PHRASES'. This mode corresponds to the fact that we know how to combine the meanings of words to obtain the meanings of word combinations. Any process of understanding will consist in part of a subprocess of understanding how to combine lexical meanings to obtain the meaning of phrases. This process fails in a type of aphasia which has been observed in which the aphasiac understands the meaning of words but cannot combine the word meanings together to understand the meaning of phrases.

(4) brown fox

*(5) The quickly brown fox jumped over the lazy dog's back.

#*(6) Her hopes had fall far.

Again (4) would seem to illustrate my point, but it has been criticized on the same basis as (1). We must go to (5) and (6) to avoid these criticisms. We know the meaning of all the words of forms (5) and (6) and yet we still have problems understanding them because we don't know how to combine the meanings of 'quickly' and 'brown' to get the meaning of the phrase 'quickly brown' which in turn is needed to form the meaning of the phrase 'the quickly brown fox'; nor how to combine the meanings of 'had' and 'fall' to form the meaning of 'had fall' which is needed to form the meaning of the predicate 'had fall far'. If we knew the meaning of 'quickly brown' and 'had fall' we could easily determine the meanings of both (5) and (6). Failure to
#Despite the fact that I have heard this in a nonstandard (Sandhills) dialect.

understand has occurred in mode 2, or what I call the 'LEXICAL-PROJECTIVE' mode. The application of our knowledge of the lexical-projective mode of meaning to a particular NL in order to construct a grammar component results in what Katz has called the 'projection-rules', [143, p153f, & p161f]. However, Katz has failed to distinguish between mode 2 or what is here called the lexical-projective mode and modes 3, 4, 5, and 6. For this reason I prefer to call these 'LEXICAL-PROJECTION-RULES'. Katz's projection rules attempt to explain all five modes of understanding other than the lexical mode and for this reason does not do an adequate job for any one of them. It should be noted that Katz did distinguish sharply the lexical mode from the others. Another team of investigators who distinguished mode one are Osgood, Suci, Tannenbaum [215] who explicitly lumped modes 2 and 3 together and distinguished it from mode 1. Altho they did not give an explicit name to this mode, meaning at this level is determined by what they call the 'Congruity Principle' and hence it may be referred to as the congruity modes. They did not mention modes 4, 5, and 6.

The lexical projection rules are the rules for combining meanings and for this reason 'projection' is perhaps a bad choice of names. However, it seems to be firmly established with linguists so I hesitate to make a change. Lexical-projective meaning, or the meaning of menetic radicals, is related to the internal structure of rhemes and how that structure combines to form the internal structure of rheme constructs. Phrases are also useful tools. We use them to build clauses and sentences with, again in order to achieve the final goal of communication.

The third mode consists of the meaning of clauses and sentences.

This mode corresponds to the fact that we know how to combine the meanings of words and phrases to obtain the meanings of clauses and sentences, and that there is a distinction between the meanings of words and phrases and the meanings of clauses and sentences. Sentences have a kind of meaning that basic words can never have. Any process of understanding the signs of NL will consist in part of a subprocess of understanding the meanings of clauses and sentences and how to obtain them from the meanings of words and phrases.

(7) The dog is not brown.

*(8) In the box jumped over the fox.

*(9) The water the deep.

Sentence (7) shows that sentential meaning is not merely the sum or the collection of the meanings of the individual words or phrases in the sentence. 'Dog' and 'brown' both occur in (7) but the meaning of the assertion is that they do not both occur together in the part of the world being described.

Forms (8) and (9) show that the process of understanding sentences is distinct from the understanding of their component phrases. Altho we know the meanings of all the phrases in (8) and (9) we do not know how to combine these to get sentential meanings. In (8) we have a well-formed prepositional phrase in subject position and a well-formed verb phrase in predicate position but the sentential component of our natural menetic grammar does not tell us how to combine the meanings of these to get a meaning for the sentence. In (9) despite the fact that it contains two well-formed phrases and we easily know the meanings of both of these, we still do not know the intended sentential meaning because

there is no verb phrase in predicate position.

Failure to understand has occurred in mode 3, or what I call the 'SENTENTIAL' mode. The application of our knowledge of the sentential mode of meaning to a particular NL in order to construct a grammar component results in what I shall call the 'SENTICON'. Katz [143, p153f & p161f] did not distinguish between the senticon and the lexical projection rules. By trying to capture sentential meaning with the lexicon and lexical projection rules only he had to build any intrinsic sentential meaning into the meanings of the individual words themselves, a task which may, in fact, not be possible. However, that was in 1966. By 1974 in a paper coauthored with Thomas Bever, [145], Katz explicitly sets up a senticon as an independent pragmatic component of his grammar in order to explain sentential meaning. He calls this pragmatic component "the theory of conversational implicatures". See, especially p44-47, for Katz's comments on sentential meaning, logic of sentential meaning, and pragmatic rules.

Austin, Russell, and Quine have recognized mode 3 even if they have not admitted the lexicon and lexical projective modes. Austin seems not to recognize any other mode at all [12, p2].

In "Use, Usage and Meaning", a symposium by Gilbert Ryle and J. N. Findlay, Ryle is at pains to distinguish between language and speech. Actually Ryle admits the lexical level which he calls the word level and lumps all others together into what he calls the construction level. However, what he has to say about meaning could easily be taken as admitting the first and second levels of meaning while banishing the third and all higher levels. This is because of a failure to distinguish

between sentences and utterances of sentences.

Words, constructions, etc., are the atoms of a Language; sentences are the units of Speech. Words, constructions, etc., are what we have to learn in mastering a language; sentences are what we produce when we say things. Words have histories; sentences do not, though their authors do. ...As we employ coins to make loans, but do not employ lendings, so we employ words, etc., in order to say things, but we do not employ the saying of things -- or misemploy them or leave them unemployed either. [267, p110ff].

As a matter of fact, we do use borrowings to build and finance companies, to recapitalize the national debt, etc. And so do we use sentences, as also words and larger units of language, to communicate with. We use sentences to frame arguments, to build paragraphs, etc. It is the saying of sentences that we do not employ in the sense that they are speech acts rather than pieces of language. Sentences are constructions of language. Utterance of sentences are units of speech!

As Ryle points out, sentences do not have histories. We do not need to learn them in order to know the language. We learn how to understand their meanings, not by memorizing them, but by learning how to construct them out of the meanings of their smaller units. But it is nevertheless useful to distinguish, as Ryle does not, the various modes of construction, (modes 2 thru 6) pertinent of phrases, sentences, etc., since they have distinct rules and are associated with distinct semiotic forms. Sentential meaning is related to the internal structure of phemes and how that structure is built out of its component rhemes.

Failure to understand is not limited to aphasia. Roy Wolcott gives an example of an unusual type of understanding present in schizophrenia, [321]. In order to explain this example, he must distinguish between word meanings and sentence meanings:

The formation rules for word-meanings are different than those for sentence-meanings. ... there are three primary rules for the formation of new words: *assonance* (similarity in sound), *association* (similarity in ideas), and *metonymy* (substitution of one word for another it otherwise suggests).

He then quotes an example given by Renee in *Autobiography of a Schizophrenic Girl* [1267, p92f].

The periods of confounding guilt persisted along with bitter moral pain, and I shed tears for hours, crying "*Raite, Raite, was habe ich gemacht?*" (What have I done?), sorrowing in my own "language," in meaningless, recurring syllables, "*icthiou, gao, itivare, gibastow, ovede*" and the like. In no way did I seek to create them; they came of themselves and by themselves meant nothing. *Only the sound, the rhythm of the pronunciation had sense.** Through them I lamented, pouring out the gruelling grief and the interminable sadness in my heart. I could not use ordinary words, for my pain and sorrow had no real basis. [Quoted in 321].

The formation rules for sentence-meanings include *concretion* (literal meaningfulness), *asyndeton* (omission of conjunctions which coordinate words in ordinary language), and *disjunction* (division into fragments). [321].

This is illustrated by quoting an example given in *The Diary of Schizophrenic Man* [1280, p189].

The stillness has to be broken before we feel free to what is the truth and who can you believe. These are changes you take when you believe other The alfabet is for people to learn how to express themself in writing people want to learn to express Medison if from God for people who don't know God or don't have faith. [Quoted in 321].

Elinor Charney has investigated the role of linguistic synonymy in mechanical translation and found it necessary to distinguish between these concepts of word synonymy and sentence synonymy. She states:

*Note the relationship to sense 2 of Table 1.

The distinction between sentence-meaning and word-meaning is particularly important in clarifying the semantic nature of the free-variables 'any', 'ever', 'whatever', and other related morphemes. Only if the two concepts are carefully kept separate can one explain how it is that the meaning or the definition of the free-variable can remain constant but the sentence-meanings of the structural configurations in which the morpheme occurs can vary. [1426, p178].

The fourth mode consists of the meaning of sentential combinations, or discourse, below the completed argument level. These are called 'discourse', or 'DISCURSIVE-PHRASES'. This mode corresponds to the fact that we know how to combine the meanings of words, phrases, clauses, and sentences to obtain the meanings of discursive phrases. Any process of understanding the signs of NL will consist in part of a subprocess of understanding how to combine sentential meanings to obtain discursive meanings.

*(10) Santa Claus comes once a year. His name is 'Spot'.

(11) Our dog's name is 'Spot'. He bites.

In utterance (11) we know who bites because we have the ability to combine sentential meanings to understand discursive meanings. That not all people have this ability equally is attested by the fact that (11) was found on a standard testing form* followed by the question "Who bites?". On the other hand one would never expect to see a discourse like (10) since we hesitate to combine the sentential meanings of these two sentences. It is this ability that allows us to detect certain typographical errors such as (10) where a complete line of text has been dropped. If a subject were asked "Whose name is 'Spot'?", after reading (10), he almost surely would not answer "Santa Claus".

*Iowa Tests of Basic Skills - Level 9, Form 5, as administered to the third grade by Atlanta Public Schools.

At least not without adding the proviso, "It seems to say here". Where failure to understand has occurred is in mode 4, or what I call the 'SENTENTIAL-PROJECTIVE' mode. The application of our knowledge of the sentential projective mode of meaning to a particular NL in order to construct a grammar component results in what I shall call the 'SENTENTIAL-PROJECTION-RULES'. It seems that Katz made no provision for this kind of a grammar component; however, Harris has begun to study the meaning of discursive phrases. And the tagmemicists have initiated excellent empirical studies of language structure at the sentential-projective level. Sentential-projective meaning is related to the internal structure of phemes and how that structure combines to form the internal structure of pheme constructs. Discursive phrases are used to build arguments and other discursive clauses, etc.

An example of combining the meaning of clauses to get the meaning of clause combinations occurs in so-called "clause-chaining" in New Guinea languages such as *Kanite* or *Wojokeso* [177, p5f]. In clause-chaining the verb of a non-final clause is marked to show whether the subject of the next clause is the same or different, and if different, marks chronological overlap versus succession as well as person and number of the following subject.

A different type of clause-chaining which occurs in all languages has been pointed out by Rogers and Van Wolkenten in their application of linguistics to the improvement of document retrieval methodology. They call sentence adjuncts such as 'in summary', 'thus', 'parenthetically', etc., 'ORGANIZATIONAL-DEVICES'.

The distinct characteristic of this category is that the devices in it do not change the actual assertion of the sentences to which they are applied, i.e., they do not operate on the sentences. Rather, they mark the use of the sentence in relationship to the organization of the discourse. Thus, their omission from a discourse would not, in general, affect its content.* [258, p64f]

1) Thus Socrates is mortal.

2) Socrates is mortal.

Rogers and Van Wolkenten would claim that 1) and 2) are synonymous as sentences, that is, they have the same sentential meaning. I would agree with them and I think many other meneticists would too. However, as Rogers and Van Wolkenten point out 1) and 2) may make different contributions to discursive meaning and this is the point of my example.

1) indicates that it is to be understood as contributing the idea of the conclusion of a logical argument to the discursive meaning while

2) does not do so explicitly and may or may not be so interpreted.

2) may be understood as complete when heard by itself, but 1) would be considered incomplete by itself by all normal native speakers of English.

The fifth mode consists of the meaning of arguments or other DISCURSIVE-CLAUSES. This mode corresponds to the fact that we know how to combine the meanings of words, phrases, clauses, sentences, and discursive phrases to obtain the meanings of arguments, and that there is a distinction between the meanings of clauses and sentences and the meanings of arguments and other discursive clauses. Arguments have a kind of meaning that words or sentences can never have. Any process of understanding the signs of NL will consist in part of a *Sentential content.

subprocess of understanding the meanings of arguments and discursive clauses and how to obtain them from the meanings of sentences and discursive phrases.

(12) First, Socrates was a man. Secondly, all men are mortal.

Therefore, Socrates was mortal.

(13) This is a beautiful painting. I love beautiful paintings.

Therefore you should buy this painting for me.

*(14) This is a beautiful painting. I love to sing. Therefore
go home.

From the meanings of the individual sentences in (12) we understand the meaning of the argument. But this is more than just the sum total of the individual sentential meanings. The validity of the argument is not in question. Both (12) and (13) are understandable. In fact, we must understand an argument before we can determine its validity. However, it is either difficult or impossible to understand the argument of (14). It is starred, by a curious reverse use of the star convention, just because it has been observed. A construction like it was a response in a game played by undergraduates at the Ohio State University during beer parties. The drinkers sit around a circular table and each utters a single sentence in turn. The rules require that no chain of consecutive sentences may form a sensible argument. In (14) we cannot tell if the argument is valid or invalid, or whether the speaker is just drunk. In fact we are not sure what the thrust of the argument is even tho we understand the meaning of each of its sentences and can even combine these by sentential projection rules. Failure to understand has occurred in mode 5, or what I call the 'DISCURSIVE' mode.

The application of our knowledge of the discursive mode of meaning to a particular NL in order to construct a grammar component results in what I shall call the 'TEXICON'. All studies to date appear to be tantamount to an assumption that the texicon for each NL is the same. This would appear to be an unwarranted assumption. Discursive meaning is related to the internal structure of dolemes and how that structure is built out of its component rhemes and phemes. Discursive clauses are used to build extended communication.

A curious, but illustrative, example of discursive meaning is given by the following scenario* and analysis.

Setting: Boy and girl are in a Chinese restaurant and the girl is talking to the boy, but the boy's attention is wandering and he looks around to examine the other girls in the restaurant. The girl suddenly, but mildly, exclaims:

A. *Girl:* My foot's gone to sleep. It must be the fried rice.

B. *Boy:* (*with a puzzled look*) What has fried rice got to do with your foot going to sleep?

C. *Girl:* So you were paying attention to me after all!

Analysis: The girl has deliberately, and successfully, used the two sentences in A together to achieve her intended effect. Thus the utterance is not deviant. The utterance cannot be said to be meaningless on pain of making a great deal of normal language phenomena meaningless. Yet the meaning cannot be of the sentential type. She has used sentential meanings and added something else to them in somewhat the form of a nonsequiter to achieve something larger than a sentential

*Observed at the Shanghai Restaurant in Atlanta, Georgia, 74-5-17

meaning. Since she has achieved her purpose with one utterance we can provisionally classify it as a paragraph, or a complete argument or communication. Paragraph meaning has a kind of meaning apart and beyond sentential meaning. It is a kind of argumentative (in the logical sense) meaning but it is different from the meaning of the syllogism in the usual sense. We also note here that paragraphic meaning contains aspects of meaning in senses 7, 8 and 9 of Table 1.

In experiments of a more classical type Young and Becker [1427], and Koen, Becker, and Young [859] tested NNS's of American by asking them to place paragraph markers at appropriate sentence junctures in both American and nonsense passages. The results indicate 1) that the paragraph is a psychologically real language unit for NNS's and 2) that the cues to paragraph placement exist in three extra-sentential systems: a) lexical; b) grammatical; and c) rhetorical.

The languages of New Guinea are excellent specimens for illustrating the difference between sentential and paragraphic meanings. In *Wojokeso* many deep structures encode only as sentences, many others encode only as paragraphs, while parallel, succession, and overlap deep structures are encoded on both levels. It is easily observed that *Wojokeso* contrasts with English in its division of functional load between sentential and paragraphic meaning. In English, Contrast, Exception, Paraphrase, and Alternation regularly encode as sentences, but may alternatively be developed in more detail and complexity as paragraphs, while in *Wojokeso* these meanings must encode only as paragraphs. [177, p106]

Somewhat the same situation holds for *Kosena*. Longacre notes that:

In general, comparing sentence and paragraph levels in Kosena, we find quite a few instances of deep structures encoded on the sentence level with no correlates on the paragraph level, but fewer instances of deep structures which encode on the paragraph level, and do not also encode on the sentence level. Sentence and paragraph are clearly distinguished as surface structure units by the distinction of same subject verbs versus different subject verbs versus final verbs, and a few other specialized features. [177, p131]

In *Daga* most deep structures encode both as sentential meanings or paragraphic meanings. Is the distinction between the two, then, really necessary? Perhaps *Daga* menetics could suffice with only one of the two levels whether it be called sentential meaning or paragraphic meaning. But Longacre points out that even in *Daga* the two levels must be kept distinct for independent reasons. [177, p118]

The sixth mode consists of the meaning of argument combinations and extended discourse, or communication in its most general and extended sense. These will be called 'EXTENDED-COMMUNICATIONS'. This mode corresponds to the fact that we know how to combine the meanings of words, phrases, clauses, sentences, discursive phrases, and discursive clauses to obtain the meanings of extended communication. Any process of understanding the signs of NL will consist in part of a subprocess of understanding how to combine the meanings of discursive phrases to obtain the meanings of extended communication. Therefore I call mode 6 the 'EXTENDED-COMMUNICATION' mode. The application of our knowledge of the extended communication mode of meaning to a particular NL in order to construct a grammar component results in what I shall call the 'COMMUNICATION-PROJECTION-RULES'. The meaning of extended communication is related to the internal structure of dolemes and how that structure combines to form the internal structure of doleme constructs.

Signs at each level or mode are used to build signs at the higher levels and each bears the mode of meaning appropriate to its own level. Words are used to build phrases. Phrases are used to build sentences. Sentences are used to build discursive phrases; discursive phrases to build discursive clauses; and discursive clauses to build extended communication. Extended communication is used to communicate!

Words, sentences, and arguments each bear meaning but the meaning of each is different. The meaning of sentences is made up in part of the meaning of its words and phrases, but also in part it is something extra. A sentence has a kind of meaning that a word or phrase can never have. This is what Langer means when she says:

A combination of words connoting a situation-concept is a descriptive phrase; if the relation-word if such a phrase is given the grammatical form called a "verb," the phrase becomes a sentence. Verbs are symbols with a double function; they express a relation, and also *assert that the relation holds...* Logically they combine the meaning of a function, ϕ , and an assertion-sign; a verb has the force of "assert $\phi()$." [160, p73].

This is the kind of meaning recognized by Quine, Russell, and Austin when they say that words do not have meaning: only sentences, [245, p17; 261, pp104,107,110; 12, pp2,4,8]. They simply meant that they were using the word 'meaning' in the sense that I am using 'sentential meaning'.

The meaning of arguments is made up in part of the meanings of its words, phrases, and sentences, but also in part it is something extra. An argument has a kind of meaning that a sentence or simple string of sentences can never have. This kind of meaning does not seem to have received any prior recognition. We can summarize the modes of meaning

Table 4. The Modes of Meaning

#	Mode	Elements	Used to	Applied Theory	Sign Structure
1.	Lexical	Words/Morphemes (menetic atoms)	Build phrases	Lexicon	Rhemes
2.	Lexical-projective	Phrases,(menetic radicals)	Build sentences	Lexical projection rules	Rheme constructs
3.	Sentential	Clauses/sentences (menetic molecules)	Build discursive phrases	Senticon	Phemes
4.	Sentential projective	Discursive phrases	Build discursive clauses	Sentential projection rules	PHEME constructs
5.	Discursive	Discursive clauses	Build extended communication	Texicon	Dolemes
6.	Extended communication	Extended communication	COMMUNICATE	Communication projection rules	Doleme constructs

in tabular form by Table 4.

I might mention one adumbration of this scheme that I am aware of. Zipf's notion of 'articulatedness of meaning' bears some resemblance to it. For example, aside from minor personal differences in timber, average pitch, and amplitude, most speakers of a dialect agree remarkably closely in the formation of phonemes. But phonemes are not signs, they are eidetic units for constructing signs. The minimum menetic atoms are morphemes. With morphemes there is some slight latitude for variation. These differences in the phonemic structure of morphemes, whatever their cause, illustrate the tolerance of at least some variability. In arranging morphemes into words there is somewhat more variability. The extensive choice in arranging words into phrases, clauses, and sentences, which is restrained at the most by parts of speech or grammatical rules, needs no illustration. And the arrangement of sentences into larger configurations is, comparatively speaking, free. [325, p192].

Clumps of clauses cling together
In the damp New Guinea weather.

James Marsh.

c. Natural Language is a Symbol System. I want to call the reader's attention next to another distinction which is closely related to both menetics and semiotics. However, this distinction is not new. It has been known for more than two milleniums. The question was raised by Plato and solved by Aristotle. The question does not seem to have received a label in the literature, and indeed this may be the reason there has been little reference to it in later times. Therefore I will

give it a name for reference purposes. The distinction cannot be given in observational terms and theoretical principles must be resorted to, therefore I will call it 'ARISTOTLE'S SYMBOLIC PRINCIPLE'. This can be stated in various ways. Two examples are given here: (1) meaning in NL is symbolic; and (2) NL is a symbol system.

Ogden and Richards spoke frequently of the need for basing a study of NL meaning in a science of 'symbolism'. However, it is not clear in what sense they were using the term 'symbol'. Aristotle's Symbolic Principle assures us that NL is indeed symbolic in the modern (Peircean) sense of the word 'symbol'. This will justify my adoption of O & R's second suggestion.

i) Peirce's analysis of representation

In order to understand the meaning of this principle we must see what symbols are being distinguished from, and to do this I will call upon the system of sign classification developed by Peirce and shown in Figure 6.

According to their mode of representation signs can be classified into icons, indexes, and symbols. Icons represent their objects via a similar quality. Peirce called this a 'firstness' relation which he derived from his "science" of phenomenology.

Indexes give their objects by a single, but actually existing, natural relationship, such as physical cause and effect. Peirce called this a 'secondness' relation as derived from his phenomenology.

Symbols determine their objects thru a general law, or convention. The phenomenological term for this is 'thirdness', and according to Aristotle's Symbolic Principle, the words of NL are examples of symbols.

ii) Plato's theory of language

Plato was concerned with the possibility of NL as a source of knowledge of things as they are. To use Peircean terms, Plato investigated the possibility that words can give us knowledge of reality because they are either icons or indexes. If words were indeed symbols there would be no necessary relationship between them and their objects and hence by themselves they could be no source of knowledge. His conclusion that words are not icons or indexes was a severe set-back to his philosophical program and was one of the principle causes of his development of 'ideal forms' as a source of knowledge.

Plato's investigations are described in *Cratylus*, [223], and *Letter VII*, [1123]. In the translation referenced here, the term 'theory of natural names' means the same as 'indexical theory of words', and 'image theory of names' means 'iconic theory of words'.

iii) Aristotle's theory of signification

By 'the signification of words' Aristotle means the way they determine their meaning, or represent their objects. There is a subtle problem here in that for Aristotle the object of a word is a mental experience of the thing rather than the thing itself. However this fact will cause us no problem because when he says that the object of a word is given by convention he means that the mental experience, and hence the thing itself, is determined by convention. He speaks of signification as follows:

Spoken words are the symbols of mental experience and written words are the symbols of spoken words. Just as all men have not the same writing, so all men have not the same speech sounds, but the mental experiences, which these directly symbolize, are the same for all, as also are those things of which our experiences are the images, [9, 1.16a3-7].

Just as no word has a necessary relation to a thought, no written symbol has a natural relation to a particular sound; hence the possibility of synonyms, homonyms, different languages and different alphabets. The brevity of Aristotle's explanation here indicates that he is introducing the point that language refers to things thru thought. It is not merely a communication with someone but communication *of* something *to* someone. In other words, the relation of reference of words to things is not natural but conventional, [1428, less.1, #6]. Aristotle speaks of words as symbols; that is, they are significant by the convention of men.

By a noun (word)* we mean a sound significant by convention. ... The limitation 'by convention' was introduced because nothing is by nature a noun (word)* or name -- it is only so when it becomes a symbol; inarticulate sounds, such as those which brutes produce, are significant yet none of these constitute a noun (word)*, [9, 2.16a19-32].

This is Aristotle's answer to the problem of natural names in Cratylus. Note that for Aristotle natural inarticulate sounds designate but do not signify. By this he means they are signs, but not symbols. From such inarticulate sounds we may learn the desires and states of emotion of both men and beasts, but only lettered words are symbols, constituted with a definite meaning by the intelligence of men.

A word is not a natural sound of man or beast and neither is it the direct instrument of a natural power. The throat, lungs, tongue, teeth, lips are instruments for producing words which are the artificial

* The Greek language had only one word, ὄνομα, where English has 'word', 'name', 'noun', and 'term'.

effects of the use of these instruments by intelligent beings, [1428, less.6, #80-81]. Altho words are thought of as effects of speech or communication, it is only because of the intervention of the intellect in imposing names and in using them that a word has any relation to that which it names. In saying that words are conventional and not natural, Aristotle means that letters and syllables have no necessary natural likeness to that which they signify. Yet they can still refer to reality by intervention of the intellect. Intelligence provides the possibility of conventional meaning for words.

Ackrill, in his commentary on De Interpretatione, objects to Aristotle's claim that words are conventional, [1429, pl17]. The statement that brute inarticulate sounds are not words because they are not articulate does not prove, according to Ackrill, that words must be conventional. It may be questioned, however, whether Aristotle intended it as proof and, furthermore, whether it is necessary to prove the conventionality of words. The alternatives are that words are either entirely arbitrary, conventional, indexical, or iconic. They cannot be purely arbitrary because men in communicating understand what is said. Given (1) the experience of watching language develop, (2) the existence of synonyms, homonyms, and different languages, and (3) the abortive attempt of Socrates to prove that words are indexical or iconic, the signification of words must be conventional. What the natural inarticulate sounds of beasts and men reveal are not things to which they refer but states of emotion. Things cannot have names unless men agree in imposing certain names of them, and if these words are to be useful in communication, they they must be conventional not arbitrary.

We note that the Symbolic Principle is a theory and not a law. No amount of observational data can "prove" it. It can only be used to produce statements that are more or less in agreement with the "facts" of nature. For Aristotle, the Symbolic Principle was a theory that explained the existence of diverse languages; the existence of synonyms and homonyms; the possibility of false words; the diverse etymology of words, especially the names of the immutable essences such as gods, stars, virtues, and elements of the universe as originally expressing contradictory principles - both motion and rest; the radical alteration of the forms of words over the ages; the problem of the original name-giver; the failure of words to resemble the things they represent; the failure of the inarticulate sounds of beasts to carry referential meaning; and the failure of Plato's iconic and indexical theories of meaning to account for the facts. Altho this is a brilliant theory, much in accord with the facts of language, it still failed of its intended purpose which was to explain how words can give us knowledge of things as they are.

Aristotle did not have the concept of the six levels of meaning explicated in the last subsection but he consistently applied his Symbolic Principle to all levels he analyzed so we may say that he acted as if he believed that his Symbolic Principle holds for all six levels of meaning. In any case, I include this as part of my statement of his principle.

d. The Meaning of NL Words and the Internal Structure of Symbolic Rhemes. Of the three concepts, rheme, pheme, and doleme, that of rheme is the simplest and could be expected to have the easiest

semiotic structure to unravel. We might therefore expect the notion of word meaning to be the simplest notion of meaning to attack. In addition starting an attack on meaning with the notion of word meaning has the additional advantage of systematicity. One may systematically start with the meaning of words, proceed to untangle the meaning of phrases, then sentences and clauses, then multiple sentences, etc. That is, one may systematically proceed right up the semiotic scale thru the mode of interpretation by developing a notion of meaning for each level, or mode, of meaning in turn and then proceed by using that result to attack the next level of meaning. For these reasons, this thesis will be limited to the notion of the meaning of individual words and morphemes -- those elements which constitute the menetic atoms.

I have thus explicated the restrictions that may be placed on the general concepts of *sign* and *semiotic structure* for use in analyzing the meaning of words in NL. We may be guided by the principle that: THE MEANING OF WORDS IN NL IS RELATED TO THE INTERNAL STRUCTURE OF SYMBOLIC RHEMES. I now proceed to explicate the external components of symbolic rhemes.

3. The External Components of Symbolic Rhemes

What is a symbol, that intelligence may use it,
and intelligence, that it may use a symbol?

Allen Newell and Herbert Simon's paraphrase
of Warren McCulloch appearing in "Computer
Science as Empirical Inquiry: Symbols and
Search" CACM, 19 (1976), p113-126.

a. Peirce's Phenomenological Concept of a Symbol. Peirce's notion of a symbol was derived from his "science" of phenomenology (also called 'phaeneroscopy') as embodying a relation of thirdness between the

sign and its referent. As for thirdness -- "It is that which is what it is by virtue of imparting a quality to reactions in the future.", [32, p91]. At one point Peirce said: "A *Symbol* is a sign which refers to the Object that it denotes by virtue of a law...", [30, p102]. Again:

A *symbol* is a sign which would lose the character which renders it a sign if there were no interpretant. Such is any utterance of speech which signifies what it does only by virtue of its being understood to have that signification [32, p104].

The object and interpretant, mentioned in these passages, are external components of all signs -- not just symbols. At one point Peirce attempted to define a sign in terms of its external components but he appears to have confused the symbol together with all signs at this point.

A sign, or *representamen*, is something which stands to somebody for something in some respect or capacity. It addresses somebody, that is, creates in the mind of that person an equivalent sign, or perhaps a more developed sign. That sign which it creates I call the *interpretant* of the first sign. The sign stands for something, its *object*. It stands for that object, not in all respects, but in reference to a sort of idea, which I have sometimes called the *ground* of the representamen. [32, p99].

Altho a symbol might have these components, it is hard to imagine, for instance, how an index must have a ground. He says: "An *index* is a sign which would, at once lose the character which makes it a sign if its object were removed, but would not lose that character if there were no interpretant." [32, p104]. At another point, Peirce said that a sign must have a context, but does not seem to have put this into any of his definitions. It therefore appears that a thoroughgoing systematic investigation of the external components of signs and their relation

to the classification of the signs was not carried out by Peirce.*

It is the purpose of this section to motivate the list of external components for symbolic rhemes given in Table 5. I shall attempt to show that a symbolic rheme must have each of the constituent components in that list and that these are sufficient -- that an entity consisting of each of these parts in the proper relations can satisfy the semiotic function of a symbolic rheme.

b. Name. In order to talk about symbolic rhemes we must have some type of sign that refers to them, in order to talk about a particular symbolic rheme we must have a sign that refers to that particular one. Such a device is the common, ordinary, name; and so we require that each symbolic rheme be potentially nameable -- that is can have a 'NAME'.

This requirement is trivial in the respect that it adds no additional restrictions to what might be a symbolic rheme other than already stated by the other requirements that we shall formulate and serves only to make explicit an otherwise convenient assumption. Notice that one way of satisfying this requirement for any arbitrary symbolic rheme in advance is to adopt the usual convention that for any symbolic rheme, a token of that symbolic rheme enclosed in single quotation marks shall be interpreted as a token of the name of that symbolic rheme. Thus the name of the word dog is 'dog' and the name of the plus sign is '+'.

* in his published writings. It now appears from recent publications of Pierce's commentators that he did carry out such a program in his unpublished writings stored in the Harvard University Library.

c. Medium. A symbolic rheme is a sign and hence must satisfy the minimum requirements for being a sign. One of these requirements is that a sign must be capable of interacting with a cognizing body. Now, not all signs do interact directly with such a body; types are not embodied and hence do not interact, but types must be capable of determining tokens which indeed must so interact when the occasion demands. Therefore we require that a symbolic rheme be capable of determining such an interaction. Now such interactions occur, insofar as is presently known, only between physical bodies. Therefore we shall require that a symbolic rheme be capable of determining a physical embodiment, which is capable of interacting by a physical process with a cognizing body. We shall call this the 'MEDIUM'. Notice that we do not require that a symbolic rheme which itself may be a type, not a token, must have a medium, but only that it be capable of determining one -- that it be embodiabale.

d. Shape. In the same vein, once a symbolic rheme has been embodied in a meium, the cognizing body must be able to distinguish it from other signs that have been embodied. We could require that each symbol be embodied in a different medium. Perhaps we could require that the word 'dog' be spoken, the word 'cat' must be embodied in chalk marks on a black board, and the word 'chase' by scratching a piece of soft clay with a stick. However effective this might be in enabling us to symbolize, it is certainly inefficient and awkward as a tool for communication. We demand something more practical of semiosis. Therefore we require that when two different symbols are embodied in the same medium, that they be capable of having different 'SHAPES', -- that there be a way of distinguishing one from the other in the same medium.

For instance, if the medium were holes punched in an 80 column card, the letter 'A' might have the shape of a twelve-one punch while the letter 'B' has the shape of a twelve-two punch. To take an extreme example, the signs of marine communication are often embodied in rectangular flags of different colors. Here, the shape in the intuitive, physical, sense is the same for different symbols, while the semiotic shape refers to the colors of the different flags which is their distinguishing characteristic.

e. Semiotic Context. We are only occasionally interested in a single sign, such as when a forest ranger watches from his tower looking for one thing: the column of smoke that would be a sign of a forest fire. However, this sign is an index and not a symbol and this one sign could hardly be said to constitute a language. We therefore require a semiotic system to have more than one sign. This implies that each sign, when actually used, will have a SEMIOTIC-CONTEXT. The semiotic context in a linguistic system is usually called the 'LINGUISTIC-CONTEXT'. Part of the linguistic context of the word 'dog' in the sentence 'The dog chased the cat.' is 'The ____ chased the cat.'. It is this sense of the word 'context' that is meant when linguists talk of 'context sensitive grammars'. Even when a sign belonging to a semiotic system is used by itself it has a semiotic context. It appears in a context in which each of the other signs in the system does not but may or may not appear; and this must be contrasted with the case in which it appears in a context in which one or more of the other signs does appear.

f. Object. The OBJECT of a sign is one of its most critical components. Signs represent their objects to their interpreters.

Peirce showed that this aspect of otherness was fundamental to the semiotic relation. Altho an object of a sign may itself be a sign, it may never be the same sign of which it is the object component. Therefore, a symbol, as a sign, must have an object component. Not every symbol has a physically existing object; for instance, the referent of 'unicorn' does not exist. However, in order to simplify theory and analysis we shall designate some trivial object such as the null set or Carnap's null individual, a^* , [45, p36f] to be the object of the symbol in such cases. I shall determine exactly what this trivial object is in a later work on theoretical analysis. The object may be considered to be part of the physical context, or environment, of the symbol, or a coding of that relevant part of the environment for the purposes for which the symbol is used.

g. Ground. Peirce defined 'GROUND' as the relation relative to which or with respect to which a sign denotes its object. It is not clear whether he intended this to apply to all signs or just symbols. In any case, symbols may be distinguished from other signs by the importance of their grounds.

Since man divides up the world arbitrarily for his own usefulness, this arbitrariness shows up in the way he uses symbolic rhemes to denote objects of the world. We can perhaps see this best with an example. The words 'desk' and 'brown' in English can be used to denote the same particular object, namely, this brown desk before which I am now sitting. 'Desk' denotes this object with respect to or relative to its size, shape, property of being functional and having particular functions -- that of serving as a place for me to write on among others -- while 'brown' denotes it with respect to its property of reflecting

visible light and having a particular color, namely brown.

Each word in the lexicon of a language and each utterance made within the language implies a discrimination. This discrimination is made by means of the ground. If I want to discriminate between various colors I use a word which denotes the intended object with respect to its color -- a symbol which has color for its ground. Each utterance implies that something is so and so, and something else is not that way or need not be that way. To use 'brown' meaningfully you must also know when not to use it. You must have some category which is 'not-brown'. In addition, since something cannot be brown and not-brown simultaneously, we see that other color names, as is the word 'color' itself, are dependent for their meaning in part on that of 'brown' and vice-versa, of course.

Not every symbol has an interesting or important ground. For instance there has long been considerable debate [200; 1019; 1287] over whether proper names, such as 'Charles S. Peirce' have any ground at all. Nevertheless, just as we allow the extension of a sign, such as 'unicorn' to be the null set in order to simplify theory and analysis, we require all symbols to have a ground, no matter how trivial, as an essential characteristic. The practical determination of what the trivial ground is will be a later task.

h. Symbolic and Emotive Mentelleacts. In Peirce's system of semiotics, the interpretant of a sign is the internal sign formed in the mind of the cognizing body as a result of interpreting the sign in question. Hence for Peirce, at times at least, interpretants were mentalistic entities. This was later resolved with the notion of the 'ultimate interpretant' which was a habit of action, but not all

interpretants are of the ultimate type. In fact Peirce's later analyses required many different kinds of interpretants.

I see no way of handling satisfactorily the mentalistic aspects of semiosis without some such concept as the interpretant but would like to avoid the ambiguity of the term 'interpretant'. I therefore introduce the term 'mentellect' and require all symbols to have mentellecs even in case it must be some trivial one for the same reason as discussed before.

There is a subtle point here in which error is likely to arise. I am treating the notion of *sign* and all related notions such as *meaning* and *sign components* as theoretical concepts rather than observational concepts. Thus one might consider that the whole process of semiosis, and especially anything to do with meaning, is a mentalistic endeavor, so why single out certain aspects and thereby require such a thing as a mentellect. This is so, but on another level meaning itself is related to various kinds of entities as we have seen in Section B and will be seeing further in C.4. Now some of these entities to which meaning is related are not mentalistic. This is the point of so-called "cognitive" meaning. We have seen for instance that in one sense of the word, meaning is related to the object of the sign and the object of the sign is certainly the antithesis of mentalistic. It is as objective as you can get -- unless of course one wishes to change his entire conceptual scheme and with it the meaning of all his words such as 'object' and 'mentalism'. Now we have seen that in certain other senses of the word, meaning is related to mentalistic entities such as feelings, emotions, thoughts, ideas, images, etc. It is these

mentalistic entities that make me say that some such component as the mentellect is necessary to the understanding of sign structure.

There is yet one more problem before I can state our requirements -- two requirements to be precise. It seems that Peirce introduced his concept of interpretant in order to provide for a future analysis of the on-going process of scientific thought. The interpretant is the representation "to which the torch of truth is handed along". As such it has its interpretant in turn; "and so on *ad infinitum*", [1109, 2.303]. However, it must be recognized as a fact that scientific thought is not the entire -- nor even predominate -- form of human mental activity. It is probably safe to say that feelings and emotions come closer to possessing this role. At any rate we must now distinguish between mentalistic aspects of semiosis which themselves pertain to either the objective or mentalistic realm at yet a third level. Scientific thought which so interested Peirce is a mentalistic aspect of semiosis which concerns what we call the objective reality -- whatever that may be. But what of feelings and emotions above emphasized? These appear to be mentalistic aspects of semiosis that involve at least one more level of mentalism. It would seem that the same concept of *mentellect* will not handle both these kinds of mentalistic aspects of semiosis and that something like two different *mentellect* concepts must be introduced; perhaps an *objective mentellect* and a *mentalistic mentellect*.

Ogden and Richards ran into this problem in a much altered fashion -- their concept of *interpretation* contained all the meaning of the sign -- however they were only interested in the mentalistic aspects of meaning. They also found two modes of interpretation

necessary and called them 'symbolic' and 'emotive', [213, p149ff].

Because of their priority I shall use their terminology with the exception of modifying 'symbolic' to 'cognitive' to avoid confusion with the *symbol* concept. But I must adopt this terminology to my own conceptual framework of semiotics. A symbolic rheme must therefore have a COGNITIVE-MENTELLECT and an EMOTIVE-MENTELLECT. The cognitive mentellect is the objective one previously suggested while the emotive-mentellect is the mentalistic one.

i. Behavioral, or Social, Context. A symbol must relate to a SOCIAL-CONTEXT. In order for a thing x to be a symbol, x must occur in some BEHAVIORAL-CONTEXT. I use the two terms, 'social context', and 'behavioral context' as interchangeable synonyms. Suppose I ball my right hand into a fist but extend the thumb from it. Then suppose I wave this back and forth several times: Is this a sign? It is not a sign without the context, because it is only the context that makes the referent unique -- that gives it a unique object. Suppose the social context is that I have on a striped uniform and am standing behind the catcher's position of a baseball diamond with a game in progress and a batter in the box; then I think you would take my action as a symbol that the batter was out. But conversely, if the social context were that I am in my study and that you have just entered and interrupted my concentration with a silly question, my same action would certainly mean 'go away and leave me alone'. Even a third context and interpretation is possible. Suppose the context is that I am standing beside a highway with a suitcase in my left hand and doing my thing as cars go by. Every one would recognize that this is

a sign that I am asking for a ride. So this self-same action is a different symbol in different behavioral contexts because it has different referents. Conceivably there are some contexts in which this particular action would have no signification at all and hence would not even be a sign at all.

Note the important distinction between the semiotic context and the behavioral context. The semiotic context is the setting of the sign among other signs and abstracts away the behavioral or social context and physical context or environment in which the sign process is taking place, while the behavioral context is the setting of the sign within the behavioral or social environment of its use while abstracting away any other signs which may be associated with it in the semiotic setting of its actual use. The social context emphasizes the behavioral conventions and social contracts relevant to the setting in which the symbol is used.

Malinowski pointed out the importance of the social context in determining the meaning of words in the Melanesian languages, [213, p303], where one cannot determine the meaning of the perfective form of a verb unless one also knows what action customarily follows the action named by the verb in the standard social life of the Melanesian society.

j. Interpreter. In the semiotic systems of both Peirce and Morris an entity called the 'interpreter' plays a key role, altho somewhat differently in the two systems. In Peirce's system, the interpretant is the internal sign formed in the mind of the cognizing body as a result of interpreting the sign in question. Hence Peirce's notion of an interpretant must imply the notion of an interpreting body, or what

we shall call the 'INTERPRETER'.

In Morris' system the interpretant of a sign is 'the taking-account-of' the referent because of the presence of the sign, and hence the interpretant is a behavioral concept, insofar as taking-account-of can be measured behaviorally. The agent for the process of taking-account-of is called the interpreter, and thus insofar as a process implies an agent, the interpretant implies an interpreter.

Thus in either Peirce's or Morris's system, the interpretant implies an interpreter, and we should ask why then do we need to make explicit provision in the logical structure of the sign for a separate interpreter? It is simply a practical matter! It turns out that making separate provision for interpretant and interpreter makes the analysis of meaning easier and yields a theory of meaning that is both simpler and more symmetric than by not doing so. Since signs are required to have an interpreter, symbolic rhemes will also have to meet this requirement.

k. Definition of Symbolic Rheme. With the above analysis as explication, I now present my definition of the concept of *symbolic rheme*.

A SYMBOLIC-RHEME, which we can name S , is something which acts so as to cause a particular shape, s , in a particular medium, M , when they occur in a particular semiotic context, C , to form a cognitive interpretant, I , and an emotive interpretant, E , in the mind of an interpreter, i , which represents a particular object, O , relative to or with respect to some ground, G , when he is interacting in a particular behavioral context, B .

It is now possible to summarize the principle external components that serve to make up the concept of a *symbolic rheme* and this is done in Table 5.

Table 5. External Components of a Symbolic Rheme

1.	medium
2.	shape
3.	semiotic context
4.	object
5.	ground
6.	cognitive mentellect
7.	behavioral context
8.	interpreter
9.	emotive mentellect

4. Components of Meaning

a. Relation Between Senses of Meaning and Components of Symbolic

Rhemes. It is immediately obvious that the number of entries in Table 5 is the same as the number of entries in Table 1. But there is more similarity than just this superficial relation. Each line of Table 5 corresponds one-to-one with each line of Table 1. For instance, line 4 of Table 1 is the sense of 'meaning' related to the class of things denoted by the word, while line 4 of Table 5 is the object of the sign. It is well known that many authors have treated the object of a symbol as the class of things of which that symbol may be truly stated -- the class of things denoted by the symbol. Line 5 of Table 1 is the sense of 'meaning' related to the way the class of things denoted

by the word is given by the word. More than one modern philosopher [45, p59; 71, p65; 1109, 2.228], has attempted to explicate this 'way' as the relation with respect to which the sign denotes its object, indicating a more than superficial relation between intensional meanings and the ground of symbols. When the *mentelle*cts were introduced as component concepts of the *symbolic rheme*, it was explicitly stated that one motivation for so doing was to introduce mentalistic aspects into the notion of *symbolic rheme*. This is clearly related to the mentalistic senses of 'meaning'. The other lines are related in such obvious ways as to need no further explanation.

b. Components of Meaning. In addition to the above relationships between senses of 'meaning' and the external components of signs, there is ample precedent for talking about 'components' of meaning -- for talking of meaning as if it could be thought of as consisting of component parts of some kind.

As early as the thirteenth century, the terminists, whose theories of meaning were greatly influenced by natural language, were treating many components of meaning. Peter of Spain, who gave terministic logic its classical form [1430, XIV.228b], for instance, gave an extensive treatment to syncategorematic meaning, the meaning of supposition, the meaning of signification, as well as lesser treatments to other components [1112; 1113].

Frege [100,p87] clearly spoke of three components of meaning: *nominatum*, *sense*, and *image*; while Lewis [171, p55] suggested four: *denotation*, *comprehension*, *connotation*, and *signification*, which he called 'modes of meaning'. On the other hand Carnap deliberately narrowed his point of view to explicate only two components of meaning,

extension and intension; but he explicitly referred to these as 'components', and also mentioned at least three other components -- emotive, motivative, and associative [45, pp6, 60, & 118fn].

To give a different kind of analogy, we can justify the notion of *components* of meaning by noting the different ways we can fail to understand the meaning of a sign, or as O & R called it, the different 'levels of failure' [213, p209].

Table 6. O & R's Levels of Failure of Understanding

- | |
|--|
| <ol style="list-style-type: none"> 1. deafness: failure at the sound, or medium level 2. foreign language: failure at the shape level 3. unfamiliar experience: failure at the referent level 4. unfamiliar relationships or properties: failure at the ground level <p>etc.</p> |
|--|

Each level of failure corresponds to a component of meaning. For instance, we can have perfect hearing and yet fail to understand a word because it is in a foreign language. In this case we have understood the medium component of meaning -- have understood that the sound was meant as a word but not which word it was -- and have failed to understand all other components. We are of course assuming the case where the subject is totally unfamiliar with the language, not where he understands the syntax and merely lacks a sufficiently large vocabulary. In this case he could be said to understand both the medium and the linguistic context components and to have failed all others. In another case,

where the subject understands the syntax and recognizes the word, but simply cannot remember from his vocabulary drill what the word stands for, he can be said to understand the medium, shape, and linguistic context levels and to have failed at all other levels.

Another motivation for calling the senses of 'meaning' different components of one concept of *meaning* concerns what have traditionally (and loosely) been called the 'functions' of language. In a sense these are just different components of meaning. O & R observe that meaning has a number of functions, or components:

In ordinary everyday speech each phrase has not one but a number of functions. We shall in our final chapter classify these under five headings; but here a two-fold division is more convenient, but the division between the symbolic use of words and the emotive use ... Under the symbolic function are included both the symbolization of reference and its communication to the listener, i.e., the causing in the listener of a similar reference. Under the emotive function are included both the expression of emotions, attitudes, moods, intentions, etc., in the speaker, and their communication, i.e., their evocation in the listener ... The two functions under consideration usually occur together but none the less they are in principle distinct. [213, p149f].

They also warn that, "The realization of the multiplicity of the normal language function is vital to a serious approach to the problem of meaning." [213, p193].

But the notion of *language function* also generates another motivation for meaning component. O & R use the notion of *language function* to develop a test to determine which function a particular use is serving, [213, p150]. This test can be easily generalized to show more functions, and hence more components. Their test for symbolic or emotive use depends on whether the use is true or false in the ordinary scientific sense. If this question is relevant, then we have symbolic use; if irrelevant, then emotive use. But let us look at the following sentences:

1) I wake and feel the fell of dark, not day.

.....Gerard Manley Hopkins.

2) Atlanta is the capital of Georgia.

3) A unicorn has one horn in the middle of its forehead.

4) A unicorn has two horns in the middle of its forehead.

Applying O & R's test to the first two sentences we find that 1) is emotive and 2) is symbolic; but now what about 3) and 4)? The question of ordinary scientific truth or falsity could hardly be germane here since zoology tells us that there are no such things as unicorns, and yet there is a sense in which 3) is true and 4) false. Uses 3) and 4) could not be classed as emotive in the way that 1) is and the relevance of some sense of truth in their regard verifies this. The notion of cognitive truth is just not relevant to 1). Thus the two functions--symbolic and emotive -- of language prove insufficient against this generalized O & R test. If we break O & R's 'symbolic' function into 'extensional' and 'intensional' functions, then 1) is still emotive, but 2) is extensional while 3) and 4) are intensional. It is probable that this test could be still further refined so that it could test for all components of meaning. See VI.C.1 for additional suggestions towards this end.

In section II of "The Problem of Meaning in Primitive Languages" [213, p300ff], Malinowski gives an actual utterance taken down from a conversation of natives in the Trobriand Islands, N.E. New Guinea. The example is too long to repeat here but it serves as empirical evidence of the many components of meaning. Malinowski's analysis shows that sociology and psychology as well as linguistics is necessary

for an understanding of meaning. His [213, p324] term "stages of meaning" is similar in structure to O & R's "levels of meaning", and my "components of meaning".

A five-fold theory of meaning developed by H. Gomperz [658] is outlined by O & R, [213, p275]. In this theory, meaning is a five component entity. On p277 they also outline another componential theory of meaning developed by Baldwin in Chapter 7, Vol. II of [367]. Baldwin relates certain components of meaning to certain question words. For instance the referent is related to 'what', the ground to 'why', etc. Kotarbinski [153] speaks on the various modes of understanding (clear vs. distinct, a la Leibniz) and the various components of meaning (image, extension, intension, etc.).

All of these lines of evidence seem to indicate that it might be useful to consider that meaning in NL has nine components. I therefore take this as my working hypothesis for the purpose of developing a language for analyzing empirical data about NL meaning. My hypothesis is that meaning has the nine components listed in Table 1 and these correspond one-for-one to the nine external components of symbolic rhemes listed in Table 5.

c. An Interesting Speculation. As an aside, it might be interesting to speculate that if iconic or indexical signs (not indexical symbols which are symbols, not indexes) have fewer components than symbols, then iconic or indexical meaning would have fewer components than symbolic meaning. However, I do not intend to follow up on this speculation until after the completion of my researches on NL*.

*Recent work in the Universal Structure Theory of Signs indicates this speculation is true.

5. Symbolic Dimensions of Semiosis

a. Derivation of Morris' Three Dimensions of Semiosis from Peirce's Triadic Relation. The first in-depth analysis of the representation relation only occurred after the rise in interest in symbolic logic in the mid-nineteenth century and was performed by Charles Peirce who analyzed it into its simplest component relations, but found a certain triadic relation was *essential* and could not itself be further reduced. This relation involves the sign with other signs in its semiotic context, the object for which it is the representamen, and the interpretant, or sign of interpretation in the mind of the cognizing body.

Morris in 1938 defined three dimensions of semiosis, [205]. The study of the relations between the sign and its semiotic context is called 'SYNTACTICS' and these relations make up the 'SYNTACTIC' dimension. The study of the relations between the sign and its object is called 'SEMANTICS' and these relations make up the 'SEMANTIC' dimension. Finally, the study of the relations between the sign and its interpretant is called 'PRAGMATICS' (mainly in honor of Peirce's philosophy of pragmatism) and these relations make up the 'PRAGMATIC' dimension.

These definitions have been accepted by many recent philosophers, logicians, and linguists as standard [461, p9; 189, p5f&11; 190], but not by all. However, the third one has had varied interpretations. The most usual variation is to replace the word 'interpretant' with the word 'interpreter' yielding pragmatics as the study of the relations between the sign and its interpreter. The usual reason given for this variation is to make of pragmatics a behavioral study rather than a mentalistic study. Morris himself used both variations at times and

did not always distinguish between them.

The ten sign categories resulting from Peirce's three-way analysis according to the triadic relation of semiosis into modes of existence, modes of reference, and modes of interpretation are shown in Figure 6. Morris' three dimensions of semiosis can be obtained either from this categorization scheme or directly from the triadic relation of semiosis by abstraction. The mode of existence of a sign is the manner in which it enters into a semiotic context with other signs. If we abstract from the three modes of existence we are left with the relations between the sign and its semiotic context, which forms Morris' syntactic dimension. If we abstract from the three modes of representing the object we are left with just the notion of a relation between the sign and its object and these relations make up Morris' semantic dimension. Finally, if we abstract from the three modes of interpretation we are left with just the notion of a relation between the sign and its interpretant and these relations make up Morris' pragmatic dimension. Morris' three dimensions of semiosis are thus seen to arise directly from the triadic nature of Peirce's basic representation relation and the three external components determined by this relation.

b. Necessity for Additional Dimensions. However, these notions of dimensions do not take into consideration the other parts of the overall representation relation that do not appear in the essential triadic relation, such as the ground of the sign, its behavioral context, etc. We need to very carefully distinguish all external components of the sign and the relations occurring between the sign and these components. In particular we need to not prejudge the issue as to which of these relations are independent or primary and which are dependent or subsidiary.

Accordingly I follow Morris in setting up one semiotic dimension for each of the external components of the symbolic rheme, and for our nine component notion of a symbolic rheme we will thus end up with nine dimensions. If some of these turn out to be redundant, the empirical evidence will tell us so and I will be happy to simplify the notation at that time. In the meantime we will have been objective and maintained our ability to analyze all necessary distinctions.

These nine dimensions will be defined in Section D along with their meaning components and other words necessary to carry out an analysis of word meaning for NL.

6. Summary

- a) I have distinguished between the internal and external structure of signs,
- b) and between six levels or modes of meaning.
- c) I have mentioned Aristotle's symbolic principle in which he identifies NL with a symbol system.
- d) These lead to an identification of the meaning of words in NL with the internal structure of symbolic rhemes.
- e) I have observed the close relationship between the senses of the word 'meaning' and the external components of a symbolic rheme
- f) leading to a working hypothesis of meaning for NL words that takes this concept to be an entity that has nine components.
- g) I have derived Morris' three dimensions of semiosis from Peirce's triadic representation relation, but
- h) for our further studies we need to maintain the independence of each component of meaning until empirical facts dictate otherwise,

- i) leading to my notion of the nine dimensions of semiosis.
- j) I will give names to and define each of these components and dimensions more clearly in Section D.

D. Definition of Terms

Man, when you got to ask what it is, you'll never get to know.

Louis Armstrong: on being
asked to define New Orleans
jazz

The first cause of absurd conclusions I ascribe to the want of method; in that they begin not their ratiocination from definitions.

Thomas Hobbes

We are ready to turn now to the third suggestion of Ogden and Richards. This is a suggestion to develop a terminology sufficient to distinguish all the subtle differences and connections that may be anticipated in any new investigation.

Thus my intention in this section is to define a terminology for analyzing the empirical data relevant to a theory of meaning for natural language words. I intend to build this terminology around the knowledge of the senses of 'meaning' summarized in Table 1, the insight into the structure of symbols given by Table 5, and the relations that have been observed between 'meaning' and other words that I have already mentioned or alluded to. In Chapter IV and V, I shall show by examples that the resulting language is not only true observationally, descriptively, and explanatorily adequate in Chomsky's sense, but is also able to discuss phenomena in diverse fields in a unified way whereas it was formerly necessary to use separate and distinct languages for what was

separate but not always distinct phenomena.

The basic structure of this terminology is given in Table 7, where all the 'meaning' related words are displayed in a matrix with one row for each basic 'meaning' related concept and one column for each component of the symbol. Each of these words will be explicitly defined in the following subsections, or the appendices. The terms which are explicitly exemplified in Chapters IV and V are defined in this chapter, while those terms which are necessary to complete the language, but which are not necessary for the specific examples I have chosen for Chapters IV and V are reserved for Appendix C. All terms are listed alphabetically in Appendix A. In D.2, I define names for each of the nine semiotic dimensions of symbol analysis; in D.3, names for each components of meaning; and in D.4 all other related or auxiliary terms. Psychological terms related to meaning, and terms for the relations between value, meaning, and definition are defined in Appendix C. D.5 is a summary of the chapter.

2. Dimensions of Symbolic Analysis

The medium of the sign is the vehicle whereby the sign becomes embodied and altho a symbol as such is only a general law and has no medium it only becomes existent thru the medium of its tokens. Thus a symbol has physical existence or being only thru the medium of its tokens that it is able to generate. We thus define 'ONTOTICS' to be the study of the relations between the sign and the mediums that it can or does determine. This set of relations constitutes the ONTOTIC dimension of semiotics.

The shape of the sign within some medium completes the embodiment of the sign and is the vehicle whereby the sign can be distinguished

TABLE 7: THE LANGUAGE OF MENETICS

CONCEPT	DIMENSIONS, COMPONENTS, AND MODES OF THE SYMBOLIC RHEME								
SEMIOTIC DIMENSIONS	SYNTACTICS			SEMANTICS			PRAGMATICS		
External Component	Medium	Shape	Semiotic Context	Object	Ground	Cognitive Interpretant	Social Context	Interpreter	Emotive Interpretant
Symbolic Dimension	Ontotic	(Morphotic)	Tagmatic	Diectic (Extetic)	Hypotic (Intetic)	Noetic (Cognetic)	Contotic	Ergotic	Emotic
Internal Component	Ontosion	Eidension	Tagmension	Extension	Intension	Cognition	Contension	Purporsion	Emosion
Action of the Sign	Ontote	{Impote Import}	Tagtote	Denote	Connote	Cognote	Contote	{Purpote Purport}	Emote
Unit Vector	Ontoseme	Eidenseme	Tagmenseme	Extenseme	Intenseme	Cogniseme	Contenseme	Purporseme	Emoseme
Ontological Marker	Oncept	{Eicept Eidecept}	Tagcept	Sept	Concept	Cogcept	Contcept	Purcept	Emocept
Investigators	Hartley Galoor	Hartley Kolmogorov Bloomfield	Chomsky Kemeny	Aristotle	Mill	Ogden & Richards Frege	Malinowski Hayakawa	Morris Quine Kaplan	Osgood
Measures	Channel Capacity	Complexity Algorithmic Information	Grammaticalness	Degree of Similarity	Degree of Synonymy	I Q		Interpretation Response Rate	Anxiety
Example	Unpunched Punch-Card	28	'(' 'Not'	'Albert Einstein'	'Brown'	'Knows' 'Believes'	'Ought'	'Do'	'Good'
Psychological	Phatic	Eidension-istic	Systemic	Referential	Intension-istic	Mentalistic	Contention-istic	Behavior-istic	Emosion-istic
Characterization	(Ontosion-istic)		(Tagmistic)	(Extension-istic)		(Cognition-istic)		(Purporsion-istic)	
Logic		Formation Rules	Transformation Rules	Predicate	Modal	Epistemic	Moral	Command	Emotional
Mode of Definition		Abbreviation	Contextual	Ostensive	Attributive		Rule Giving	Operational	Persuasive Ideal (?)
Reliability	Realizable	Well-Formed (WFF)	Provable Derivable	Truth	Analytic Necessity	L-Truth			
Whose Study is		Morphology	Syntax or Tagmatics but (Not Syntactics)	Epistemology	Theory Intension-ology Science	Philosophy	Ethics	Behaviorism	Esthetics
Evaluation		Proper	Correct	Valid	Convincing			Adequate Appropriate Persuasive	Effective
Mode of Reasoning		Construction	Deduction	Observation	Induction	Abduction		Syncretion	
Intelligence				Intuition	Intellect	Imaginative		Creative	Emotional
Nervous Subsystem				Sensory System	Central Nervous System	Autonomic (?)		Somatic (Motor) System	Autonomic (?)
Wisdom				Knowledge & Beliefs	Understanding		Culture	Experience Obedience	Sensitivity
Form of Inquiry				Denotative	Science Conotative	Philosophy	Sociology	Technology	Criticism
Stage of Action				Perceptual	Conceptual	Theoretical		Prescriptive Manipulatory	Appraisive Consumatory
Mode of Understanding									
Q-Word			Mathematical	Clear WHAT	Distinct HOW			Adequate WHY	
Value Dimension				Detachment				Dominance	Dependence
VALUE				Significance					

from other distinct signs embodied in the same medium. Again, since a symbol as such is only a general law and has no inherent shape it only becomes fully embodied in a token when it determines both a medium and a shape. We thus define 'EIDONTICS' to be the study of the relations between the sign and the shape of the medium that it can or does determine. This set of relations constitutes the EIDONTIC dimensions of semiotics.

TAGMATICS is the study of the relations between the sign and its semiotic context. This set of relations constitutes the TAGMATIC dimension of semiotics.

DIECTICS is the study of the relations between the sign and its object. This set of relations constitutes the DIECTIC dimension of semiotics. 'EXTETIC'* would be a possible alternative to 'deictic'.

The ground of a symbol determines the relationships whereby it determines its object. HYPOTICS is the study of the relations between the sign and its ground. This set of relations constitutes the HYPOTIC dimension of semiotics. 'INTETIC'* would be a possible alternative to 'hypotic'.

NOETICS is the study of the relations between the sign and its cognitive mentellect. This set of relations constitutes the NOETIC dimension of semiotics. CONTOTICS is the study of the relations between the sign and its behavioral and social context. This set of relations constitutes the CONTOTIC dimension of semiotics.

ERGOTICS is the study of the relations between the sign and its user, or interpreter. This set of relations constitutes the ERGOTIC

* I am greatly indebted to Professor Theodor Langenbruch of the Modern Languages Department at the Georgia Institute of Technology for the suggestion of these names.

dimension of semiotics.

EMOTICS is the study of the relations between the sign and its emotive mentellect. This set of relations constitutes the EMOTIC dimension of semiotics.

3. Meaning Components and Other Internal Concepts

In accordance with subsection C.4 where I noted that there is one sense of 'meaning' for each component of the symbol and that we may treat these as components of meaning, I define in this section names for each of these components of meaning. The names are assigned to correspond to the semiotic dimension determined by the external component of the symbol related to the component of meaning under consideration and in analogy with the two components of meaning that currently have the most widely accepted nomenclature: 'extension' and 'intension'.

The ontotic component of meaning is that sense of the word 'meaning' which corresponds to the medium of the token of the symbol. It is the meaning that is related to the linguistic medium. There being no other previously used term that I have found for this component, I therefore call this the 'ONTOSION' of the sign. This is the meaning of sensory discrimination, or sensory recognition. Further discussion of this component of meaning can be found at III.B.2; IV.F; V.B.1; and V.C.1.

The eidontic component of meaning is that sense of the word 'meaning' which corresponds to the shape of the symbol type. It is the meaning that is related to the linguistic shape. There being no other previously used term that I have found for this component I therefore

call this the 'EIDENSION' of the sign. Further discussion of this component of meaning can be found at III.B.3; IV.G; V.B.2; and V.C.2.

The tagmatic component of meaning is that sense of 'meaning' that is related to the linguistic context. It is the meaning that is coded into the syntax. Altho minimal elements of this type of meaning have sometimes been given special names, such as 'syntagmemes', the type of meaning itself has not, that I have been able to discover, received a special technical name of its own other than 'syntactically coded meaning',* where the word 'syntactically' refers to the linguistic context of the sign rather than being the adverb form of Morris' word 'syntactic' which has a broader meaning as we shall see in Chapter V. I therefore call this component the 'TAGMENSION' of the sign. The words 'tagmatics' and 'tagmension' were chosen over 'syntactics' and 'syntasion' in order to avoid just this confusion with Morris' terminology. Further discussion of this component of meaning can be found at III.B.4; IV.H; V.B.3; and V.C.3.

The deictic component of meaning for a term is that sense of meaning that is related to the class of entities of which that term is truly predicated. It is the meaning associated with the notion of 'truth' and 'falsity', and therefore in part the meaning of the scientist. As the most analyzed component of meaning, by far, this component has received many names in literature. Among these are: 'extension', (Carnap); 'nominatum', (Frege); 'signification', (Hispanus); 'denotation', (Mill); and 'designation', (Martin). While each investigator may refer to slightly different concepts, all are related to the class of entities of

* But note paradigmatic meaning and syntagmatic meaning.

which the term is truly predicated and all seem to fall somewhere between the two extreme concepts of Frege's *nominatum* and Carnap's *extension*. Since Carnap's concept is the one most thoroughly worked out in detail, I choose to honor Carnap by calling this component the 'EXTENSION' of the sign, without committing myself at this time as to whose previous concept it most closely matches, if any. I hope to show later that my concept of *extension* when examined from one viewpoint is equivalent to Carnap's *extension* and when examined from another, to Frege's *nominatum*.

Among the candidate terms, the three ending in 'tion' are undesirable because they are open to the action/result ambiguity of most 'tion' nouns; while 'nominatum' has been specifically identified with Frege and his particular substitutivity conventions. It has the added disadvantage of sounding strange to the American ear. Another possible candidate, 'referent', (Ogden & Richards), has the disadvantage that its plural form is homonymous with 'reference', a word with an entirely different meaning. Further discussion of this component of meaning can be found at III.B.5; IV.I; V.B.4; and V.C.4.

The hypotetic component of meaning is that sense of 'meaning' that is related to the way the class of things denoted by the word is given by the word. It is determined by the ground of the sign. This is the meaning intended by the philosophic concepts of intension such as 'properties', 'concepts', and 'relations'.

Next to extension, this component of meaning has probably received more philosophic attention than any other. It therefore has also been referred to by various names and been explicated by various

similar but distinct concepts. Among the names appearing in the literature are: 'supposition', (Hispanus); 'connotation', (Mill); 'sense', (Frege); and 'intension', (Carnap). I again rule out the two terms ending in 'tion' for the same reason as before, and the term 'sense' has also received a specific association with Frege's substitutivity conventions. And also again, altho 'intension' has been used by more than one investigator to denote similar concepts, Carnap's concept of *intension* has been worked out with the greatest thoroughness. So I again want to honor Carnap by calling this component of meaning the 'INTENSION' of the sign. Again I do not mean to imply that my concept of *intension* is the same as Carnap's or anyone else's. But also I hope to show later that my concept of *intension* when examined from one viewpoint will be equivalent to Carnap's and viewed from another, to Frege's *sense*. Further discussion of this component of meaning can be found at III.B.6; IV.J; V.B.5; and V.C.5.

The noetic component of meaning is that sense of 'meaning' that is related to the cognitive intellect of the sign. This type of meaning has been mentioned often in the literature because of its importance for thinking, reasoning, etc. However, it is usually not clearly distinguished from emotion which is defined later in this subsection.

Since there is no uniformly accepted designation for this component and since it refers to a mentalistic event in the mind of the cognizing body, I call this component the 'COGNITION' of the sign.

Despite the great amount of interest in this component of meaning, little of substance seems to be known about it, other than that it is

somehow related to other important mentalistic concepts such as images, ideas, and thoughts. Further discussion of this component of meaning can be found at III.B.7; IV.K; V.B.5; and V.C.6.

The contotic component of meaning is that sense of 'meaning' that is related to the behavioral context of the word. It is the meaning that has been encoded into language by society by its habits of social usage. Altho this component has been mentioned by both Malinowski and Hayakawa, it is one of the least studied components of meaning, and seems to have received no special name in the literature. Perhaps this lack of emphasis is due to the fact that this meaning component has its greatest importance in languages of non-western societies. Since there is no previously used term to signify this concept, I therefore call this component the 'CONTENSION' of the sign. Further discussion of this component of meaning can be found at III.B.8; IV.L; V.B.8, and V.C.7.

The ergotic component of meaning is that sense of 'meaning' that is related to the way in which the word is used. It is associated with the interpreter of the sign. This component was investigated by Kaplan in his PhD thesis [139], where he called it the 'purport' of the sign. Like eidension, it is also very strongly related to the meaning of art. I want to keep Kaplan's terminology, but modify it slightly to fit our previous analogy. I therefore call this component the 'PURPORSION' of the sign. Further discussion of this component of meaning can be found at III.B.9; IV.M; V.B.7; and V.C.8.

The emotic component of meaning is that sense of 'meaning' that is related to the emotive mentellect of the sign. This has been referred to in the literature as 'emotive', (Ogden & Richards);

'evocative', (Pollock); and non-cognitive; (Feigl). The literary and journalistic sense of the word 'connotation' as opposed to the philosophical and logical sense originated by Mill, is the associations in the mind to which the denotations (or dictionary meanings) give rise, [127, pl7fn]. Hence this is also a reference to what I shall call 'EMOSION' in systematic analogy to the other components of meaning. Further discussion of this component of meaning can be found at III.B.10; IV.N; V.B.6; and V.C.9.

4. Other Semiotic Terms

In this sub-section I define other semiotic notions relative to the semiotic dimensions of the symbol, including the action of the sign in determining a meaning component, the ontological characterization of the meaning components, and example words from the American language.

For the action of the sign in determining its meaning component in a particular dimension and the ontological characterization of that component I take as a model the following sentence: 'In the *deictic* dimension, a sign *denotes* its *extension*, which is a *set of objects*.'

I do not mean to imply anything about the ontological status of the meaning components by setting up these words. They are merely ontological place markers. I do this only in following O & R's third suggestion, so that we have a language available at any time it becomes necessary.

I form the word 'ONTOTE' in analogy to 'denote' and 'connote'; and the word 'ONCEPT' in analogy to 'concept' and 'purcept'. We may then say: In the *ontotic* dimension, a sign *ontotes* its *ontosion*, which is an *oncept* of the *medium*.

As an ontotic example we might have a punch-card with no holes

punched in it, for as soon as we punch holes in it we have a shape as well as a medium. I can't imagine an example from natural language where we would have an ontotic component and nothing else.

The word 'IMPOTE' (or 'IMPORT')* is formed from Kaplan's word 'import' in analogy to 'denote' and 'connote'; and the word 'EICEPT' (or 'EIDENCEPT')* in analogy to 'concept' and 'purcept'. We may then say: In the *eidontic* dimension, a sign *impotes* its *eidension*, which is an *eicept* of its *shape*.

As an eidontic example we might have some random doodle such as '*du*' which altho it has a shape is not even a sign because it has no object, etc.

The words 'TAGTOTE' and 'TAGCEPT' are formed by the above analogies, allowing us to say: 'In the *tagmatic* dimension, a sign *tagtotes* its *tagmension*, which is a *tagcept* of its *semiotic context*.

The left perren, '(', or propositional negation sign ' \neg ', in logic or the word 'not' in American are examples of symbols that have primarily tagmatic meaning.

Of the many words in the literature used to name the deictic action of the sign in standing for its object, such as 'denote', 'signify', 'designate', and 'refer', (each of these is also used in other senses as well), I choose to use 'DENOTE' in its univocal sense. Altho 'denote' has been used in this sense thruout the literature, it is most often used in the sense of 'denoting multiply'. Martin [87] uses 'designate' in the same sense that I use 'denote'. Frege said, "We let a *sign* *designate* its nominatum.", [100, p89]. The reason I use 'denote' in this way is because of its similarity to 'connote'

*The linguistic ear will make the final decision if it ever becomes necessary to make much use of any of these words.

and the ease with which it forms nonhomonymous analogs.

The word 'SET' is used in analogy to 'concept' and 'purcept' to represent the ontological entity formed by the object of the sign. 'Class' and 'set' in their technical senses have traditionally been used in this function but the issue is not clear. Quine has taken the notion of 'class' as primitive, the object of signs to be classes, and attempted to explicate intensions in terms of classes but did not succeed [245]. Carnap on the other hand has taken 'concepts' as his primitive concept, the intension of signs to be concepts, and shown how the notion of 'class' may be explicated in terms of 'concepts' [45]. There are also the subtle differences between classes, names of classes, symbols for classes, and symbols for the names of classes which are not always distinguished. By using the neutral word 'set' we avoid prejudicing the objective reality until a proper determination can be made. Sets may very well turn out to be nothing more than classes, but again they may not, and if they do we shall be very happy to acknowledge that fact. This discussion by the way is independent of the ambiguity of the word 'class' due to the different concepts of *class* which arise from the different forms of class theory which are presently prevailing. If indeed, sets turn out to be classes, the theory should tell us which concept of *class* is required to fit the semiotic facts.

The proper use of these words thus allows us to say that in the *deictic* dimension, a sign *denotes* its *extension* which is a *set* of its *objects*.

Proper names such as 'Albert Einstein', have a very strong deictic component and altho there has been much debate thruout philosophy as to whether there is any further 'meaning' to a proper name -- such as

an intension -- it is clear that the extension of a proper name is its principle meaning component.

While the hypotetic action of the sign in standing for any object with respect to the proper ground has received several names in the literature -- 'connote' and 'express' are the principle two -- there are not nearly so many as for the deictic action. Frege said, "We let a *sign express* its sense . . .". [100, p89]. Since the time of Mill, 'CONNOTE' has been the best accepted term for this concept. It has the additional advantage of easily forming nonhomonymous analogs.

Concept is an old philosophical concept. Carnap has explicated concepts as the intensions of signs [45]. 'Concept' and 'purcept' are naturally analogous and easily form other nonhomonymous analogs. I therefore adopt 'CONCEPT' as the name for ontological entities which form intensions of signs without in any way implying that 'concepts' are to be explicated in Carnap's way.

Our model sentence using these two words becomes: In the *hypotetic* dimension, a sign *connotes* its *intension*, which is a *concept* of its *ground* (or *properties*).

'Brown' is a good example of a word whose intension is the most important component of its meaning. The ground associated with this sign is the property of being colored and having a certain color.

'Brown' connotes any object with respect to its having that certain color. The concept associated with 'brown' is abstracted from the property of being brown colored. The intension of 'brown' is that any object denoted by 'brown' is so denoted because it has this property.

'Brown' also has an extension -- the set of all past, present, and future existing brown things -- altho this is not nearly so important as its

intension.

I form 'COGNOTE' and 'COGCEPT' by the standard analogy. Altho 'image', 'idea', and 'thought' occur frequently in the literature I have found no generic term which includes all of these. 'Cogcept' fills this role. Thus images, ideas, and thoughts are all cogcepts just as properties, relations, and individual concepts are all concepts. In the *noetic* dimension, a sign thus *cognotes* its *cognition*, which is a *cogcept* of its *cognitive mentellect*.

'Knows' is a example of a word whose meaning is primarily neotic since it describes a mental, cognitive, interpretation of some cognitive sign.

Altho both Malinoski and Hayakawa discussed the importance of the contotic component of meaning, neither attempted to analyze it in any systematic detail. No names have been found which represent the contotic action of a sign in determining its contension or to mark the ontological place of contensions. The words 'CONTOTE' and 'CONTEPT' are formed by the by now standard analogy, allowing us to say: In the *contotic* dimension, a sign *contotes* its *contension*, which is a *concept* of its *social context*.

The meaning of the word 'ought' seems to be predominantly contotic.

I have found just two words in the literature to describe the ergotic action of a sign in determining its purporsion: 'express' and 'purport'. I have found no analysis of 'express' whereas Kaplan's analysis of 'purport' is worked out in some detail, [139]. I therefore adopt 'PURPOTE' (or 'PURPORT')* for this purpose. I will use 'PURCEPT' to mark the ontological place of purporsions. We can thus say that

in the *ergotic* dimension, a sign *purpotes* its *purporsion*, which is a *purcept* of its *interpreter*.

'Do' is an example of a word whose meaning is primarily ergotic.

Much of the discussion of the mentalistic aspects of meaning in the literature have not distinguished between the noetic and emotic factors. However O & R did distinguish between what they called the "symbolic interpretant" and the "emotive interpretant". Because of a lack of terminology in the literature, I form 'EMOTE' and 'EMOCEPT' by the previous analogies. Feelings, emotions, etc. are emocepts which is thus a generic term for these kinds of things. In the *emotic* dimension, a sign *emotes* its *emosion*, which is an *emocept* of its *emotive mentellect*.

The meaning of the word 'good' is primarily emotic.

5. Summary

The main function of this chapter has been to develop a language of menetics. The development centered around an observation that the various senses of 'meaning' that have appeared in the serious literature on the subject equal in number the components of the semiotic concept of *symbol* and bear a fundamental similarity on a one-for-one basis.

Table 7 is a listing of all principle terms and the senses in which they should be taken. I have used the term 'definition' loosely for this as it is not the result of serious explication, but the starting point for it.

Having developed this much language to serve as surveyor's stakes I want to move next to analyze the empirical data on meaning in

natural language and the various empirical laws that hold for this corpus. It may be that once the explorations move out into the field, the set of markers originally developed will prove too limited or inflexible to handle all the uncharted mountains we will encounter. If so, I stand ready to modify the system, I only claim it as a starting point.

CHAPTER IV

SOME EMPIRICAL LAWS OF MEANING

Get your facts first, and then you can distort them as much as you please.

_____ Mark Twain

A. Introduction

"I meant by 'impenetrability' that we've had enough of that subject, and it would be just as well if you'd mention what you mean to do next, as I suppose you don't mean to stop here all the rest of your life."

"That's a great deal to make one word mean," Alice said in a thoughtful tone.

"When I make a word do a lot of work like that," said Humpty Dumpty, I always pay it extra."

_____ Lewis Carroll: Humpty Dumpty

In section III.C.4, I developed a concept of *components of meaning* whose original motivation stemmed from philosophical analysis, and in III.D, I developed a terminology for talking about all possible components of meaning. Now how many of these so-called components are actually required by the menetic data at hand? What is the empirical support for each one? My purpose in this chapter is three fold: 1) to show by example how the language of menetics may be used to discuss the data, the laws, and the theories of menetics; 2) to show by example how one could assemble enough empirical data to motivate a menetic theory of words that requires word meaning to have each of the nine components previously discussed; and 3) to show by the same examples some of the various empirical methods that are available to meneticists for discovering

menetic laws and developing menetic theories.

A word of warning is necessary concerning the second of the above purposes. It will not be possible within the scope of a thesis to assemble enough data and laws to actually motivate the suggested theory. In a search for such laws, more than a hundred were found before I realized that each new book I examined would continue to have new laws and data that could be added to such a catalog. The scope of work intended for the thesis research would not allow time for the examination, analysis, and systematization of all of these laws. Accordingly I have given just a few examples for each component to motivate the expectation that such empirical bases may be established for each component.

It would probably never be possible to complete such a catalog because of the open ended texture of nature [298, p37], semiotic nature included. However, it is necessary to begin this task in order to actually carry out the design and analysis of menetic theory.

B. Meaning is Multicomponential: Illustrating the Method of Paradox

"The question is," said Alice, "whether you *can* make words mean so many different things."

"The question is," said Humpty Dumpty, "which is to be master -- that's all."

Lewis Carroll: Humpty Dumpty

We first ask why meaning must be multicomponential at all. Why can't meaning be simply one holistic thing, a scalar so to speak? G. E. Moore's paradox of analysis gives us an answer to this question. However, before I state the paradox, I want to say a few words about paradoxes in general as a scientific methodology.

1. The Method of Paradox

Russell thought that paradoxes (puzzles, antinomies) serve much the same purpose for the study of signs as labs serve for physical science, [261, p108]. Frege says much the same thing in [100]. Paradoxes are not laws. They are the experiments that generate the data upon which menetic laws are based. An observational meneticist must have a good command of the tools of paradox. G. E. Moore was a member of the British analytical school of philosophy and an astute observational meneticist. Norman Malcolm in Schilpp's Library of Living Philosophers claimed that:

No one can rival Moore as a refuter because no one has so keen a nose for paradoxes. Moore's extraordinarily powerful language-sense enables him to detect the most subtle violations of ordinary language. [181, p366].

In the case of paradoxes, the statement of the paradox itself is usually more striking than the statement of the law governing the data generated by the paradox and in the past the paradox has usually received a name whereas the data or law has not. Hence, I reverse my usual approach here and state the paradox first and then the law determined by the data generated by the paradox.

The use of the word '*sophisma*' in a technical sense probably stems from the Stoics, who employed it to designate the conclusion of an apparently well-constructed syllogism, which is nonetheless false or obscure. In modern times some --- but not all --- writers have divided sophisms into two categories: antinomies, in which the conclusion is believed to be false thereby implying an error either in the apparently true hypotheses or in the apparently sound reasoning; and paradoxes, in which the hypothesis and reasoning are believed to be true --- thereby implying that the conclusion is not really as simple or obvious as it was originally

thought to be. Other writers --- including this one --- simply use the word 'paradox' as a modern term for '*sophisma*' and leave unimplied thereby wherein the error lays.

By the fourteenth century, the sophism had taken on major philosophical importance as a highly sophisticated design tool for menetic theory. John Buridan's collection of topically arranged sophisms was one of the first by an individual author, [33]. Buridan's sophisms were arranged systematically so as to constitute an advanced treatise in the theory of menetics. Albert of Saxony, a later fourteenth century logician, compiled what was perhaps the largest collection, containing some two hundred sophisms, [340]. By the end of the fourteenth century, the paradox had become one of the fundamental methods meneticists had for generating empirical data and laws for designing and testing their theories.

One of the most famous paradoxes of all time is the Liar, also called 'The Cretan,' or 'Epimendides' Paradox,' [185]. However, this much debated paradox concerns the nature of sentential meaning and so does not fall within the scope of this thesis.

One of the most useful forms of paradox for menetics is the philosophical paradox. This is because the paradox usually stems from a misconceived idea of the nature of meaning and the unravelling of the paradox causes us to change our ideas about the structure of meaning. Malcolm says:

An empirical statement can be paradoxical and not be false. A philosophical statement cannot be paradoxical and not be false. This is because they are paradoxical in totally different ways. If an empirical statement is paradoxical, that is because it asserts the existence of empirical facts which everyone or almost everyone believed to be incompatible with the existence of other well-established empirical facts. But if a philosophical statement is paradoxical, that is because it asserts the impropriety of an

ordinary form of speech. It is possible for everyone to be mistaken about certain matters of empirical fact. ... But it is not possible for an ordinary form of speech to be improper. ... The way to treat a philosophical paradox is first of all to resist it, to prove it false. [181, p361f, p367].

We note that a menetic statement is an empirical statement and hence can be paradoxical and not be false. But a philosophical statement is not a menetic statement; a paradoxical philosophical statement is an instrument of menetics, an empirical tool which it can make use of.

We have thus seen that one of the empirical methods available to the meneticist is the method of paradox. We now look at a specific application of this method which shows that meaning must be multi-componential.

2. Moore's Paradox of Analysis

... If the verbal expression representing the analysandum has the same meaning as the verbal expression representing the analysans, the analysis states a bare identity and is trivial; but if the two verbal expression do not have the same meaning, the analysis is incorrect. [161, p323].*

This is Langford's version of the paradox. It assumes that there is one "thing" that is the meaning of a word or phrase. Moore hints that he also made this assumption when he said:

I have assumed that there is some meaning which is *the* ordinary or popular meaning of such expressions as 'The earth has existed for many years past'. [1041, p198] (*italics in the original*).

The data that this paradox generates concerns all of the uses of analysis in logic and philosophy. This data tells us that analysis is very often correct and nontrivial. As an example we can look to Einstein's analysis of the meaning of the word 'simultaneous'. Hence we must reject the assumption that meaning is monocomponential. The notion of one "thing" that is meaning is at fault and requires multiple meaning components, some of which are the same if the analysis is correct and some

*The underlines are my own.

others of which are different if the analysis is nontrivial. The data thus forces us to accept meaning as multicomponential.

The above analysis, is very similar to Langford's own analysis of the Paradox of Analysis. My analysis of the paradox is based on Frege's approach and employs many of Langford's arguments. Langford's analysis, in fact, is very Fregean altho he nowhere gives him the credit due or even cites his[100] as a prior work.

It would not be appropriate to develop my theory of analysis in detail in this thesis because my purpose is only to develop the language of menetics and to show its usefulness. However, since adumbrating my theory would show the usefulness of the language I will state here the conclusion of my analysis of 'analysis'. Analysis is closely related to definition and hence there may be as many different kinds of analysis as there are kinds of definition, i.e., the number of components of meaning. Langford mentioned two kinds of analysis in [161, p340] which he called 'Formal' (or syntactic analysis) and 'Conceptual' (or semantic analysis). However, both Moore and Langford had a particular kind of analysis in mind and it is this mode of analysis I have attempted to define. This is the mode Langford called 'conceptual' analysis. In [204, p662] Moore explicitly states that he does not mean by 'analysis', 'formal analysis'.

Just as Frege's notions of signification appear to be a useful starting point for a generalization to internal semiotics, his notions of truth and significance for mathematical statements appear to be a useful starting point for an analysis of *analysis*. In any case my analysis of the meaning of conceptual analysis looks very much like Frege's

analysis of the meaning of arithmetic equations [100].

Let us call what is to be analyzed the 'ANALYZED', and that which does the analyzing, the 'ANALYZER'; then analysis is correct if analyzed and analyzer have the same extension and intention; and the analysis is nontrivial if they have different cognitions. Further, the analysis is in the standard form if, in Langford's terms, the direction of change in the cognition is from the more idiomatic to the less idiomatic, i.e., if the analysis removes an idiom. Later we will see that this requirement may be simplified due to the fact that the intension of a term uniquely determines its extension, hence we may say: ANALYSIS IS CORRECT IF ANALYZED AND ANALYZER HAVE THE SAME INTENSION AND NONTRIVIAL IF THEY HAVE DIFFERENT COGNITIONS. The requirement that they have the same intension is equivalent to saying that the analyzed and analyzer are necessarily the same, or that the proposition expressing their identity is analytic in Carnap's sense of the word [45].

Langford suggests that:

One is tempted to say that there must be some appropriate sense of "meaning" in which the two verbal expressions do have the same meaning and some other appropriate sense in which they do not. [161, p323].

This is almost a verbatim quote of Frege's [100].

After defining 'analysandum' and 'analysans' as I have 'analyzed' and 'analyzer,' Langford proceeds to borrow the distinction between a phrase or sentence which can be understood on the first occasion of its use and one which cannot which the linguists use to distinguish a standard expression from an idiom. He next uses (I think) Pierce's notion of *ultimate-interpretant* as a habit of action (Langford uses the terms 'concept' and 'conscious habit') to analyze the notion of idiomaticity

thus bringing semiotics squarely into his own analysis. He is now ready to frame his definition of *conceptual analysis*.

Suppose that we have before us an analysis of a single idiomatic idea. Then, in passing from the analysandum to the analysans, we shall observe that there is, in some sense or other, a decrease in idiomatic content. The analysans will be more articulate than the analysandum; it will be a grammatical function of more than one idea. One who uses the verbal expression representing the analysandum will mention objects of a certain class; one who uses the verbal expression representing the analysans will mention these same objects, but will mention them descriptively by reference to other kinds of objects. The two verbal expressions will therefore not be synonymous; but the analysandum and the analysans will be cognitively equivalent in some appropriate sense. [161, p326].

Later he illustrates this with an example of 'orange' and 'intermediate in color between red and yellow' and then adds:

... there is a sense in which the expressions "being orange" and "being intermediate in color between red and yellow" do not have the same meaning, and there is another sense in which these expressions do have the same meaning. They have the same meaning in the sense that they mean the same things and yet, as Moore has on occasion put the matter, it is no accident that they do, as it would be if the terms red and round happen to apply to exactly the same objects. The sense in question is therefore stronger than that of having the same denotation and is yet not so strong that the two verbal expressions can be said to be synonymous. [161, p331].

When Langford says that the two expressions mean the same things or mention the same class, I take him to mean that the two expressions have the same extension. When he says that the two expressions will be cognitively equivalent in some appropriate sense or when Moore says that it is no accident that they denote the same class of objects as if 'red' and 'round' happened to apply to exactly the same objects and that the sense in question is stronger than extension and yet not as strong as synonymy, I take him to mean that the proposition equating the two expressions is analytic, or necessary [45] and that therefore the two expressions have the same intension. When both of them say the two

expressions are not 'synonymous' I take them to mean that they have different cognitions.

I would have preferred a usage of the terms 'synonymous' and 'cognitively-equivalent' that would have enabled Langford to say that the two expressions are synonymous but cognitively different in some appropriate sense. This would allow us to say both that we may not know the analysis of a term and that we analyze the meaning of a term. As Langford himself points out we may know how to recognize a cube but not know that a cube has twelve edges and yet "a cube is a regular polyhedron with twelve edges" is a legitimate analysis of 'cube', and 'cube' and 'regular twelve edged polyhedron' are synonymous in a certain sense.

Langford points out that when it is the purpose of analysis to produce a definition the motive is usually to create a concept that is more precise or less vague than some other previous concept, [161, p329]. Thus we see that explication is a form of analysis but we also see that analysis must concern signs or expressions of concepts and not concepts themselves. Because if analysis involved concepts we could not allow explication to relate two different concepts together and still be called 'analysis'.

Langford claims that Moore has not attempted to examine systematically the notion of analysis, [161, p323]. However, in his reply to Langford [204, p663], he does frame a definition of analysis which I believe is wrong even tho it helped me to arrive at my definition. He states:

If you are to "give an analysis" of a given *concept*, which is the *analysandum*, you must mention, as your *analysans*, a *concept* such that (a) nobody can know that the *analysandum* applies to an object without knowing that the *analysans* applies to it, (b) nobody can verify that the *analysandum* applies without verifying that the *analysans* applies, (c) any expression which expresses the *analysandum* must be synonymous with any expression which expresses the *analysans*.

It seems to me that (b) requires that the two expressions have the same extension, (c) requires that they have the same intension (it appears to me that Moore's use of 'synonymous' is not synonymous with Langford's 'synonymous' in this respect), and (a) requires them to have the same cognition.

Now there are two faults with this formulation of analysis. First of all it is not as useful as Langford's in that we no longer have a criterion of significance for analysis. "'Brother' means the same as 'brother'" is now just as significant an analysis as "'brother' means the same as 'male sibling'". We have lost the requirement for a cognitive distinction, or as Langford phrased it, nonsynonymity. In this respect Moore's definition does not even satisfy his own requirements since he says that 'brother' is not an analysis of 'brother'.

But there is a more serious fault with Moore's formulation that makes it not only less useful, but wrong as well. It seems to me that requirement (a) is mistaken. I may know that Tom is a brother without knowing that Tom is a male sibling; for instance if I don't know what 'sibling' means, and Moore gave the concepts of *brother* and *male sibling* as his examples of analysis. Similarly 'regular twelve edged polyhedron' is an analysis of 'cube' and as Langford showed, there are people who know perfectly well what a cube is but do not know that it has twelve edges.

Therefore I think we must stick with Langford's analysis of the paradox of analysis. Especially so since attempts to show directly that this analysis fails or is not necessary have themselves been shown faulty. Max Black [23] attempted to show that the paradox could be dispelled by a one component theory of meaning by using the notion of three-place relations, but Morton White [306; 290] was able to quash his arguments after an intermediate reply by Black [24].

3. The Paradox of Reference

If the meaning of a term is taken to be its extension solely then paradoxes can be constructed based on any two terms which denote the same set of objects unless they necessarily denote the same set of objects.

This is Katz's form of the paradox which is a restatement of Frege's form: *Terms with the same extension cannot always be substituted for each other without producing paradoxical results.*

Carnap [45, p133] calls this the antinomy of the name relation since from his point of view it was the name relation that was at fault. He credits Frege with the first observation of this regularity [100] and Russell with first noticing the paradoxical character [261]. However, both the regularity and its paradoxical nature were recognized already as early as the fourteenth century. Buridan's ninth sophism on connotation, [33, p124], is

(9) You know the one approaching.

Which in essence he derives by substitution of identical supposition as

You know your father. (T)

Your father = the one approaching. (T)

You know the one approaching. (F)

The conclusion is obviously false since Buridan posits the case that altho the one approaching is your father, he is yet too far away for you to discern who it is. If you are asked who he is, you must therefore answer truly that you don't know who is approaching.

In fact, Buridan even had a well-developed quantification theory for handling such problems, (which Quine, however, does not think is possible [245]):*

... the mentioned verbs, since they connote their reasons, confuse whatever terms are following them, so that one cannot make a descent to singulars by a disjunctive proposition. ... But a term occurring before the verb is not thus confused. So one can descend by disjunction. [33, pl38].

Frege gave as evidence for his conclusion the famous example involving the Morning Star and the Evening Star. A better example might be one used by Russell. He uses the sentence, 'George IV wished to know whether Scott was the author of Waverly.', and since 'Scott' and 'the author of Waverly' have the same extension, he substitutes the one in place of the other and gets, 'George IV wished to know whether Scott was Scott.'. Now the first sentence may be true but the latter is undoubtedly false, but it was obtained from the former by substituting terms with the same meaning (under the extension only assumption), and hence the result is paradoxical.

Katz stopped short of stating this as a law; I have completed it for him because the data he presents merits it, and he hinted at it strongly anyway. He begins by citing Frege's results, but gives additional

*'confuse' and 'descent' as here used are technical terms in Buridan's quantification theory.

data and improved examples, and then shows the possibilities of generating paradoxes from just about any co-extensional terms if extension is their only meaning. After citing Frege's example of 'Morning Star' and 'Evening Star' he says:

Further counterexamples of this kind abound: 'nine' and 'the number of planets'; 'creature with a heart' and 'creature with a kidney'; 'the largest city in America' and 'New York.' If the meaning of a term or expression is taken to be its referent(s), then paradoxes result such as that the meaning of a term 'New York' or the meaning of the expression 'the largest city in America' must change if Los Angeles surpasses New York in size, for then these two constructions will designate different objects. [143, p47].

The reason that these examples are improved upon Frege's is that it is possible that 'Morning Star' denotes Venus seen in the morning, while 'Evening Star' denotes Venus seen in the evening, thus it is not clear cut that these two terms have the same extension. While it is a clear cut biological fact that 'creature with a heart' and 'creature with a kidney' denote the same set of objects.

The above examples suggest that the problem lies in finding just those contexts in which substitutivity does and does not hold. It holds by definition in what Quine calls 'REFERENTIAL-POSITION,' or what Carnap calls 'EXTENSIONAL-CONTEXT'. It fails in what Quine calls 'OPAQUE-POSITION' and what Carnap calls 'NON-EXTENSIONAL-CONTEXT' (which includes intensional and nonintensional contexts). Carnap shows that some of the paradoxes disappear as soon as both extension and intension are required as meaning components.

Altho the Paradox of Reference was included in this section because of its wording, which is obviously menetic, it is not an independent observation. It is implied by Moore's Paradox of Analysis. If meaning is multicomponential, and if we take one of these components to

be extension, then extension by itself is insufficient to explain all of the menetic data, and this last statement is the resoltuion of the Paradox of Reference.

C. Meaning Cannot be the External Components: Illustrating the Method of Paradox

A modern day semiotician and meneticist who was master of the instrument of paradox was Ludwig Wittgenstein. He attempted to make explicit the absurdities that derive from misusing language. He claimed his purpose was, "to teach you to pass from a piece of disguised nonsense to something that is patent nonsense.", [320, #464.]

1. The Paradox of Absurd Construction

Katz [143, p77] credits Wittgenstein [320] with enabling us to see the absurdity in the view that a word's meaning is what it denotes.

If the meaning of a term is regarded as the object of that term itself and this object only, then in any NL true sentences can be constructed which would be regarded as absurd by any NNS of that NL.

Katz [143, p77] supposedly cites some of Wittgenstein's data from the first or second edition of [320], (but definitely not from the third). Typical examples are: "I broke part of the meaning of the word 'slab'.", or "I laid a hundred parts of the meaning of the word 'brick' today."

In aphorism #40 we find somethid very similar to Katz's examples:

When Mr. N. N. dies one says that the bearer of the name dies, not that the meaning dies. And it would be nonsensical to say that, for if the name ceased to have meaning it would make no sense to say "Mr. N. N. is dead."

Also at the beginning of aphorism #55 we find:

What the names in language signify must be indestructible; for it must be possible to describe the state of affairs in which everything destructible is destroyed. And this description will contain words; and what corresponds to these cannot be destroyed, for otherwise the words would have no meaning.

Katz credits Wittgenstein with debunking the theory that the meaning of a word is what it denotes. But Wittgenstein never mentions extension. He never claims that the meaning of a word, even the total meaning, is not the extension of the word. The culprit of the absurdities is not so much the object denoted as it is the concreteness of objects as against meanings. In the second quotation above, he says meanings must be indestructable, that is, they must be abstract.

We conclude from the paradox of absurd constructions that meanings must be abstract.

If meaning is extension alone, or in part, then extension must be abstract. The extension of 'brick' cannot be the physical bricks of the world themselves but something abstracted from them such as the set of all bricks or the name of this set. We might possibly regard sets as abstractions formed by putting the names of their members between braces, thus {Washington, Adams, Jefferson, . . .} is the set of presidents of this country altho we do not actually collect the men together or assemble the presidents themselves. We only collect their names. But notice that "Lee Oswald assassinated a member of the set of American presidents." is not absurd in the way that "Lee Oswald shot part of the meaning of 'American president'." is. Thus the members of sets are not the names appearing in the braces, but the objects mentioned.

2. The Generalized Paradox of Absurd Constructions

While Wittgenstein has concentrated on showing us the absurdity of regarding the objects of a sign themselves as part of the sign's meaning, this observation may be carried over to all of the external components of the sign. The generalized paradox of absurd constructions

may be phrased as follows:

If the meaning of a term is regarded as any external component of that term itself or any combination of external components of that same term and this combination only, then in any NL true sentences can be constructed which would be regarded as absurd by any NNS of that NL.

Let us look at a couple of examples. The meaning of beauty has often been said to lie in the 'eye of the beholder'. And just as some cognitive philosophers have said that the meaning of a term is the object it denotes, some affective philosophers might say that the meaning of a term is the interpreter that it purports. Assume for the moment then that the meaning of a term is its interpreter. Then it would make perfectly good sense to say

*1) I saw part of the meaning of 'Hello' this morning.

(Because the person I saw this morning said "Hello")

*2) Ten parts of the meaning of the lecture were in attendance.

whereas in fact, any NNS of English would regard both of these sentences as absurd.

Whereas there is a genuine relation between the meaning of a term and its interpreter, the purporsion of the term cannot be the interpreter himself. If meaning is purporsion alone, or in part, then purporsion must be abstract. It may be related to the interpreter but it cannot be the interpreter himself. It must be at least abstracted from it. The phrase '713' has a special purporsion for Hank Aaron but that purporsion is not the ball player himself, altho by a metaphorical twist '713' can be used to denote Hank Aaron. Aaron's purporsion of '713' is abstracted from all of his years of training, all of his muscle cramps, blisters, knee pains, and a whole winter of torture, but it is not those

physiological phenomena themselves. They are part of Hank Aaron himself, part of the interpreter of '713'. They are part of the external component, whereas meaning components are internal to the sign.

As another example, let us look to Wittgenstein himself who often said that the meaning of a sign was its use, or rules of use. Now as this was interpreted by various philosophers, 'rules of use' often came to mean 'linguistic rules of use', in other words, the linguistic context of the sign. The meaning of a term is the semiotic context that it tagmotes. If we assume this to be true then the following unobserved (because they are absurd) sentences should be generated:

- *3) In a declarative sentence, a verb is always preceded by part of its meaning.
- *4) Part of the meaning of a pronoun must be the same as part of the meaning of the verb.

Wittgenstein's insight is valid and his interpreters have found a useful interpretation of this insight. There is a relationship between the meaning of a term and its semiotic context, but the tagmension of a term cannot be the semiotic context itself. If meaning is tagmension alone, or in part, then tagmension must be abstract. It may be related to the semiotic context but it cannot be that context itself. It must be at least internalized.

3. Meaning Must be Internal to the Sign

We see from the generalized paradox of absurd constructions that the meaning of a sign cannot consist of any number of its external components so that if there is any validity at all to the insight that various aspects of meaning are related to various of the external

components then these aspects must consist of the internal sign components that are related to those external components. Meaning must be internal to the sign and therefore the components must consist of the internal sign components. Indeed there may be some justification for supposing that the entire internal structure of a sign consists solely of its meaning components and their mutual interrelationships.

We see within this section the justification for establishing the distinction between internal and external sign components. This distinction was first conceived, in fact, upon reading Katz's analysis of Wittgenstein. By use of the paradoxes that have troubled philosophers, Wittgenstein reminded us how to unravel one kind of these paradoxes. The generalized paradox of absurd constructions shows us how to unravel eight more kinds of paradoxes in addition to containing Wittgenstein's reminder as well. I suspect that several of these kinds of paradox have been extensively analyzed in the literature and that my solution is not new; but it is systematic. It systemizes the solutions to nine different kinds of paradoxes as well as perhaps offering new solutions to a few.

D. Meaning is More than Extension: Illustrating the Method of Observing Language in Use (by Bilinguals)

The symbol may, with Emerson's sphynx, say to man, of thine eye,
I am eyebeam.

Charles S. Peirce

1. The Method of Observing Language in Use

What counts as evidence for the laws and theories of menetics is partly the same data that counts as evidence for the laws and theories

of grammar: the linguistic behavior of the members of a language community. Certain utterances may be easily observed, other possible utterances may never be observed outside of a linguistics lab and by convention these are starred when used as data. In this section we will see how genetic inferences may be drawn from observing the linguistic behavior of bilinguals.

2. The Bilingual Dictionary Observation

In 1955, Carnap [45, p239] made the observation that 'Einhorn' and 'Kobald' have the same extension* (namely the null set) but are always translated as 'unicorn' and 'goblin' and never as 'goblin' and 'unicorn'. The data for this observation is all the German-English dictionaries that have been written and the linguistic behavior of all the lexicographers who ever wrote a German-English dictionary. If extension is the only meaning of a term how do we explain the ubiquity of this fact. Why doesn't one lexicographer slip and translate 'Kobald' as 'unicorn' and 'Einhorn' as 'goblin'? Extension by itself is not enough to explain this regularity of meaning. This observation is in reality a law, since a similar observation holds for dictionaries between any two NL's, and between any two words with null extensions and different meanings.

Altho this proves there is more to meaning than extension alone, it does not prove what intensions are as Carnap was trying to do. Or perhaps his only aim in [45, p239] is to disprove the extensionalist thesis. If so, he does achieve this purpose. Thus 'unicorn', 'Santa Claus', and 'the

*his use of the word 'extension' is more precise than mine and hence different, but this does not affect my argument.

average consumer' cannot be considered either meaningless or synonymous.

And lest anyone suspect an experimental bias brought about by the collusion of all lexicographers, Carnap suggests a modification of the experiment whereby it is submitted to all the men on the street who have been raised bilingually in German and English for their opinion. Then if collusion still remains, at least it has been raised to the level of 'convention' which is after all just the name of the symbol game.

3. Logical Relation Between this Observation and the Paradox of Reference

The law which results from this observation is that extension by itself is not enough to explain the regularities of meaning. This is not a new law for us. We have already encountered it in discussing the paradox of reference. What we are seeing new here is a different kind of "menetic experiment" that produces data to test or verify the same law. Thus, as in other fields of science, menetic laws provide a way of organizing various kinds of sense experiences together by exhibiting a regularity.

Since this is the same law implied by the paradox of reference, the bilingual dictionary observation is logically not an independent observation but is also implied by Moore's paradox of analysis, as is the paradox of reference.

E. Relation Between Law and Theory: Illustrating the Method of Language in Use (by NNS's)

"Do, as a concession to my poor wits, Lord Darlington, just explain to me what you really mean." _____ "I think I had better not, Duchess. Nowadays to be intelligible is to be found out."

_____ Oscar Wilde: Lady Windermere's Fan

The purpose of this section is to distinguish between semiotic law and

semiotic theory by giving examples for the linguistic literature and to illustrate the method of language in use (by NNS's) which is a standard method of linguistics. The primary examples of law are what are called the RIT rules presented in E.1. Here the word 'rule' is used in the sense 'scientific law'. In other places in the linguistic literature it is used in the sense 'calculus of the theory', and in still other places 'axiom of the theory'. In E.2 is presented an example of a linguistic theory from the literature that is intended to explain or predict the RIT rules (the laws given in section 1). In E.3, I discuss the characteristics of theory. Finally in E.4, a brief discussion of three concepts *observational language*, *descriptive language*, and *theoretical language* is presented and contrasted with three concepts, from the linguistic literature, that Chomsky has popularized: *observational adequacy*, *descriptive adequacy*, and *explanatory adequacy*.

Several philosophers have noted that linguists and semioticians themselves are not always clear about these distinctions. Bar-Hillel suggests that this is because:

Linguistics, as every other empirical science, is a complex mixture of theory and observation. The precise nature of this mixture is still not too well understood, and in this respect the difference between linguistics and, say, physics is probably at most one of degree. This lack of methodological insight has often led to futile disputes between linguists and other scientists dealing with language, such as psychologists, logicians, or communication theoreticians, as well as among linguists themselves. [17, p551].

1. The RIT Rules

The laws of reflexives, imperatives, and tags.

a. the law of reflexive pronouns

All American sentences with surface structure subjects have reflexive pronouns in object position iff the subjects and objects are coextensional.

This law was phrased by Lakoff as follows:

In sentences with overt subjects, we find reflexive pronouns in object position just in case the subjects and objects are coreferential, and nonreflexive pronouns just in case the subjects and objects are noncoreferential. [157, p289].

He gave the following evidence:

- 1) I shaved $\begin{Bmatrix} *me \\ you \\ him \end{Bmatrix}$ $\begin{Bmatrix} myself \\ *yourself \\ *himself \end{Bmatrix}$
- 2) You shaved $\begin{Bmatrix} me \\ *you \\ him \end{Bmatrix}$ $\begin{Bmatrix} *myself \\ yourself \\ *himself \end{Bmatrix}$

Other forms are easily adduced:

- 3) She powdered $\begin{Bmatrix} me \\ you \\ him \\ *her \end{Bmatrix}$ $\begin{Bmatrix} *myself \\ *yourself \\ *himself \\ herself \end{Bmatrix}$
- 4) The unicorn saw the sprite and kissed {her} { *herself }
- 5) The unicorn saw the centaur and ran away from {him} { *himself }
- 6) The unicorn groomed { *him } { himself }.

It may appear that extensionality only enters into this law by mistake. Since 'the unicorn' and 'the centaur' are coextensional (namely the null set) the law would predict 'himself' in 5) and not 'him', but in fact just the opposite is observed. The law can easily be amended by placing 'cointentional' everywhere for 'coextensional,' in which case the law still satisfies all the observations recorded by Lakoff in [157] plus other data similar to the above.

The law could then read as follows:

All American sentences with surface structure subjects have reflexive pronouns in object position iff the subjects and objects are cointentional.

A thuro investigation of this law with its alternate phrasing needs to be made, including its interaction with proper names, for instance:

$$7) \text{ John brushed } \left\{ \begin{array}{c} \text{me} \\ \text{you} \\ * \text{him} \\ \text{her} \end{array} \right\} \left\{ \begin{array}{c} * \text{myself} \\ * \text{yourself} \\ \text{himself} \\ * \text{Herself} \end{array} \right\}$$

$$8) \text{ John pleased } \left\{ \begin{array}{c} * \text{John} \\ \text{Jane} \end{array} \right\} \left\{ \begin{array}{c} \text{himself} \\ * \text{herself} \end{array} \right\}$$

$$9) \text{ Thor liked } \left\{ \begin{array}{c} \text{me} \\ \text{you} \\ * \text{him} \end{array} \right\} \left\{ \begin{array}{c} * \text{myself} \\ * \text{yourself} \\ \text{himself} \end{array} \right\}$$

One theory of meaning has proper names possessing an extension but no (or trivial) intention. One way of avoiding the suggested modification of the law is to regard the definite article and proper names as having either an optative or existential meaning in addition to the simple contextual (tagmatic) meaning attributed to them by Russell.

We could paraphrase 5) in the optative mood as follows:

- 10) Let us create, or at least assume we have created a unicorn, this unicorn, namely the one we created, or assumed, saw a centaur and ran away from {him} {*himself}

According to the assumption embodied in 10) regarding the meaning of 'the unicorn', 'the unicorn' and 'centaur' are no longer coextensional and hence the original phrasing of the law would be satisfactory.

b. the law of tag subjects

A tag question is a question which takes the form of a statement for a main clause with the interrogative expressed by the tag clause,

as for example

- 1) He'll go home, won't he?

The law of tag subjects may then be stated as follows:

All tag questions in American, where the main clause has a surface structure subject, have as their subject the pronominal form of the subject of the main clause.

This was phrased by Lakoff as follows:

... in tag questions, we find that as a general principle the pronominal form of the subject of the main clause occurs as the subject of the tag. [157, p289].

He gave the following evidence:

- 2) I'll go him, won't $\left\{ \begin{array}{l} I \\ *you \\ *he \end{array} \right\}$
- 3) You'll go home, won't $\left\{ \begin{array}{l} *I \\ you \\ *he \end{array} \right\}$

And other forms are easily adduced:

- 4) She'll go home, won't $\left\{ \begin{array}{l} *I \\ *you \\ *he \\ she \end{array} \right\}$
- 5) He'll go home, won't $\left\{ \begin{array}{l} *I \\ *you \\ he \\ *she \end{array} \right\}$
- 6) They shoot horses, don't $\left\{ \begin{array}{l} *we \\ *he \\ they \end{array} \right\}$

c. the law of imperative reflexives

Every imperative sentence in American with a personal pronoun in object position is reflexive iff the pronoun is second person.

This was phrased by Lakoff as follows:

In imperative sentences we find that ... a second person reflexive, but no other, shows up in object position, and that a second person nonreflexive pronoun is excluded in object position. [157, p289f].

He gave the following evidence:

- 1) Shave $\left\{ \begin{array}{l} \text{me} \\ *you \\ \text{him} \end{array} \right\} \quad \left\{ \begin{array}{l} *myself \\ \text{yourself} \\ *himself \end{array} \right\}$

but other evidence is easily adducible:

- 2) Wash $\left\{ \begin{array}{l} \text{us} \\ *youall \\ *(you'se) \\ \text{them} \end{array} \right\} \quad \left\{ \begin{array}{l} *ourselves \\ \text{yourselves} \\ (\text{yourselves}) \\ *themselves \end{array} \right\}$

d. the law of imperative tags

All imperative sentences of American in tag question form contain only second person subjects.

This was phrased by Lakoff as "... the tags for imperative sentences contain second person subjects.", [157, p290]. His evidence [157, p289] was:

- 1) Go home, won't $\left\{ \begin{array}{l} *I \\ \text{you} \\ *he \end{array} \right\}$

but additional evidence is easy to come by.

e. the law of imperative subjects

No subject appears in the main clause of imperative sentences of American unless special emphasis is intended and then only a second person subject appears, but a second person subject is always understood.

This was phrased by Lakoff as, "In imperative sentences we find that a second person subject is understood ...". [157, p289]. He gave

no evidence for this generalization but it is so well known by every schoolchild that he didn't need to give any evidence. Evidence is easy to find.

$$1) \left\{ \begin{array}{l} \emptyset \\ *I \\ *You \\ *He \end{array} \right\} \text{ close the door.}$$

$$2) \left\{ \begin{array}{l} *\emptyset \\ *I \\ You \\ *He \end{array} \right\} \text{ close the door!}$$

3) Upon hearing the utterance "Close the door." and then being asked "Who is meant to close the door?", S will always reply that he (S) is meant to close the door.

1) is evidence for the first part of the law, 2) is evidence for the second part and 3) is a rephrasing of the third that makes it evident what evidence supports it and what would refute it.

2. A Theory of Imperative Sentences of American

Lakoff has presented a theory which is able to explain {1.a, ..., 1.e} as well as many other laws of American altho he does not present it as a theory. His theory is:

that imperative constructions in English are not subjectless in underlying structure, and that they in fact have second person subjects. ... that there is a rule of reflexivization which reflexivizes object pronouns that are coreferential with their subjects. [157, p289].

Altho he doesn't state it, he must also assume a subject deletion rule which deletes the subject of an imperative sentence just in case there is no special emphasis on it.

This theory is then able to explain, or predict, each of {1.a, ..., 1.e} in the sense that by starting with the hypothesis of second person

subjects and applying each of the rules, each of the laws 1.a thru 1.e can be derived when the terms of the resulting theoremes are interpreted appropriately.

There is an ambiguity in Lakoff's statement of this theory, concerning the word 'subject'. The concept of *subject* used in the laws is not the same concept as used in the theory. In the former we have the observational concept of *subject* while in the latter we have the theoretical concept of *subject*. For many transformationalists these terms are synonymous with 'surface-structure subject' and 'deep-structure subject'.

We may sketch this theory in formal terms as follows:

THEORY:

AXIOMS:

DEC: $\text{NP}_i - V - \text{NP}_j$

IMP: $I - \text{PP}_i(2\text{nd}) - V - \text{PP}_j$

CALCULUS:

Phrase Structure Rules

.
.
.

Transformational Rules

(Tag Q): $\text{NP}_i - V - \text{NP}_j \rightarrow \text{NP}_i - V - \text{NP}_j, V' - \text{PP}_i?$

Reflex: $\text{NP}_i - V - \text{NP}_i \rightarrow \text{NP}_i - V - \text{PPR}_i$

(Emp): $I - \text{PP}_i(2\text{nd}) - V - \text{PP}_j \rightarrow$
 $I - \text{Emp} + \text{PP}_i(2\text{nd}) - V - \text{PP}_j!$

Del: $I - \text{PP}_i(2\text{nd}) - V - \text{PP}_j \rightarrow V - \text{PP}_j$

INTERPRETATION:

NP left of leftmost V \rightarrow subject

Leftmost NP to right of leftmost V \rightarrow object

Two NP's, NP_i and NP_j , in the same string $\rightarrow NP_i$ and

NP_j are coextensional iff $i = j$.

PPR \rightarrow reflexive personal pronoun

PP \rightarrow personal pronoun

PP \rightarrow an instance of a NP

PPR \rightarrow an instance of a NP

V' - NP ? after a comma \rightarrow a tag question

NP in a tag question \rightarrow subject of the tag question

string before the comma of a tag question \rightarrow main clause

subject anywhere in the derivation of a sentence \rightarrow is

understood by the interpreter to be the subject of the sentence.

PPR \rightarrow an instance of PP

This is only a sketch of a theory and not a full boat, but it has enough details to show how the above mentioned laws can be derived using the indicated interpretation.

The law of reflexive pronouns; Proof by cases:

1. $NP_1 - V - NP_2$

DEC axiom

2. $NP_1 - V - NP_2$

Reflex does not apply

$\therefore NP_1 - V - NP_2$

therefore if subject and object are not coextensional and the optional transformation (Tag Q) is not applied, there is no reflexive pronoun in object position.

3. $NP_1 - V - NP_2$ DEC axiom
4. $NP_1 - V - NP_2, V' - PP_1?$ by (Tag Q)
-
- ∴ $NP_1 - V - NP_2, V' - PP_1?$ since Reflex does not apply

Therefore if subject and object are not coextensional and (Tag Q) is applied, there is no reflexive pronoun in object position.

5. $I - PP_1(2nd) - V - PP_2$ IMP axiom
6. $V - PP_2$ by Del since Reflex doesn't apply
-
- ∴ $V - PP_2$

This sentence form does not have a surface structure subject and hence does not enter into an analysis of the law of reflexive pronouns.

7. $I - PP_1(2nd) - V - PP_2$ IMP axiom
8. $I - Emp + PP_1(2nd) - V - PP_2!$ by (Emp) since Reflex doesn't apply
-
- ∴ $I - Emp + PP_1(2nd) - V - PP_2!$ since Del is blocked

Therefore if subject and object are not coextensional and (Emp) is applied, there is no reflexive pronoun in object position.

9. $I - PP_1(2nd) - V - PP_2$ IMP axiom
10. $I - PP_1(2nd) - V - PP_2, V' - PP_1(2nd)?$ by (Tag Q) since PP is a NP
-
- ∴ $V - PP_2, V' - PP_1(2nd)?$ by Del since Reflex doesn't apply

But this sentence form does not have a surface structure subject and hence does not etc.

11. $I - PP_1(2nd) - V - PP_2$ IMP axiom
12. $I - PP_1(2nd) - V - PP_2, V' - PP_1(2nd)?$ by (Tag Q)
13. $I - Emp + PP_1(2nd) - V - PP_2!, V' - PP_1(2nd)?$ by (Emp) since Reflex doesn't apply
-
- ∴ $I - Emp + PP_1(2nd) - V - PP_2!, V' - PP_1(2nd)?$ since Del is blocked

Therefore if subject and object are not coextensional and (Tag Q) and (Emp) are both applied, there is no reflexive pronoun in object position. And since these are the only sentences with surface structure subjects in which the subject and object are not coextensional we may conclude that in any sentence with surface structure subject if the subject and object are not coextensional, there is no reflexive pronoun in object position.

$$14. \quad NP_1 - V - NP_1 \quad \text{DEC axiom}$$

$$\therefore \quad NP_1 - V - PPR_1 \quad \text{by Reflex}$$

Therefore if subject and object are coextensional and no optional transformations are applied there is a reflexive pronoun in object position.

Similarly by modifying each of the previous derivations we can see that the same conclusion holds in each case. Therefore in any sentence with surface structure subject there is a reflexive pronoun in object position iff the subject and object are coextensive, which is the law of reflexive pronouns which was to be demonstrated.

Each of the other RIT laws can be derived using similar productions. As another example I derive next the law of tag subjects:
The law of tag subjects:

The law of tag subjects applies only in the case of application of (Tag Q), therefore there are two cases. We can start with DEC and apply (Tag Q), or we can start with IMP and apply (Tag Q), in which case we must also apply (Emp) in order to get a surface structure subject.

$$1. \quad NP_1 - V - NP_2 \quad \text{DEC axiom}$$

$$\therefore \quad NP_1 - V - NP_2, V' - PP_1? \quad \text{by (Tag Q)}$$

Therefore the subject of a tag question form of a declarative sentence is

the pronoun form of the subject of the main clause. It is easily seen that reflexivity has no effect on this conclusion:

2. $NP_1 - V - NP_1$ DEC axiom
3. $NP_1 - V - NP_1, V' - PP_1?$ by (Tag Q)

- ∴ $NP_1 - V - PPR_1, V' - PP_1?$ by Reflex.
4. $I - PP_1(2nd) - V - PP_2$ IMP axiom
5. $I - PP_1(2nd) - V - PP_2, V' - PP_1(2nd)?$ by (Tag Q)

- ∴ $V - PP_2, V' - PP_1(2nd)?$ by Del.

But the main clause has no surface structure subject and hence this form does not enter into the law under consideration. Next we have:

6. $I - Emp + PP_1(2nd) - V - PP_2! V' - PP_1(2nd)?$ 5 and (Emp)

Here again, we see that the subject of the tag is the pronoun form of the subject of the main clause. And finally:

7. $I - PP_1(2nd) - V - PP_1(2nd)$ IMP axiom
8. $I - PP_1(2nd) - V - PP_1(2nd), V' - PP_1(2nd)?$ by (Tag Q)
9. $I - PP_1(2nd) - V - PPR_1(2nd), V' - PP_1(2nd)?$ by Reflex

- ∴ $I - Emp + PP_1(2nd) - V - PPR_1(2nd)! V' - PP_1(2nd)?$ by (Emp),

we see that even with reflexivization, the subject of the tag is the pronoun form of the subject of the main clause.

Since these are the only possibilities, we have that all tag questions with a surface structure subject of the main clause have as subject of the tag the pronoun form of the main clause subject. And this is the law of tag subjects which was to be demonstrated.

As a final example I show how the law of imperative subjects may be demonstrated by discursive reasoning without using the formal calculus as above.

The law of imperative subjects.

Since all derivations must start with the IMP axiom which has a second person noun phrase in subject position a second person subject is always understood for all imperatives. Unless (Emp) is applied, the subject of an imperative sentence is always deleted by Del, but if (Emp) is applied the second person subject is allowed to surface and so we have:

No subject appears in the main clause of imperative sentences unless special emphasis is applied and then only a second person subject appears, but a second person subject is always understood. Which is the law of imperative subjects which was to be demonstrated.

3. Characteristics of Theory

We now see that Lakoff's observations may be rephrased as, 'the theory that imperative sentences have second person deep-structure subjects explains the observed relationships between laws {1.a, ..., 1.e}. What Lakoff did show was that a transformational grammar of a language is a theory that explains certain observed laws of that language. This is not a new concept, however. Chomsky has stated many times that a grammar is a theory of a language, [64, p24; 55, p49; 60, pp223 & 245; 61, pp531, 533 & 535; and 54, p112; etc.]. In fact this concept of grammar appeared as early as the Modistae who attempted to develop a universal theory of language [36].

It is possible to add many more examples of laws and theories from

classical linguistics. Chomsky, Lakoff, Katz and others have given many examples, [63, p67f; 60, p235pp; 55, p64ff; and 64, p103f; etc.].

However, no new insight into the nature of theory could be gained by these examples since they essentially replicate the example given in E.1 and E.2. It is of more interest to look at some of the characteristics of theory as seen by linguists.

Chomsky has been perhaps the leading spokesman for those linguists who view a grammar as a theory in the scientific sense. He states:

Any scientific theory is based on a certain finite set of observations and, by establishing general laws stated in terms of certain hypothetical constructs, it attempts to account for these observations, to show how they are interrelated, and to predict an indefinite number of new phenomena. A mathematical theory has the additional property that predictions follow rigorously from the body of theory. Similarly, a grammar is based on a finite number of observed sentences (the linguist's corpus) and it "projects" this set to an infinite set of grammatical sentences by establishing general "laws" (grammatical rules) framed in terms of such hypothetical constructs as the particular phonemes, words, phrases, and so on, of the language under analysis. [54, p113].

Concerning the relation between theory and data, or empirical phenomena, Chomsky states:

A theory of language must state the principles interrelating its theoretical terms (e.g., "phenome", "morpheme", "transformation", "Noun Phrase", "Subject") and ultimately must relate this system of concepts to potential empirical phenomena (to primary linguistic data). [64, p208].

And what is linguistic data? Chomsky answers:

The behavior of the speaker, listener, and learner of language constitutes, of course, the actual data for the study of language. [57, p56].

Given this view that grammar is a theory in the scientific sense, how do we create a theory? What do we want in a theory and how do we get it there? Again, Chomsky has anticipated these questions by giving the answers, even if in piecemeal fashion. First, his answer to what

we should look for in a grammar:

What we want in a grammar is not mere coverage of facts, but insightful coverage, something much more difficult to define or to attain. [61, p549]. ... We want the rules ... to be as few and general as possible. In particular, we prefer rules that apply to large classes of elements and that have a simple and brief specification of relevant context; and we prefer a set of rules in which the same classes of elements figure many times. [61, p542]. ... The major systematic feature always used, overtly or not, in choosing among alternative descriptions, is the degree of generalization achieved. We have a generalization when distinct statements about distinct linguistic elements can be replaced by the same or similar statements. [60, p242]. ... a grammar that predicts ... a large class of cases by general rules is to be preferred over a list of variants and their distribution. [61, p548].

Next Chomsky's answer to how do we get the kind of grammar we are looking for:

I know of no general mechanical procedure for arriving at the answer to this question, just as I am unacquainted with any *general* ... mechanical procedure for arriving at a phonemic, morphological, or constituent analysis for the sentences of a language. To answer all of these questions, we must apparently do what any scientist does when faced with the task of constructing a theory to account for particular subject matter --- namely, try various ways and choose the simplest that can be found [60, p223].

In taking this approach, Chomsky was not being novel. He was merely adapting to linguistics a philosophy of science created (apparently) independently by Peirce and Einstein. The distinction here is between classical positivism in the sense of Comte and Mach on the one hand, and neo-, or logical-, positivism as expressed by Einstein and pragmatism as expressed by Peirce, on the other. The philosophy that theory is an invention of the human mind that can be expressed in terms of theoretical concepts (concepts that are not necessarily observational), but that theory must possess empirical adequacy by being subjected to observational interpretation and evaluation against the laws and data it was designed to explain.

Einstein apparently was not aware of Peirce's earlier studies in the philosophy of science in which Peirce concluded that theory is neither deduced nor induced, but a free creation by man. He invented the term 'abduction' for this concept: a law is induced, a theorem is deduced, but a theoretical principle is abduced.

In reference to Peirce's analysis of abduction, Chomsky says:

Peirce, to my knowledge, is original and unique in stressing the problem of studying the rules that limit the class of possible theories, [67, p96].

Chomsky was wrong, of course; Peirce may have been original in his explicit statement of this problem but theoreticians, at least since the time of Newton, have carried out such studies at least implicitly and Peirce certainly is not unique. Einstein has explicitly stressed this many times in analyzing physical theory.

One of the principle purposes of designing the language of Menetics is in order to be able to study the laws of meaning that limit the class of possible menetic theories. It is a major purpose of Chapters IV and V to motivate a feeling that significant progress have been made toward this goal.

F. Observational Support for Ontosion (The Meaning Related to the Medium): Illustrating the Methods of Behavioral Observation and Psychological Experimentation

Well-timed silence hath more eloquence than speech.

_____ M. Tupper

In the problem of decoding, the most important information which we can possess is the knowledge that the message we are reading is not gibberish.

_____ N. Wiener

When the message itself has given us this information, we have understood a part at least of the ontosion of the message. This is the component of meaning associated with the medium of the sign. The part of the ontosion understood corresponds to the knowledge obtained by any listener upon reaching the so-called 'THRESHOLD OF PERCEPTIBILITY', when the sounds heard begin to be perceived as speech sounds. See, for instance, [396] . That this knowledge is not automatically forthcoming is attested by the fact that the single best method of disguising a secret message (better than any other known coding technique) is to conceal the fact that there exists any message to be decoded at all.

This component of meaning was introduced in III.B.2 and defined in III.D.3. It is further explicated in V.B.1 and V.C.1. Several regularities in verbal behavior have been found which appear to relate to or to require an ontotic component of meaning. The empirical regularities reviewed here are: 1) the Prevention of Silence Principle; 2) the Phatic Agreement Principle; 3) Terwilliger's Law of Flicker; and 4) Skinner's Verbal Summator Principle. The methodology for observing these regularities involve Behavioral Observation and Psychological Experimentation. I will say a few words about Behavioral Observation in F.1 and something about Psychological Experimentation in F.4.

1. Observation of Human Behavior and Its Setting

The method of observing human behavior in its setting, or total content, is a variation on the method of observing language in use in that the actual human setting in which the language usage occurs plays an important role in the conclusions that are drawn from the observations. The method has been most closely associated with the General Semanticists

and the Behavioral Psychologists. The method will become clearer in the discussion of the next two principles.

2. The Prevention of Silence Principle

What is the meaning of "One...two...three...testing..."? Hayakawa has observed that we sometimes talk simply for the sake of hearing ourselves talk; because the activity gives us a pleasant sense of being alive. He stated this in the form of the following principle:

The prevention of silence is itself an important function of speech. [123, p78].

He gives the following evidence to back his claim in a section headed "Noise for Noise's Sake":

Children prattling, adults singing in the bathtub, are alike enjoying the sound of their voices. Sometimes large groups make noises together, as in group singing, group recitation, or group chanting, for similar presymbolic reasons. In all this, the significance of the words used is almost completely irrelevant. We may, for example, chant the most lugubrious words about a desire to be carried back to a childhood home in old Virginny, when in actuality we have never been there and haven't the slightest intention of going. [123, p77f].

If we carelessly step off a curb when a car is coming, it doesn't much matter whether someone yells, "Look out!" or "Hey!" or "Prends garde!" or simply utters a scream, so long as whatever noise is made is uttered loudly enough to alarm us. It is the loudness of the cry that conveys the necessary sensations, and not the words. The medium is not the message, but the meaning associated with the medium is, and this is the content of McLuhan's message for philosophy.

Skinner suggests that:

Emotional reactions are not always controlled by specific differentiated forms of response. One may react emotionally to a verbal stimulus merely because it possesses the property of being verbal. ... A man alone in a foreign land may react with profound emotion to any speech in his native tongue. [281, p158].

He adds more evidence to this:

Another aversive condition avoided by verbal behavior without respect to form is simply silence. There are many situations... in which silence is used as a punishment, and it is therefore well to avoid any silence which may be interpreted as punishment. Certain standard responses - comments about the weather, the health of the listener, and so on - show a relatively high frequency mainly because they avoid silence. The threat of silence leads on the one hand to formless grunts, mumbles, hemmings, and so on, and on the other to an increased probability that *any* type of verbal behavior will be emitted. [281, p200].

One type of silence which is aversive to the listener, though not used as punishment, is the interruption of a sustained discourse. The speaker may be distracted, forgetful, or confused. The strength of the aversive condition built up in the resulting silence is shown in the energy of the response which finally becomes available. Some escape is provided by temporizers such as *m-m-m*, *uh*, etc.

Another case of avoiding silence is stalling. Explicit responses which play for time are commonly set up. The trubador has stock lines or refrains, the principle function of which is to permit him to recall or arrange the material to be emitted next. It has been shown that some of the stock lines of Homer probably served this purpose [1104] . Stalling may be achieved not only by stock responses, but by repeating a question (called an "echoic response") or by mumbling which brings a request for repetition after which a response of sharper form may be available.

Skinner adds that complete nonsense may be tolerated when communication is primarily phatic as when two children become silly [281, p395]. This presymbolic talk for talk's sake is, like the cries of animals, a meaningful form of activity.

Speech is also emitted simply because it is verbal in supplying examples---as in discussing semiotics, as in giving a sample of one's handwriting to be analyzed, in sketching in printed matter when drawing a picture of a newspaper or magazine, or in testing a public-address system.

When the MC wants to announce the next show, he could just as well hold up a sign

OUR NEXT GUEST IS

ANITA BRYANT

as well as he could say it over the mike, especially if the audience is so situated as to all be in good eyesight of the stage. Either medium serves just as well. But if he wants to test the PA system, he can not do so by holding up the sign

One ... Two ... Three ... Testing ...

He must say it thru the mike. The medium is critical. The essential meaning of this ontotic communication is its ontosion. When the emcee says into the mike, "One ... two ... three ... testing ...", he isn't saying anything much --- but it is nevertheless important at times that he say it. The medium of his words is testing his communication channel. Thus the meaning of his message is related to the medium of his message; the testing of the channel.

The essential meaning of the crying of a newborn baby is ontotic. It is the medium of the message that carries the crucial meaning. If it were able to cry by, say, waving his hands, it could not exercise its

lungs by crying in this unbabylike fashion. Nothing will do but that the right medium be employed, and nothing else matters very much.

The next law is similar to the last, except that the last related to single individuals and the next to groups of more than one individual.

3. The Phatic Agreement Principle

In phatic communication we are careful to select subjects about which agreement is immediately possible.

Hayakawa gives several examples of the data that supports this law, [123, p79], one of which I reproduce here.

"Nice day, isn't it?"

"It certainly is." (Agreement on one point has been established. It is safe to proceed.)

"Altogether, it's been a fine summer."

"Indeed it has. We had a nice spring, too." (Agreement on two points having been established, the second party invites agreement on a third point.)

"Yes, it was a lovely spring." (Third agreement reached.)

...With each new agreement, no matter how commonplace or how obvious, the fear and suspicion of the stranger wears away, and the possibility of friendship enlarges.

To this point he notes that, "What we call social conversation is again largely presymbolic in character.", [123, p78]. At a cocktail party, for example, we all have to talk---about anything that can be agreed upon: the weather, Hank Aaron's home runs, the new Omni, or Raquel Welch's latest picture. Rarely, except among very good friends, are the remarks made during these conversations important enough to be worth making for their informative value. Nevertheless, it is regarded as rude to remain silent. Indeed, in such matters as greetings and farewells---"Good morning"---"Lovely day"---"It was a pleasure meeting you"---it is regarded as a social error not to say these things even if we do not mean them. There are numberless daily situations in which we talk simply

because it would be rude not to. Every social group has its own form of this kind of conversation---"the art of conversation", "small talk", or the mutual kidding that Americans love so much. It is completely impossible for us in society to talk only when we "have something to say". We talk together about nothing at all and thereby establish friendships. The purpose of the talk is not the communication of information, as the symbols would seem to imply, but the establishment of communion.

Such presymbolic uses of language not only establish new lines of communication, but keep old lines open. Old friends like to talk even when they have nothing especially to say to each other. In the same way that long distance operators, ships radio officers, outback station owners (to use an example from the Australian dialect), and signal corps outposts chatter with each other even when there are no official messages to communicate, so do people who live in the same household or work in the same office continue to talk to each other even when there is nothing much to say. The purpose in both cases seems to be partly to relieve tedium, but partly, and more importantly, to keep the lines of communication open.

4. Observation of Psychological Experiments

Once the parameters of human behavior have begun to be understood, they can be controlled in observations deliberately designed to maximize the amount of information the observation contributes to our understanding of behavior. Such deliberately designed, controlled, observations are called 'psychological experiments'. Our understanding of linguistic and semiotic behavior has only just recently reached the point where linguists, semioticists, and psychologists have begun serious efforts in the

experimental psychology of linguistics and semiotics. The name 'psycholinguistics' has been coined to label this area.

Some of the best examples of psychological experimentation have been performed by Garner and his colleagues at Yale University in the area of the interrelations between the ontotic and eidontic levels of semiotics. Some of this work is discussed in section IV.P. under empirical evidence for relations between components. In the next two paragraphs, I discuss two experimentally discovered regularities pertaining to menetics at the ontotic level: Terwilliger's Law of Flicker and Skinner's Law of Verbal Summation. The psychological literature does not seem to have noticed the very close relationship between these two laws and so in paragraph 7, I discuss the similarities between the two and discuss some generalizations of Terwilliger's and Skinner's experiments.

5. Terwilliger's Law of Flicker, (1968).

The perceptual stability of a word is directly (contrasted with inversely, not implying directly proportional to) related to the meaningfulness of the word, [289, p269f].

Meaningfulness was measured by obtaining single free associations from a sample of subjects and totaling the number of different associations obtained. The perceptual stability of a word was measured by the rate of flicker at the point where the flicker became slow enough for the subject to perceive the flicker. The flicker was seen sooner (at a faster rate) in words which are less meaningful, and a word with more meaning was seen to flicker later, at slower rates than words with less meaning.

Altho it is not clear just how the number of single free associations of a word is related to any part of its meaning, it *is* perfectly clear that it is somehow related to the meaning or meaningfulness of the word. The point here is that flicker perception which is a property of the medium which carries the word is somehow, even tho not precisely detailed, related to the meaningfulness of the word. Thus this experiment which Terwilliger conducted for his investigations into the Whorfian hypothesis shows the usefulness of at least one menetic component being at least related in some way to the medium of the sign;-- an ontosion component.

Terwilliger points out some of the advantages of this particular experimental design. We are not dealing with the perception of the word itself. The subjects see and recognize the word easily. We are dealing with the perception of an attribute of the medium, namely its flicker. Hence there is no possibility of a response bias producing this effect and the likelihood or willingness of saying the word is irrelevant here.

6. Skinner's Verbal Summator, (1936).

Skinner noticed that a single instance of a nonvocal auditory pattern seldom evokes a verbal response but that rhythmically repeated patterns do so, [281, p260]. He called this process 'summation' and made it the basis of a very useful experimental instrument which he called the 'verbal summator'. Skinner gave several examples of summation in ordinary verbal behavior. Calling a man by name may be ineffective if the man is at a distance, if the background is noisy, or if he is preoccupied with other behavior. But there is an intensity level at

which such a stimulus, ineffective when presented once, will be effective if presented rhythmically at the same intensity several times. If we speak to someone who is reading a newspaper and he does not answer, we will be likely to speak again in a louder voice, but we can also achieve the same effect by speaking at the same intensity several times. Skinner says:

It is this summation of ineffective stimuli which evokes a partially echoic response to a nonvocal stimulus pattern. When the stimulus is effective through summation, it is still necessary in most cases for other sources of stimulation to be present to determine the precise form of response. [281, p260].

The verbal summator consists of a phonograph or tape recorder which repeats a vague pattern of speech sounds at low intensity or against a noisy background as often as may be needed to evoke a response. The material sounds like fragments of natural speech heard thru a wall. Under experimental conditions, a S will generally hear something being said for each pattern, and most S's require no more than ten or fifteen presentations of each stimulus. Hundreds of responses may be collected in a few hours. Different S's seldom give the same response and therefore certain inferences about other variables may be made. The responses tend to be unedited because the S remains unaware of the controlling sources and is usually convinced that he is merely repeating what he hears, altho possibly with some errors. An example of some of the data obtained from one S in a typical experiment follows, [280]:

Barley
have hold on that
do not do that
spell the party
have you pummelled him
how do you do
good-night
you know a part

cracker
sour pickles
I knew her
a Bilderbuch
Tabelletuch (reported only after repetition had been stopped)
America
watch my margin
after all my duty
fly like a bee

Some of the controlling parameters may be identified. The immediate environment is one. After watching E adjust two small knobs on the summator, one S reported that the instrument said "What wheels do you touch?". A distant clock striking the half hour led one S to report "Half past". Conditions of deprivation or aversive stimulation are also relevant and seem to account for responses such as "Call them louder", "Make it closer", etc. As soon as a few responses have been emitted, self-echoic and self-intraverbal responses begin to occur. This accounts for frequent rhymes such as "Trial by another", followed by "Is he your brother?".

The conclusions from the above are obvious. The medium of communication has a meaning associated with it, or is able to carry a kind of meaning even in the absence of any specific shape that would help identify that meaning. At an intermediate stage between initiation of the stimulus and onset of a specific meaning, there is a vague, hazy kind of meaning associated with the stimulus. The S may share Alice's reaction to the Jabberwocky: "Somehow it seems to fill my head with ideas---only I don't exactly know what they are." More will be said about this vague, hazy kind of meaning in IV.G.4.

7. The Ontotic Integrator, (1975).

Perceptual stability and verbal summation phenomena are the two extreme aspects of an integrated range of phenomena. This observation

seems to have been overlooked in the literature [91; 280; 281; and 289]. It is easier to see this if we compare the flicker phenomena with a visual counterpart of verbal summation. If we use the visual channel instead of the audio channel, the analog of sound intensity would be both the light intensity and the duration of viewing exposure. Perception of the visual word could be limited either by such a low light intensity that the visual image can not be perceived or by providing such a short duration, such as 5 msec., that the image is not perceived. Audio noise would be replaced by visual noise, such as extraneous flickering light and shadows or poor focusing, and verbal repetition would be replaced by visual repetition. Such a 'visual summator', or a device similar to it appears to have been developed by W. K. Estes [91]. Estes' data looks very similar to Skinner's data given above.

But since visual repetition of a controlled duration exposure is just flicker whether it be at a high rate or low rate of repetition, we see that visual summation is just flicker phenomena presented at low flicker rates, low visual intensity, and high noise levels; while perceptual stability (Terwilliger) phenomena is just flicker phenomena presented at high flicker rates, high visual intensity, and low noise levels. These two sets of phenomena are thus seen to be extreme opposites.

Conceivably the data taken at intermediate points between these two extremes could be even more informative as to the operative laws of ontotics. The ontotic integrator, fig. 7, has been designed to incorporate the important aspects of both Terwilliger's and Skinner's instruments while allowing controlled experimentation thruout all the

intermediate ranges. Two cases are important: 1) the case in which there is not really any word presented, artificial or otherwise; and 2) the case in which an actual visual signal is presented, whether it is an actual word or only an artificial form such as 'LYDRERIC'. As in all the other parameters of these two phenomena, these cases are just the two extremes of each other. The deviation in shape of the word form from a given natural language may be measured by an eidontic deviometer for that language (see IV.G.4). The case of a visual smudge or unfocused lines which are not really a string of letters at all is just the extreme case of eidontic deviance.

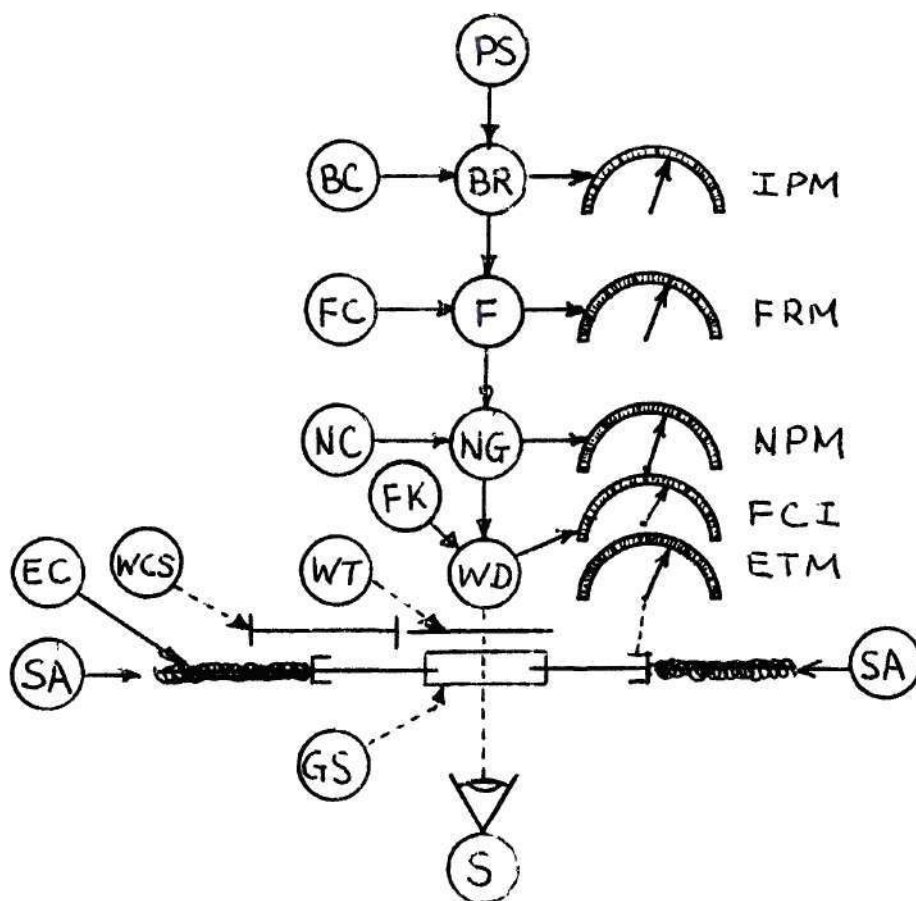
The Miller-Bruner-Postman [202] experiment in which the accuracy of interpretation of word forms is measured as a function of their eidontic deviance indicates that it must be possible to control very accurately the exposure time for this kind of phenomena. For this reason a guillotine shutter and exposure chronometer have been included in the instrument in addition to the capabilities present in either Terwilliger's or Skinner's instruments.

The ontotic integrator consists of a transparency viewing box (shown as WD in fig. 7) in which a word, word form, or smudge, is inscribed on a slide, WT. The word is transparent against an opaque background and is illuminated from behind. It is focused by means of FK and the degree of focus is indicated by FCI. The word may be changed by means of a slide mechanism, WCS, such as used in the common slide projector. The exposure time is controlled by means of a guillotine shutter, GS, shutter actuator, SA, and exposure control, EC, and measured by an exposure chronometer, ETM. The illumination of the viewing box is powered by a power source, PS, which is controlled by an illumination, or brightness control, BC, which adjusts a device such as a rheostat, BR, and the resulting illumination power is measured by IPM. The resulting power supply is alternated by an interruptor,

F, which is controlled by the flicker control, FC, and the flicker rate is measured by FRM. Finally, before being connected to the illumination circuit of the word display unit, noise is added by a noise generator, NG, controlled by NC, and the resulting noise power is measured by NPM.

The Skinner experiment can be replicated by placing a visual smudge in the word display out of focus, adjusting the noise level to its highest setting, the flicker control to its lowest setting, and the exposure time to infinity (by clamping the guillotine permanently open). The Terwilliger experiment can be replicated by placing normal American words in the word display and adjusting to get a perfect focus. The noise level is reduced to its lowest setting while the exposure time remains at infinity. The flicker rate is set initially at its highest setting and is then slowly decreased until the flicker is perceived.

Several experiments involving the intermediate ranges of the ontotic integrator will be suggested in P.7 where the method of psychological experimentation is applied to the observation of empirical relations between ontosion and eidension.



PS - Power Supply
 BC - Brightness Control
 BR - Brightness Rheostat
 IPM - Illumination Power Meter
 FC - Flicker Control
 F - Interrupter
 FRM - Flicker Rate Meter
 NC - Noise Control
 NG - **Noise Generator**
 NPM - Noise Power Meter

EC - Exposure Control
 ETM - Exposure Time Meter
 WD - Word Display
 WCS - Word Changing Slide
 S - Subject
 GS - Guillotine Shutter
 SA - Shutter Actuator
 WT - Word Transparency
 FK - Focus Control
 FCI - Focus Control Indicator

Figure 7. Schematic Diagram of the Ontotic Integrator

G. Observational Support for Eddension (The Meaning Related to
The Shape): Illustrating the Methods of Language in Use and
Psychological Observation.

Men content themselves with the same words as other people use,
as if the very sound necessarily carried the same meaning.

John Locke

This component of meaning was introduced in III.B.3 and defined
in III.D.3. It is further explicated in V.B.2 and V.C.2.

I believe that Kaplan's unpublished Ph.D. dissertation, [139],
has a considerable amount of data relative to establishing an empirical
basis for eidension, but I must wait until his thesis is again available
to me. He defines IMPORT as a component of meaning [139, p77]. He
believes it is pragmatic in nature, but on p81, he makes it clear that
import attaches to objects, rather than signs. On p83, import is a way
of reacting to a sign, of confusing its mediacy with immediacy. This
is most important in the case of symbolic import, as in poetry, where
the reaction is to the sign itself, and not to its object. Import seems
to be either ontosion or the effect of the medium on the pragmatic com-
ponent of meaning. Given a medium, import is the effect of the shape
in that medium on the interpreter. This brings us to the main purpose
of Kaplan's thesis, the semiotic explication of esthetic meaning. This
is a very large question in itself, ranging over all the arts. There
have been no dearth of esthetic philosophers who have attempted to ex-
plicate the notion of meaning for the arts including both Plato and
Aristotle, and more recently Herder, Schopenhauer, and in this century
Kaplan, Langer, and Goodman. Very little of this analysis has been sub-
jected to empirical tests, altho much of it is often based on

observational evidence. But a few very small beginnings have been made. I will restrict my comments to the subject of poetry.

1. Poetry

In spite of Aristotle's principle, language sound may very often constitute its own sense. In an attempt to develop the systematic tools for analyzing this eidontic aspect of meaning, J. R. Firth, in 1930, defined the PHONESTHEME as a unit of sound sense, or esthetic meaning, [598]. In a systematic study of the role of the phonestheme in poetry, F. Richter defines it as an esthetically foregrounded distinctive acoustic feature and claims that

...studies of the relation of sound to sense in poetry would profit by a systematic effort to isolate these phonesthemes, which are a real element in the "meaning" of a poem. [1193].

As a typical result of his analysis he concludes that

...the "appropriate" effect ('pressing liquid') of /sp/ in *spew*, *splash*, *spray*, and *spout* may be traced to its kinesthetic source as an affective configuration of stridency, continuance, tension, and interruption. [1193].

So far as I know, Richter does not claim to have discovered any basic theoretical principles of eidension or even any quantitative regularities between semiotic shape and poetic meaning, but the ground has certainly been broken for further studies in this area.

One additional study that does discover quantitative relationships in the sound patterns of poetry is L. G. Jones' The Poetic Score [138]. But before discussing this work, we should perhaps perpare the way by introducing some of the more elementary or simple concepts of eidension.

One element of shape that carries meaning is rhythm. Hayakawa defines RHYTHM as the effect produced by the repetition of auditory (or kinesthetic) stimuli at fairly regular intervals, [123, p63]. Rhyme and

alliteration are ways of emphasizing rhythm in language thru repetition of similar sounds at regular intervals. We have already seen in Section IV.F the summative effect of repetition on perception at the ontotic level, now here we see its use as a deliberate element of shape and eidension---as an eidetic component. Because the affective effect of eidension can be so powerful, Hayakawa concludes that

Political-slogan writers and advertisers therefore have a special fondness for rhyme and alliteration: "Tippecanoe and Tyler Too", "Rum, Romanism, and Rebellion", "Keep Cool with Coolidge", "Order from Horder", "Better Buy Buick", "Take Tea 'n' See", "I like Ike", "All the Way with L.B.J.". These are rather absurd slogans so far as informative value is concerned, but by their sound they set up small rhythmic echoes in one's head that makes them annoyingly difficult to forget. [123,p63].

Owners of gift shops will frequently call their place of business "Gyfte Shoppe" hoping that such spelling carries the eidension of antiquity. Spelling constitutes the shape of written words.

Ullman [296, p44] points out that the French words '*sombre*', '*ombre*' (shadow), '*nombre*' (number), '*decombres*' (rain), and '*concombre*' all have expressive shapes, that their eidension is suitable for poetry, and indeed most of these are among the most frequently used rhymes in French poetry, except '*concombre*', which unfortunately has for its intension the concept of *cucumber*. We might point out that in American there is no cognitive difference between 'little' and 'small'. The difference is primarily one of eidension.

The final and perhaps best available analysis of meaning in poetry is the study by L. G. Jones referred to above in which he explicates meaning in the arts as pattern (shape) of the linguistic elements, phonologic, morphologic, tagmatic, etc. He states that when language is used in its poetic function it says what it means and also what it is.

Verbal behavior which emphasizes something about the shape of the message is typical of the poetic function of language. Whereas Richter went back to one linguist with strong ties to semiotics for his beginning orientation in poetic analysis, Jones went back for his beginning orientation to another linguist who also has strong ties to semiotics---Roman Jakobson---whose penetrating studies of poetic language are well-known both within and without the field of linguistics. Jakobson sees the poetic function as an integral component of all language---not just poetry. He states:

...(the) focus on the message for its own sake, is the POETIC function of language. This function cannot be productively studied out of touch with the general problems of language, and, on the other hand, the scrutiny of language requires a thorough consideration of its poetic function. Any attempt to reduce the sphere of poetic function to poetry...would be delusive oversimplification. ...in all other verbal activities it acts as a subsidiary, accessory constituent. This function, by promoting the palpability of signs, deepens the fundamental dichotomy of signs and objects. Hence, when dealing with poetic function, linguistics cannot limit itself to the field of poetry. [796, p356].

Jones' analysis emphasizes the shape of the message, not merely the more obvious levels of rhythm and rhyme, but also the grammatical and general phonological levels as well. My discussion of Jones' work will be limited to the phonological level in view of the restricted topic in this thesis of word meaning.

Jones claimed to have based his analysis of poetic meaning on a study of the structure of the linguistic sign and, like Jakobson, believes that the best theories of sign structure stem from Peirce. But without making any essential use of Peirce's theories, except perhaps for use of the term 'interpretant', which he misconstrues as the interpreter, he concludes that "frequently the poet attempts to say something which cannot be adequately expressed in ordinary discourse".

It is well that he spent no more space on theoretical analysis such as this. His main contribution is to show by quantitative examples the role of shape, and especially symmetrical patterns, in carrying the eidension of grammatical and phonological structures. These examples are clinical rather than statistical in the sense that they are unique samples selected from a population of individual cases rather than an ensemble collected from a general population, i.e., nothing can be inferred about the general laws of eidension from these examples, but they are highly suggestive for further analysis and experimentation.

Jones' first example is Robert Frost's "Stopping by Woods on a Snowy Evening" and since this is primarily an analysis of grammatical shape, I will skip most of it; however, he does mention that in the repetition of the last line the forms themselves, the shapes, become the primary meaning. J. Ciardi, [503, p673], has remarked of this same line that the repeated shape suddenly transforms the mere words into poetic symbols, i.e., the poetic effect of this line is primarily eidontic.

Jones states that poetry shares with music and all the other arts the property that its meaning can only be felt but not translated into words. In his analysis of symmetry, Jones finds that conversation and prose have no obligatory rhythm or rhyme or interplay of similar shape elements, but in poetry this device predominates as it also does in music. Symmetry, as a specific measure of shape, represents a mirroring of parts and a return to a beginning point. In a section on phonological patterns in poetry Jones states:

On the phonological level various types of patterns of symmetry and parallelism operate as poetical devices and structures. Such patterns are often felt by sensitive readers who recognize something unusual about the sound texture of a poem beyond such obvious and well-studied properties as alliteration or rhyme. Modern phonological techniques can help us to specify these patterns in fruitful detail and bring their structures and relationships out of the realm of vague and fragmentary descriptions.

Jones bases his analysis on the acoustic distinctive features system and discovers that verse forms have rather interesting structural patterns when one counts the plus and minus acute values in the stressed vocoids of a poem. He justifies this on the basis that the stressed vocoids are the bearers of the rhythm of the poem and therefore the central elements of the sound texture. Jones determines the stressed vocoids by determining the underlying metrical structure rather than relying on measurement of an individual performance. By summing these values as positive and negative quantities over a given line he obtains what he calls the 'TONAL BALANCE' of the line. He demonstrates this method on Emily Dickinson's "Because I Could Not Stop for Death" by counting three features; acute, compact, and tense, and computing stanza averages for each of these and plotting each of these as a graph. The averages for acute are the tonal balance figures. The tonal balance figures indicate a kind of synesthetic relation to the semantic content rising and falling in unison with the semantic value. Furthermore the values for the first and last stanzas are the same. Jones cites this as not only a case of terminal symmetry but again this parallels the semantic structure of the poem in that the last stanza refers to the events of the first stanza. He also observes that the graph of the compact feature is almost a mirror image of the acute feature, and that the feature tense seems to follow the semantic structure. The tonal balance for Dylan

Thomas's "Alterwise by Owl-light" according to rhyme units (the first six lines and two sets of four lines) is completely symmetrical (+3,+6,+3). Again as in the Dickinson poem, the compact values are a mirror image (-4,-7,-4). Another kind of tonal symmetry that Jones has discovered consists of a symmetrical distribution of the difference in tonal balance between succeeding lines. E. E. Cummings' "When Faces Like Flowers Float Out of the Ground" has this kind of symmetry. Both the Thomas sonnet mentioned above and the second sonnet of the same sequence has this symmetry, while the third sonnet in the series does not.

Jones has not shown us that this property is unique to poetry or that it is not shared by prose in general. I have made some studies using the Georgia Tech phoneme representation system for standard American developed by Professor Richard Hawkey and myself and using a system of distinctive articulatory features. The articulatory features differ somewhat from the system of acoustic features used by Jones but not enough to hinder the study. The difference I found between poetry and prose was dramatic. Symmetry is very much more an essential element of poetic language than it is of prose.

Jones concludes his analysis of semiotic shape in the sound texture of verse by point out that:

...the patterns have all been worked out on the basis of gross tonal structure, that is, on entire sequences of predominant sounds and not on the basis of individual sound sequences. It seems to me quite plausible that such tonal balances and shifts in tonalities and even tonal imagery is quite workable for a poet on the level of the line or stanza unit. Furthermore, such tonal manipulation of the sound texture of verse serves as another kind of symbolization which accompanies and fortifies other linguistic and semantic levels of the poetic form.

Altho no rigorous quantitative regularities involving eidension in the arts have yet been found, it is evident that already we know quite a bit about the role played by shape in esthetic meaning and that very soon esthetic laws requiring an eidontic component of meaning will be formulated, if not in poetry then certainly in painting, music, sculpture, dance, etc., and probably in all.

2. Phonology

Franz Boas seems to be all but forgotten by the linguists of the 70's, and it has been a very long time since I have seen any reference to Boas' Law. Perhaps this is because Boas' Law has become so embedded in the language of structural linguistics that, as mentioned in III.B.1, its statement in the current linguistic language seems trivial. Boas stated his startling discovery as:

One of the most important facts relating to the phonetics of human speech is that every language has a definite and limited group of sounds, and that the number of these in any particular dialect is never excessively large..., [421, Intro.].

It was this law upon which Sapir drew to motivate his theoretical concept of *phoneme*. Using Boas' *phonetic units* as an observational concept that can be defined operationally and which correlates to a fairly good extent certain of our raw sense impressions, Sapir began a new step in the structuralist program, that of developing explanations. 'Phoneme' was a term that had been used by DeSaussure neither as an observational term nor as a theoretical term (i.e., as a nonscientific term), but Sapir borrowed it for a theoretical term that he wanted to relate to the phonetic unit. He proposed that the phoneme is an ideal sound at which we aim in pronunciation, but fail to produce exactly as we intend or in exactly the same fashion as we hear it, [1241, p56fn]. Not all

differences in sound have eidontic significance but only those exemplifying different phonemes. Upon this theoretical concept, Sapir founded the science of phonology which has since become a "classical" branch of linguistics.

Even for Sapir the phoneme was a first attempt to explain and describe how all the phonetic data hangs together, i.e., is interrelated.

It may be because of the huge success that phonology has had in explaining the interrelationships of our phonetic sense experiences that Boas' law tends to be ignored or forgotten by present-day linguists, but I suspect a far different reason. We tend to think of the important laws of nature as being quantitative functional relations between different concepts, thus ignoring the fact that most of the pioneering work of science is the establishment of the proper concepts to start with. The language of science is not arbitrary; it is empirically determined, but we sometimes tend to forget the laws (and those who discovered them) which only serve to develop the language and do not exhibit any functional relationships, (Recall II.C.1 and II.C.2). Boas' Law is such an example. It is fundamental for the language of phonology, but once the language has proven successful the law is soon forgotten.

At the theoretical level the principle of distinctive features is an example of a taxonomic principle of phonology (contrasted with functional principles). In each human language only a few dozen phonemes are required to explain all of the menetically relavant phonetic data, however, since the phonemes of each language are usually distinct, the several thousand human languages require approximately 100,000 phonemes.

It was found that a theory utilizing a mere dozen distinguishing features suffices to differentiate all 100,000 phenomes.

All phonemes in all languages are composed of a very few elementary components called distinctive features.

It may be more common in the case of taxonomic laws and principles to say that the concept was discovered rather than the law or principle. We say Compton discovered the electron, so perhaps we ought to say that Jakobson, Fant, and Halle discovered the distinctive feature. However, this is only a linguistic shorthand. The distinctive feature was not discovered; it is a concept that was invented to explain the regularities described by the distinctive features principle.

In presenting this concept, Jakobson, Fant, and Halle state:

Any distinctive feature is normally recognized by the receiver if it belongs to the code common to him and to the sender, is accurately transmitted and has reached the receiver. [136, p8].

Distinctive features are useful for showing the relationship between shape and meaning in natural language and the role phonology plays in studying this relationship.

Suppose that both participants of the speech event use the same kind of standard British (often referred to as 'Received Pronunciation' at many New England Schools) and that the listener has received the vocables gip, gib, and gid, which are unfamiliar to him, as to many other speakers of British. He does not know that gip means "to clean (fish)", gib, "castrated tom-cat", and gid, "an animal disease". Yet the information he obtains from these three samples is that they may be British words, since none of the features and feature combinations contained in them contradict the British code. Moreover, the three samples

convey the information that, if they are words, then each of them has a different meaning, for there is a duple distinction between gip and gid and two different minimal distinctions separate gib from gip and gid. Were the British-speaking listener to hear the following highly improbable sentence: "The gib with the gid shall not gip it", he would know from his knowledge of the rules of the British code that /gib/ \neq /gip/ \neq /gid/. Were the samples to be transmitted in a German speech circuit, gib and gip would be identified as two optional variants of what is probably the same word, since in German the distinctions of /b/ and /p/ is cancelled at the end of the word. The same identification would be made in a Finnish speech circuit, since in the Finnish code the difference between the sounds [b] and [p] has no distinctive value.

Thus it is clear that even in prosaic uses of natural language there is meaning in the shape of signs and phonology is useful for studying this aspect of meaning. Obviously a menetic component related to shape would be useful for explaining and predicting this phenomena.

3. Razran's Law of Generalization, (1939).

The next set of experiments would be more appropriately included within the semantic discussions except for the fact that it has been used incorrectly as a basis for downgrading the importance of eidension in the study of menetic phenomena. The present discussion is an attempt to correct this false attitude and to suggest that the psychological phenomena of generalization can be used as an experimental tool of great power for probing the menetic structure of signs, especially when used in conjunction with other instruments of experimental semiotics, such as the ontotic integrator, the eidometer, and iconic circles.

Terwilliger [289, p62] states that Razran showed that generalization of conditioned responses to words takes place on the basis of meaning rather than phonetic resemblance, where 'meaning' here has some approximation to 'intension,' or 'cognition', He states:

Suppose that we have conditioned some response to a word such as /cat/. Two possibilities for generalization exist. Either the response can be made to words which sound similar, such as /rat/ and /hat/ and /cap/ and /cab/, or the response can generalize to words of similar meaning but different phonetic structure, such as /feline/ and /kitty/. Or, generalization can take place to both sound and meaning. In fact, the results of experimental studies on this issue are quite unambiguous. The generalization takes place according to similarity of meaning and not at all* to similarity of sound, at least insofar as we are dealing with normal adults and children. [289, p62].

Terwilliger does not show us any of the data or give any detailed description of the experimental methodology; in fact, he has quoted Razran out of context and completely misunderstood him. The only source he gives is [254] which is a long, detailed but thuro and well conceived analysis of Soviet psychophysicologists' contributions to the psychology of the human conscious and unconscious. In this analysis, Razran is very careful to state each time he mentions his own work on semantic conditioning that his S's had transferred their conditioning more to words that were semantically similar than to words that were phonologically similar, (see, for instance, p100), a far cry from Terwilliger's statement that similarity of sound affects generalization "not at all". In fact, Razran states quite specifically [254, p104] that the phonological (phonetographic) level of generalization is not nonexistent in us but is held in abeyance and reasserts itself in periods of lower organismic functioning.

*My underlines

In looking to the original statement of Razran's Law, we find it in [253, p90] as:

A subject gets more conditioned to the meaning of a word than to its mere visual-auditory form.

Razran's experiment involved the use of salivation as the conditioning technique and a list of homophones and synonyms as stimuluses. Salivation was measured by the cotton method, a technique discovered and perfected by himself. The stimuluses are given in Table 8:

Table 8. Razran's Stimulus Words

Conditioned Stimulus Words	Generalized Stimulus Words	
	phonologically similar	semantically similar
style	stile	fashion
urn	earn	vase
freeze	frieze	chill
surf	serf	wave

The data is given by the following table reproduced from Razran's paper:

Table 9.

CONDITIONED SALIVATIONS OF 3 ADULT HUMAN SUBJECTS TO 4 WORDS, THAT HAVE BEEN FLASHED ON A SCREEN WHILE THE SUBJECTS WERE EATING, AND TO 4 HOMOPHONES AND 4 SYNONYMS OF THESE WORDS.*					
Words	<u>Experimental session</u>				Mean
	2	3	4	5	
Style	234 mg.	276	293	218	255
Stile	57%	51%	42%	49%	50%
Fashion	64%	76%	66%	69%	69%
Urn	186	199	234	223	211
Earn	41%	34%	26%	34%	34%
Vase	50%	54%	48%	44%	49%
Freeze	268	308	314	246	284
Frieze	38%	32%	45%	46%	40%
Chill	43%	56%	68%	72%	60%
Surf	190	230	240	310	243
Serf	24%	20%	18%	28%	23%
Wave	46%	52%	68%	58%	56%
Mean for Conditioned Words	220	253	270	249	249
Mean for Homophones	40%	34%	33%	39%	37%
Mean for Synonyms	51%	60%	63%	61%	59%
*Each entry is a mean of 9 determinations and represents milligrams of net conditioned salivation (minus control salivation) in one-minute periods (the entries for the homophones and synonyms are given in percentages of the main conditioned salivation).					

It can be seen that eidontic generalization is about 63% as great as semantic generalization, so that the statement that there is NO eidontic generalization is patently false. In fact, Razran says

A subject gets more conditioned to the meaning of a word than to its mere visual-auditory form (although this pure form conditioning is, as seen from the table, by no means negligible). [253, p90].

In a footnote, Razran states that salivation is not the only suitable response for dealing with menetic generalization. He suggests that the gsr, the pupillary and wink reflexes and "indeed any response that is readily conditioned and quantified should be equally good". Indeed it was not long before Razran's results were fully verified by Riess [1194; 1180] using the gsr as the conditioned reflex. The problem has been studied by several other Americans [881; and 882], while from 1952 on, the Russians have advanced it with special speed and planning.

There are two suggestions for generalizing Razran's result and integrating it into experimental menetics. The first is the rather obvious comment that the strength of response could be used as a measure of meaningfulness while the strength of generalization could be used as a measure of the similarity of meaning between two words. As an example of the former, we would have the following list <Freeze, Style, Surf, Urn> in rank order of meaningfulness. The efficacy of this measure could be tested by comparing it to the number of mean-free-associations of a word and by comparing it with the results of Terwilliger's flicker measurement. As an example of the latter, we would have that 'fashion' is more similar in meaning to 'style' than 'vase' is to 'urn'. The efficacy of this measure could be tested for internal consistency by comparing the results of salivation against the results of the gsr.

The second suggestion concerns an investigation of menetic structure. In this vein, it is important to know that Razran also discovered that conditioning was distributed in accordance with parts of speech [1172]. Therefore I feel that "semantic" generalization can be used to explore menetic structure along with such other tools as age of development, processing speed, memory span, and memory coding. For instance in [281, p158] Skinner suggested that concrete terms usually have greater emotional effects than abstract. These emotional effects can be measured by salivation, gsr, pulse rate, and blood pressure. By generalizing the response, the effect of abstractness on similarity of meaning could then be measured. Another variation using Razran's Law would be to combine generalization with a measurement of the maximum signal to noise ratio that can be tolerated and still produce menetic generalization. The measurement would be the amount of noise still left in the signal when the menetic generalization effect is on the verge of disappearing.

Finally, because of other studies I shall report on in G.4 and IV.P, we might expect to find large changes in menetic generalization at the point where a sign takes on a new component. In other words, tagmatic generalization > eidontic generalization > ontotic generalization, etc. This effect could then be used to help map out the structural relationships between the components of tagmension, eidension, and ontosion, etc.

Finally, we conclude that far from denying an eidension component of meaning, Razran's Law verifies an eidension component and could very well provide a tool for mapping out the relations between it and other components of meaning.

The effect Razran described with his law is quite in accordance with other work in perceptual and cognitive psychology. For instance, Garner [103, p90] both in his own work and in that of Whitman found that performance in a sorting task was greatly improved by adding a semantic and tagmatic level where he had previously had only an ontotic and eidontic level and the effects of shape and eidension previously found were attenuated but not completely eliminated when the shapes formed words with tagmension and a semantics.

4. Evidence from Eidometer Studies that a Sharp Change Occurs at $\sim 1.0^{\circ}$ ED, (1974).

The eidontic deviometer (ED), or eidometer, is an instrument for measuring the shape of a word relative to a typical shape (or norm) for a given language. For instance, the words of Table 10 are ranked in order of increasing deviance from normal American words:

Table 10. Artificial Word Forms Ranked in Order of Increasing Deviance from American

Word Form	Deviance $\sim ^{\circ}$ ED
THIS	0.0
LYDRA	0.5
SROULDI	1.0
ABATIBBRIX	1.5
KEFASETOGE	2.0
XWQQ-RY'D-UL	2.5
WSBBUU'-FQXX'NOII-ZZZ	3.0

The eidontic deviance is a systematic semiotic measurement generalized from and based on an insight originally due to Markov and later used by Shannon. Markov information sources can be made to generate artificial word forms of various orders. Markov's Law states that the

higher the order of the Markov chain used in the Markov information source, the more the output will look like the natural language upon which the measurements were made to construct the n-gram tables used in the information source.

However, this intuitive relationship cannot be used as it stands for measuring word shapes. We cannot assign a given word to a given order. Only processes can be related to orders. For instance, the word 'N' has been observed at various times as the output of a zero order Markov source, a second order, and a third order Markov source. To which order should we assign this particular shape?

There are also several other problems associated with the use of Markov chains as a measure of word shape. There is too much variation in the shape of words generated by a source of a given order. As an example of this problem, Table 11 lists several words all generated by a second order source.

Table 11. Words Generated by a Second Order Markov Information Source

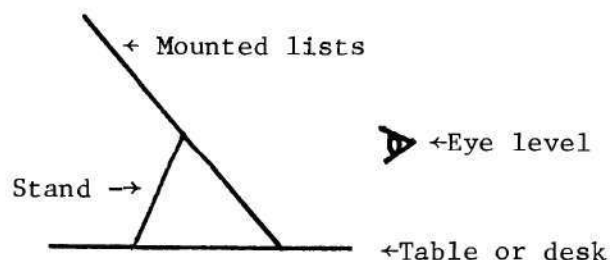
1.	N
2.	LYDRA
3.	PIBRASOUL
4.	TED
5.	AT
6.	RIG-ORAXA
7.	FORTRAX
8.	HIDN'T
9.	S
10.	RIP'ASONGER-ING

As can easily be seen from this table there are words which look very much like normal American words (in fact, words 4 and 5 are normal

words, while word 7 might very well be the name of a programming language and word 8 looks like a clever invention meaning 'did not hide') and words which by no stretch of the imagination could be said to look like American (words 3, 6, and 10 are perhaps the worst). Another problem with the use of Markov orders as measures of word shape concerns the fact that mathematicians have not yet developed a concept of Markov chains of non-rational or even non-integral orders. We have no values between 2 and 3 to use as measures. Our measurement scale would indeed be sparse.

All of these problems can be avoided by the following procedure: Generate 40 words each of four orders 0 thru 3 (higher orders may be used if available---my polygram frequency tables are based on counts of the 5-1/2 million letters in the Brown Corpus of standard machine readable American and includes all counts of monograms, digrams, and tri-grams only). Have a literate S sort these 160 words into 16 classes of about 10 words each. Display each class on one sheet of paper as a list of words so that you have 16 lists in all. Have a second literate S sort these 16 lists into rank order according to which list in general looks most like normal American words and which look least. Number the lists according to this rank order. Now determine the order of the source that generated each word on each list. For each list, add up the source orders and divide to find the average. Compute the rank order of the 16 lists according to average source order. Markov's Law states that there will always be a high correlation between these two rankings. For instance, the Spearman rank correlation coefficient given by

Use a board such as beaver board, cork, or other such as will easily hold thumb tacks. Assemble a piece of this material the height of one of your lists and wide enough to hold all of your lists. The lists may be overlapped to save space but none of the words may be covered up. This board should be mounted on a stand such that it will be in a comfortable position for use.



The lists on the face of the instruments should be given some identification designating rank order, such as the letters A, B, C, ..., etc., or Roman numerals I, II, III, ..., etc.

I and several of my students had prepared such an instrument with the scales labeled 0.0; 0.25; 0.50; 0.75; 1.00; 1.25; 1.50; 1.75; and 2.00 in order to test the efficacy of interpolation. We had generated 113 words of all orders 0 thru 2 and found that we could get repeatable measurements as fine as 0.05°ED . Several of us found that some of our S's remarked that the words they were measuring began to take on a meaning of their own, a generalized kind of meaning, when their ED fell somewhere between 0.50 and 1.00°ED . This was a vague, general kind of meaning that is characterized by such protocol comments as "it's changing right before my eyes". When S's are measuring a group of words,

they will usually settle down to some steady rate of processing. When this phenomena occurs, it breaks the cycle completely and the first time it happens to a S he will be completely surprised, or even shocked by it.

This phenomena appears to pertain directly to eidension in that we have the same medium, no tagmension, no extension, etc., and only the shape is changing. The meaning can only be characterized as vague, or general, or "it's trying to tell me it's meaningful, but I can't make out what". I am presently engaged in designing an experiment to explore the nature of this phenomena. I might add that this is wholly my own work, I have not been able to find anything similar to it in the literature, and certainly no mention of what could be called the "onset of eidension". The only thing vaguely resembling this is an experiment by Miller, Bruner, and Postman [202] which explored the interpretation accuracy of words in various of Shannon's original Markov source lists.

One possible explanation for the onset of eidension will be explored in section IV.P when Garner's "Selective Sequential Processing Hypothesis" is examined. Briefly the hypothesis is to the effect that each internal component of the sign is processed in a separate processing center of the mind and that the processing is sequential and occurs in a fixed order. A sign will be processed first at the ontotic level and then may or may not be passed on to the eidontic level depending on the outcome of the processing at the ontotic level. The onset of eidension then represents a critical value below which the sign is not passed on to the eidontic center, and above which it is. This hypothesis can be easily checked by methods due to Garner and his

colleagues and discussed in IV.P; or even by the method of menetic generalization discussed in IV.G.3.

In IV.G we have examined various empirical phenomena which can be used as justification for an eidension component of meaning. In discussing these the language developed in Chapter III was used. In IV.F the same was done for ontosion. The language I have developed really shows its power when discussing the interrelationships between levels. For this reason some of the phenomena which might properly belong in these two sections has been deliberately withheld until IV.P when I discuss the interrelations between ontosion and eidension. Two constellations will be discussed there, the Garner phenomena and the Zipf-Jung phenomena.

H. Observational Support for Tagmension (The Meaning Related to the Linguistic Context): Illustrating the Method of

Logical Analysis

What mean all these mysteries to me,
Whose life is full of indeces and surds?
 $x^2 + 7x + 53 = 11/3$.

_____ Lewis Carroll.

A word without linguistic context is a mere figment and stands for nothing by itself.

_____ Baker: The Pattern of Language

This component of meaning was introduced in III.B.4 and defined in III.D.3. It is further explicated in V.B.3 and V.C.3.

The group of laws discussed in this section will have a bearing on the relation between the structure of meaning as a whole and the structure of tagmension since each shows some regularity regarding the re-writing of various kinds of words or phrases *in context*. But first I

want to introduce another method of studying the structure of meaning.

1. The Method of Logical Analysis

Logicians have been traditionally concerned with the study of the aspect of meaning which is related to the semiotic context. I am not saying that this is all that logicians study or have studied but simply that it has been one of their primary interests. This aspect of logical analysis is emphasized by Strawson in three passages from his Introduction to Logical Theory. He first says that the logician analyses only those meanings that are connected together in semiotic context:

Words of logical appraisal have connected meanings. To be clear about the meaning of one such word is to be clear about the meaning of the others. [1310, p2].

Next he says that these meanings consist of similarities between contextual patterns:

... in noticing such formal analogies, what do we notice? We notice *resemblances* between valid inferences. And these are not resemblances in style or theme, but verbal resemblances; resemblances between groups of words with a recurring verbal pattern. [1310, p45].

Finally, he reemphasizes this by specifically mentioning another kind of meaning that logic may be thought to be concerned with,-- extension:

Formal logic is concerned with the meanings of sentences only insofar as these can be given by entailment-rules. Indeed, its concern is far more limited than this suggests, for only a relatively small subclass of highly general entailment-rules are of interest to the logician. Hence formal logic systematically ignores the referring element in ordinary speech. [1310, p214].

The fact that logicians have been successful in this analysis gives us one more tool to use in our analysis of meaning (and also shows that words do have contextual meaning and thereby the usefulness of the 'tagmension' terminology). One purpose for the semiotician's study of formal logic is to be able to determine when such a tool as logical

analysis can be helpful in the study of meaning structure and when not.

My words in this section should not be interpreted as taking sides in an intertwined pair of controversies that concern the nature of the foundations of logic: whether in fact logic and mathematics are purely syntactic in nature or include a semantic element and whether logic is primarily tagmatic or noetic. The first controversy has concerned primarily the formalists vs. the symbolists (i.e., formal logic vs. symbolic logic) while the latter has been intertwined with the nominalist/realist controversy. These controversies are completely separate from the useability of logical analysis to analyze the tagmatic meaning of words and I have carefully chosen my examples to reflect this fact.

2. Russell's Contextual Definition Observation, (1905).

In 1905 Russell discovered a contextual rewriting rule whereby he claimed the definite description can always be eliminated in favor of predication. [261]. Later, he generalized this by observing that individual expressions, descriptions, and class expressions can all be defined in terms of contextual definitions and hence what is said with their help can also be said without them.

Denoting phrases in propositions can always be rewritten in context into forms in which no denoting phrases occur.

It is important to note that the conclusion "hence denoting phrases do not have meaning" is not a natural law and not forced on us by the data. It is not even an opinion about law or the data. It is an opinion about what kind of theory is the most practical. [92, p106]. The rewritten phrase is not synonymous with the original but only preserves the tagmension. Hence meaning is not preserved by this transformation,

but it does tell us something about the structure of tagmension. Carnap remarked [45, p140] that rather than this phenomena justifying the exclusion of meaning from these expressions, a correct theory of meaning would explain this phenomena, i.e. by a theorem. This is also an opinion on the practical direction of menetic theory but one that is closer in outlook to the tone of this thesis. Altho Russell interpreted his discovery incorrectly, he evidently did make the first observations and recorded them, hence it deserves to be called 'Russell's Contextual Definition Observation', or 'Russell's Law of Denoting Phrases'.

In developing his rule, Russell takes the notion of *variable* as fundamental, [261, p104], but the notion of a variable is tagmatic and the meaning of a variable has only a tagmension component, thus Russell is limiting himself from the very start. The evidence indicates that denoting phrases have more than just a tagmatic meaning.

Suppose now we wish to interpret the proposition, 'I met a man'. If this is true, I met some definite man; but this is not what I affirm. What I affirm is, according to the theory I advocate: 'I met x , and x is human' is not always false. [261, p104].

In this one step Russell loses all meaning except tagmension. He also concludes that

' C (a man)' means ' $C(x)$ and x is human' is not always false. and that this leaves 'a man', by itself, wholly destitute of meaning, but gives a meaning to every proposition in whose verbal expression 'a man' occurs. But there is no justification that 'a man' is left meaningless, he can only claim to have found that the tagmension of 'a man' has a certain structure.

Russell noticed that for occasions when only syntax and tagmatic meaning are at stake, i.e. logical analysis, the denoting phrase ' C (all x)'

can be replaced by 'If y is x , then $C(y)$ is true' is always true.'; the denoting phrase ' $C(\text{an } x)$ ' can be replaced by 'It is false that ' $C(y)$ and y is x ' is always false.'; and the denoting phrase ' $C(\text{the } x)$ ' can be replaced by 'It is not always false of y that $C(y)$ and $\exists(y)$ and ' $C(z) \rightarrow z = y$ ' is always true of z .'

In the case of indefinite singular terms, Quine interprets this as saying that all indefinite singular terms can be paraphrased in terms of 'everything' or 'something' followed by the words 'is an object x (or y , etc.) such that'. Hence in logical analysis we may conveniently subject these to condensed symbolization:

' $\exists(x \in \mathcal{O})$ ' for 'something is an object x such that'

and

' $\forall(x \in \mathcal{O})$ ' for 'everything is an object x such that'

[245, p162].

But not even Quine claims synonymy; only explication for purposes of logical analysis.

3. Quine's Rule of Contextual Rewrite for the Singular/Plural Dichotomy, (1960)

Quine himself [245, p90] observed a superficial (i.e. can be eliminated) grammatical dichotomy between singular and plural (not the singular/general dichotomy) and by standardizations of phrasing the contexts that call for plurals can in principle be paraphrased away altogether. If this is completely true in general it indicates that the whole meaning of the plural morpheme is carried by the tagmension component, but this is not too surprising since the plural morpheme is a prime example of a tagmeme and these in part formed the philosophical basis for the notion of tagmatic meaning in the first place. A term's

...singular and plural forms are most conveniently looked on not as two kindred terms, but as ways in which one and the same term turns up in varying contexts. The '-s' of 'apples' is to be reckoned thus merely as an outlying particle comparable to the 'an' of 'an apple'. [245, p90].

Later he shows us how this observation may be used in logical analysis:

General terms of the form ... 'other than y ', are of particular interest in that they enable us to analyze away the most distinctive use of the grammatical plural. Thus take 'I hear lions', meaning at least two. This amounts to 'I hear a lion other than a lion which I hear'---a paraphrase which, however, unnatural, is both straightforward and devoid of plural endings. (The 'other than' in it may, as before, be rewritten 'which \neq '.) Extensions of the same method enable us to say specifically for each n that there are n objects of a given sort, that there are more than n , and that there are fewer, still without recourse to plural forms. [245, p118].

And finally, for the most recalcitrant form of the plural, as general term in non-predicative position:

In 'Turtles are reptiles', 'Paul and Elmer are sons of colleagues', 'Buffaloes have dwindled', and 'I now hear lions', six general terms appear in the plural; in the paraphrases:

(x) (if x is a turtle then x is a reptile),
 $(\exists x)(\exists y)$ (Paul is a son of x and Elmer is a son of y and x is colleague of y),
 $(\exists t)$ (t is before now and $\hat{x}(x$ is a buffalo) now is smaller than $\hat{x}(x$ is a buffalo) at t),
 $(\exists x)(x$ is a lion and I now hear x and $(\exists y)(y \neq x$ and y is a lion and I now hear $y)$)

all six have predicative position. [245, p174].

From these examples we thus see the usefulness of the *tagmension* concept for logical analysis and the usefulness of logical analysis for exploring the structure of tagmension.

I. Observational Support for Extension (The Meaning Related to the Object): Illustrating the Method of Behavioral Observation.

Men are the constant dupes of names, while their happiness and well-being mainly depend on things.

James F. Cooper

This component of meaning was introduced in III.B.5 and defined in III.D.3. It is further explicated in V.B.4 and V.C.4.

The problem with extension is that the feeling that extension is part of the meaning of words is so intuitive that ever since the time of Plato meneticists have been looking for evidence and laws that would support the principle that extension is not the *only* component of meaning. See the discussion of Wittgenstein's paradox in IV.C.1. (Aristotle, however, designed a formal logic of the syllogism which depended only on an extensionistic theory of meaning.) As a result of this situation it is not easy to come by law-like statements in the literature relating the meaning of words to their objects. If such laws and their evidence are to be found, they may very likely be found in the older literature on nominalism and empiricism, e.g. Peter of Spain, Occam, Locke, Hume, and J. S. Mill.

In the meantime, however, there is no lack of informal discussion on the need for an extensional component of meaning. The following discussion by one of the more respected General Semanticists, S. I. Hayakawa, uses a methodology, Behavioral Observation, which has already been discussed, so I proceed directly to the discussion of meaning. The observations are partly Hayakawa's and partly mine.

1. Towards a Law Requiring an Extensional Component of Meaning

Hayakawa has remarked that:

... an examination of the physical context (of an utterance) directs us to the extensional meanings. [123, p56].

For instance, when John says to Mary, "Bring me the blue book on that table.", Mary walks to the table rather than some other place and sees that it is piled with many things including books of various colors, but

only one blue book. She brings John the blue book, not a red book or a candlestick. She correlated John's words with various objects they were intended to stand for. This suggests that: *The meaning of words is in part related to the objects they stand for.* We may call the above the 'Restricted Principle of Extensionality'. This contrasts with the much stronger nominalistic Principle of Extensionality which states that *all* meaning can be reduced to extension; altho some milder versions limit this claim only to all meaning occuring in science and philosophy. This thesis takes no stand on this milder nominalist principle, but is obviously contradictuous to the stronger version.

The objects of our words are very often more meaningful (I do not mean more *significant*) than the words themselves. If extension were not a component of meaning it would be hard to account for the fact that even if we fail to use the customary words in some situations, people can very frequently understand us. For example:

- 1) A. Gosh, look at that second baseman go!
 B. (looking): You mean the shortstop?
 A. Yes, that's what I mean.
- or 2) A. There must be something wrong with the oil line; the
 engine has started to balk.
 B. Don't you mean "gas line"?
 A. Yes---didn't I say "gas line"?

The objects often indicate our meanings so clearly that we do not even have to use the right words in order for our meaning to be understood.

I myself observed a transaction (Peachtree Battle A & P, 74-9-21; Atlanta, Georgia) in which the only possible explanation for the observed

actions is that the meaning of words includes an extension component.

3) Scenario:

Boy---Holding a pink grapefruit: What would we do if I
bought one of these?

Girl: Well, I don't like the pinks, I like the white ones
better.

Boy---Exchanges the pink for a white and says: Let me
rephrase the question. What would we do if I bought one
of these?

The last line of the scenario has the same superficial structure (surface structure minus the nonterminal nodes) as the first line but their meanings are different, in that they achieve different responses. The rephrasing doesn't make sense if we look at only the superficial structure. They are identically the same strings. The only difference is the real object, the grapefruit the boy holds in his hand. Therefore the phrase 'one of these' must have a component of meaning related to, but abstracted from the real-world object. Extension must be one component of meaning.

J. Observational Support for Intension (The Meaning Related to the Ground): Illustrating the Method of Logical Analysis.

"Must a name mean something?" Alice asked doubtfully.
"Of course it must," Humpty Dumpty said with a short laugh:
"my name means the shape I am---and a good handsome shape it is,
too. With a name like yours, you might be any shape, almost."

_____ Lewis Carroll: Humpty Dumpty

This component of meaning was introduced in III.B.6 and defined in III.D.3. It is further explicated in V.B.5 and V.C.5.

In two recent books [45; 245] Carnap and Quine have used the method of logical analysis to examine the empirical support for, and the theoretical properties of, extension and intension; and altho Quine himself was unsympathetic to the concept of *intension*, he has gathered together a series of law-like statements describing its properties. These "laws" were known before Quine---some since at least the thirteenth century---but Quine has gathered them together in one place and given an excellent discussion of them. My statements of the laws will follow more closely Quine's versions, but my analysis will adopt concepts and arguments from Carnap who in general is much more sympathetic to the multiple component approach to menetic theory. The use of the terms 'extension' and 'intension' by Quine and Carnap do not indicate identity with my concepts bearing the same labels. While there is obviously and deliberately a family resemblance, my concepts are deliberately more vague than either of theirs.

Finally I shall close this section with a mention of a philosophic problem that has been important ever since the time of Boethius (c.500), and has been closely associated with the concept of *intension* by many semioticians since Peter-of-Spain and John Duns-Scotus. While the problem of *generality* is closely related to the concept of *intension* the problem is primarily a theoretical one rather than one of experiment and observation and after showing the ability of the language of menetics to handle the concept of *generality*, I shall drop the subject without attempting to abduce a theory.

1. The Laws of Referential Opacity

- a) Quotation gives rise to non-referential positions. [245, p143].

- b) One and the same occurrence of a term may have purely referential position with respect to its immediate surroundings and not with respect to a broader context. [245, p144].
- c) An occurrence of a term within an opaque construction may not bar it from referential position in every broader context. [245, p146].

A fourth law of opacity was stated:

- d) Constructions using psychological verbs may have both a transparent and an opaque interpretation. [245, p145].

However, this law involves a relationship between cognesion, intension, and extension, and so I have chosen to ignore it for this discussion.

Def: Two terms are EXTENSIONALLY-IDENTICAL \equiv They have the same extension; that is, they denote exactly the same objects. Quine calls this 'referential identity'.

Def: A position within an expression is subject to the SUBSTITUTIVITY-OF-EXTENSIONAL-IDENTITY \equiv the extension of the experssion remains invariant to the substitution in that position of any term for an extensionally identical term.

Def: A position in an expression is EXTENSIONAL \equiv it is subject to the substitutivity of extensional identity. Thus a term occurs in extensional context just in case its position is subject to the substitutivity of extensional identity. Quine calls this 'referential position'.

Quine credits Frege [100] with both the concept and the criteria for extensional position; only the nomenclature has been changed. To Carnap [45] are due the following concepts and criteria.

Def: Two terms are INTENSIONALLY-IDENTICAL \equiv they have the same intension; that is, they connote exactly the same concept.

Def: A position within an expression is subject to the SUBSTITUTIVITY-OF-INTENSIONAL-IDENTITY \equiv the intension of the expression remains invariant to the substitution in that position of any term for an intensionally identical term.

Def: A position in an expression is INTENSIONAL \equiv it is subject to the substitutivity of intensional identity and is not extensional. Thus a term occurs in intensional context just in case its position is subject to the substitutivity of intensional identity but not to the substitutivity of extensional identity. The concept of *intensional identity* is a stronger notion of identity than that of *extensional identity*.

We can now see that a) is simply a rephrasing of Frege's observation in 1892, that words in direct quotation do not have their customary nominata [100,p87]. This in turn was known as early as the thirteenth century by Peter of Spain. A classic example is

"Tully was a Roman" is trochaic.

Here the phrase 'Tully was a Roman' appears in quotes and thus refers not to the Roman senator but to the first line of a certain poem in British. Now 'Tully' and 'Cicero' are different names denoting the same object but yet if we say

"Cicero was a Roman" is trochaic.',

so far from meaning the same thing are they that not even the truth value is preserved. Not only does 'Cicero was a Roman' not refer to the first line of *any* poem, its meter is not even regular.

As data for b) we have the fact that the word 'Tully' in 'Tully was a Roman' has purely extensional position, but not in

'"Tully was a Roman" is trochaic.',

hence this is just another but broader aspect of the same phenomena.

It was also observed by Frege, [100].

Evidence for c) is given by the occurrences of the personal name in:

'Tully was a Roman' is true.

'Tully' denotes a Roman.

but the predicates of these sentences are peculiarly menetic, referring as they do to *truth* and *denotation*. This result may depend heavily on the particular forms of the definitions for 'opacity', 'extensional position', and the assumption of truth values as referents of declarative sentences, (substitution *salva veritate*).

One characteristic that these three "laws" share is their concern with opacity as can be seen from this definition:

Def: An expression of containment C is EXTENSIONALLY-TRANSPARENT iff whenever an occurrence of a singular term t is purely extensional in a subexpression S , it is purely extensional also in the containing expression $C(S(t))$. An expression of containment C that is not extensionally transparent is called 'EXTENSIONALLY OPAQUE'.

Another of their characteristics is that all three show how an extensional component of meaning can be related to an intensional component.

2. Generality is Related to Intention

Science, as Aristotle said, deals with generals. Hence if we can develop languages for doing science at all, the words of these languages

must have a component of meaning related to generals. It may also be stated that if the statements of science are true of the real world, the objects of scientific statements must be somehow real. The question of "real" generals can best be studied by an empirical analysis of intension and its relations to extension, but this leads to a question of interpretation involving realism and nominalism and it is not this philosophic controversy that I intend to discuss but only the "meaning" of generals. The nominalist makes generals a mere convenience whose only value is that they are compendious [1109, 4.1]. The realist agrees that generals are convenient because of this compendicity but stoutly maintains they have additional values as well. It is this agreed upon compendicity that I am introducing at this point. For example, Peirce, a notorious realist, would insist that there is something real about humanity. On the other hand 'unicorn' is just as general a term as 'human', but no one---Peirce included---ascribes any reality to it. We thus ask what is the meaning of the generality of general terms, of such terms as 'unicorn'.

The concept of generality to be discussed here is best presented by the scholastic definition as that which is predicable of many. While this is not the only definition of generality by any means, it will allow me full freedom to illustrate the use of the language of menetics and that is the only objective of this chapter.

This notion of *generality* pertains to the relation of a predicate to a subject. When the logician says that 'man' is a general term, he is indicating that 'man' can be predicated of many different subjects and it is in the relation which a term bears to many subjects that generality is to be found. Scotus sometimes used the term 'logical

universal' to refer to this concept of generality, [26 , p45]; while Peirce distinguished two ways in which the predicate can be general. First, its signification can be in many minds. Peirce calls this 'subjective generality', [1109, 5.429], and it is related to the intension of the term. The 'objective generality' of a term lies in its signifying many things [1109, 5.103], and it is related to the ground of the term. Peirce held that corresponding to every term is a set whose members have a certain character, or property, [1109, 4.171 & 4.649]. For instance corresponding to the term 'blue' is the set of blue objects having the property blueness. This property, or character by which the sign denotes the particular objects it denotes, Peirce calls the 'ground' of the term. Objectively a term connotes the property of the ground and denotes the objects of the set; while in subjective terms, for Peirce, a term has an extension and an intension. He gives the example [1109, 4.650] of the set of all phoenixes that were, are, or will be which is identical with the collection of cockatrices that exist now so that the extension of these two terms is the same altho their intensions are different. In the terms of the last subsection, 'phoenix' and 'cockatrix' are extensionally identical but intensionally different. He also says that we can move from 'All men are mortal.' to 'The property of mortality is possessed by every man.', [1109, 6.382]. Thus the act of predication shows that the subject does or does not possess the property of the ground connoted by the predicate. A predication uses the extension of the subject term to draw attention to an object while using the intension of the predicate term to draw attention to a ground. The predication, if positive, affirms that the denoted object has the

property of the connoted ground; and, if negative, denies the same.

'John is tall.' is true iff the object denoted by 'John' has the property of tallness connoted by the term 'tall'. In turn, the set of objects denoted by a term include every object which has the property of the ground connoted by the same term. It is not the object (in itself, as separate from the sign) that has essential properties, but the ground of the term used to denote that object. 'Essential' and 'accidental' are thus relations between properties and signs and not between properties and objects in themselves. In turn, it is the ground that gives rise to generality. Because the term denotes any object that has the property of the ground connoted by the term and because more than one object may have any given property the term denotes (may denote) many things and is thus predicable of many. Thus generality is a gruntotic property of signs, not a property of objects (in themselves) and is what the scholastics called a 'property of second intention,' (not 'intension').

It is not my purpose to explicate the concept of *intension* here; that would be a theoretical task, and I have only intended to give an example of the use of my language to discuss this concept. This I have done. Not have I pursued this example far enough to explicate the uniqueness of proper nouns (from what has been said above, proper nouns could also be general) but that also would be a theoretical task. I hope that the above example has suggested that the language of menetics could also be used to discuss *singularity* as well as *generality*. If this leads to an empirical discussion of *singularity* and *generality*, so much the better.

K. Observational Support for Cognesion (The Meaning Related to
The Cognitive Mentellect): Illustrating the Method of
Language in Use

These eternal and necessary truths are understood by the
rational soul of man thru the illumination that stems from the
mind of God.

_____ St. Augustine: *De Trinitate*

The immediate logical interpretant reacts upon the immediate
formal interpretant.

_____ Charles Peirce

Cognesion determines intension.

_____ The Language of Menetics

This component of meaning was introduced in III.B.7 and defined
in III.D.3. It is further explicated in V.B.5 and V.C.6.

In Chomsky's early work [55] he attempted to avoid an involvement
with "semantic" matters. However, by the time of [64], he had begun to
realize the importance of extensional opacity and other semantic matters.
But note, that in his treatment of "semantic markers" he is never clear
as to which markers are actually semantic, which syntactic, and which
are really pragmatic. By 1970, Chomsky was coming to see the need for
various semantic components and had a partial feel already for the role
played by cognesion. His confusion of terminology between 'intension'
and 'cognesion' is typical of almost all of the literature except that
of the realist philosophers who I find to have been the most careful
on this particular point. Even Carnap claimed that his *intension* was
an explication of Frege's cognesion-like concept of *Sinn*.

1. Chomsky's Observation on the Representation of Cognesion

Different cognesions must have different menetic representations.

This observation [65, p26f] phrased in terms of 'intensions' and 'semantic representations' could by itself be enough to force the inclusion of a menetic component of cognesion in the theory of meaning. It is clear from what Chomsky says that he means by 'semantic representation' a representation of all of the meanings of a form and not just its semantic meaning. It is also clear from his examples that he does not mean by 'intension' what either I, or Carnap, meant by this term, but means something much closer to Frege's *sinn*, or my *cognesion*. The observation is based on properties of the verb 'realize', but holds equally well for any epistemic verb such as 'believe', 'know', 'be aware of', etc.

The data for the observation includes consideration of such expressions as (33)-(35):

(33) John's uncle

(34) the person who is the brother of John's mother or father
or the husband of the sister of John's mother or father

(35) the person who is the son of one of John's grandparents or
the husband of a daughter of one of John's grandparents, but
is not his father

As well as the context (36):

(36) Bill realized that the bank robber was _____.

The expressions (33)-(35) are all NP's syntactically, and are all intensionally identical but the sentences S_{33} , S_{34} , S_{35} formed by inserting (33)-(35) into (36) are not paraphrases of each other since it is easy to imagine conditions in which each might be true and both of the others false. Hence the menetic representation of such phrases as (33)-(35) and such verbs as 'realize', etc., must be designed to take this into account. Since the difference between (33), (34), and (35) is primarily one of cognesion, a cognesional component must be included in the menetic representation, and such verbs as we are discussing must

be sensitive to and react to this component. We must consider such facts as that people can perfectly well have contradictory beliefs, can correctly be said to fail to realize that P even tho (in another sense) they know that P, or to be aware that P but be unaware that Q where P and Q are different expressions of the same proposition. There is nothing in the least paradoxical about these facts; it is the function of such words as 'realize', 'be aware of', etc., to deal with such situations which are perfectly common and quite intelligible in NL.

We might attempt to frame definitions for cognesional identity, cognesional position, intensional and cognesional opacity, etc., as was done in IV.J for the components of extension and intension, however, the state of the art of logical analysis is not currently up to this.* Carnap, Church, Putnam, and Mates have been involved in logical analysis involving the clarification of the distinction between intension, ground, cognesion, and cognitive mentellect. Carnap attempted a definition of 'intensional synonymy' in [45, p231ff] but in 1950 Mates discovered a paradox [190, p215] that showed the weakness of Carnap's definition and perhaps the difficulty of explicating any notion of synonymy not involving identity of all nine menetic components. Church [73; 484] used a stricter relation which he called 'structural isomorphism'. Neither author quite reached the point of suggesting the notion of *string identity* but this is approached quite closely by both,

*I say "not currently" rather than "not yet" because until we have critical editions of the logical writings of several of the Scholastics, such as Peter-of-Spain and John Duns-Scotus, it may reasonably be suspected that Scholastic logical analysis was up to at least attempting such definitions.

especially when combined with Putnam's requirement for 'syntactic identity'.

We may summarize the discussion of this and the previous two sections with the following example: It is necessary that five plus four is nine, but it is only empirical and not necessary that nine is the number of planets, therefore we cannot reason correctly that it is necessary that five plus four is the number of planets. However, it is necessary that nine is five plus four, and also necessary that nine is six plus three, hence it is correct to reason that therefore it is necessary that six plus three is five plus four. However, we must keep in mind the fact that it is not correct to conclude that Tom believes that six plus three is five plus four from the facts that Tom believes that nine is five plus four and Tom believes that nine is six plus three; primarily because Tom may not believe, or even be aware of, the transitivity of equality. This example can be explained by requiring menetic theory to have three semantic components which we may arbitrarily call 'extension', 'intension', and 'cognesion'. We then say that the terms 'nine' and 'the number of planets' have the same extension but different intensions and different cognesions while the terms 'five plus four' and 'six plus three' have the same extensions, and the same intensions, but differing cognesions. Chomsky observed phenomena such as this associated with such cognesionally opaque (this term is not defined) verbs of NL as 'believe' and 'realize' and therefore realized the necessity of the empirical requirement of including the representation of cognesion in any menetic theory for NL.

2. Abstraction is Related to Cognesion.

Intellectual thought involves abstractions and this could again involve us in the question of "real" abstractions taken up by realism; a question which I want to avoid in this thesis. I only want to suggest a relation between the *meaning* of abstractions and cognesion much like the relation between the *meaning* of generals and intension. The same caveats are operant here as in section IV.J.

Peirce held that the term 'abstraction' has been misleadingly applied to two quite different operations which he called 'prescise abstraction' and 'hypostatic abstraction'; or sometimes just 'presciscion' and 'abstraction', [1109: 2.364; 2.428; 4.234-35; 4.332; and 5.534]. In prescise abstraction a thing is thought of in general thru one of its aspects indifferently to the others, as in: 'The library building is large.', where nothing is said about color, position, and so forth. The library is one of many large things. Insofar as we are interested in larges at all, we are interested in large things in general. However, in hypostatic abstraction the property selected is converted into another logical subject, and thus changes from something we think thru to something we think about: 'The library building has largeness.' [1109, 4.332]. Now instead of things large, our interest focuses on largeness itself *as a thing*. 'The largeness of the library building is impressive.' Our focus narrows from large things in general to the abstract concept of largeness itself, as a thing about which we can further talk. We may call this the 'condensation' of generality as opposed to either Quine's 'division of reference', or Scotus' contraction of 'hekicity'. Often Peirce follows James in describing abstraction as making

"substantive" the "transitory" elements of thought (the "birds on the wing"), [1109, 3.642, 8.89-90]. However, Peirce emphasizes that abstraction is not to be taken as a psychological process [1109, 2.44, 2.428]. It is part of semiotic structure. The concept of *precision* is just our old concept of *generalization* revisited in terminology appropriate for contrasting it with *abstraction*. It is Peirce's concept of *hypostation* that will serve as our model of *abstraction*. We may view condensation of generality as a cone with its base in the ground of the term and its apex in the cognitive mentellect of the term as in Figure 8.

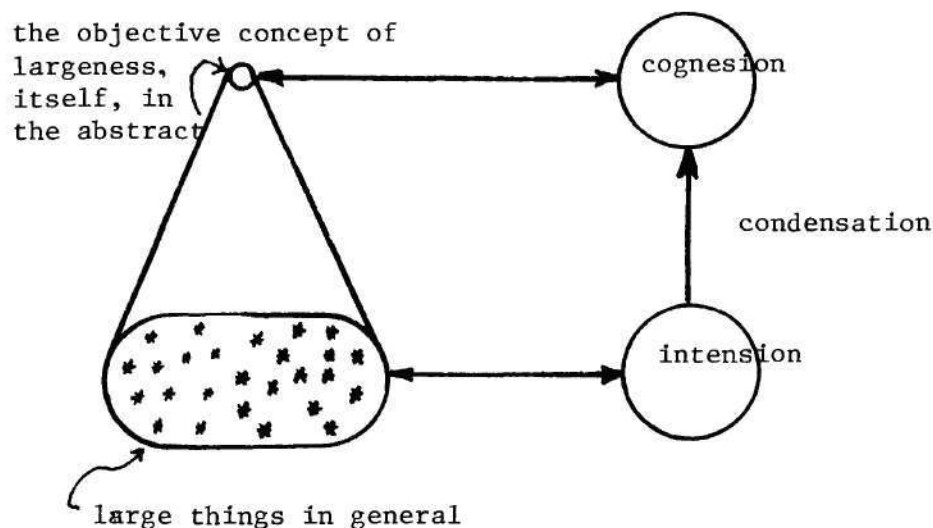


Figure 8. Condensation of Generality

If we turn the cone of condensation upside down, using analogical reasoning, we can view the contraction of hekicity as a focusing from things in general to an individual thing, from all large things to a particular large individual.

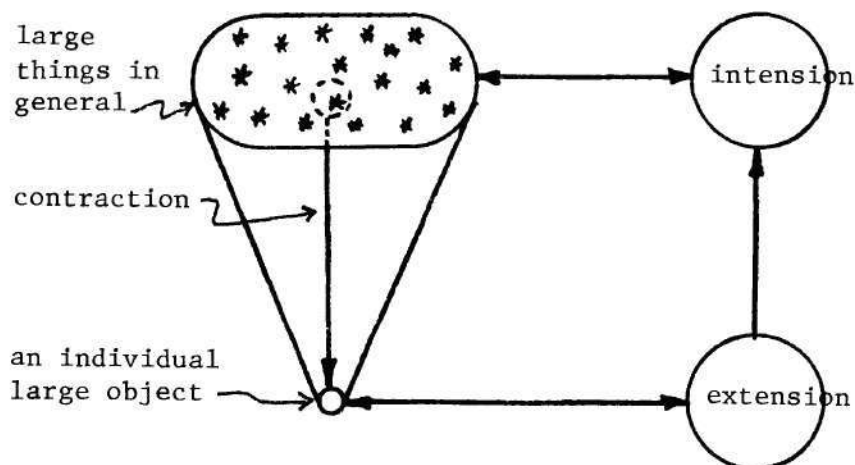


Figure 9. Contraction of Hekicity

We thus find the base of the contraction cone in the ground of the term, but its apex is fixed in the object. Thus while condensation and contraction have an analogical structure, they are essentially different in this respect, that contraction is dependent on an individual thing while condensation is dependent on an objective concept. Note that Duns-Scotus uses the term 'contraction' as a relation between the ground and object of terms while I use 'condensation' as a relation between intension and cognition. This difference is founded in Duns-Scotus'

concern for realism and my concern for menetics. The terminology can be adapted either way, it is tolerant of philosophical viewpoints. Even nominalism can be seen to have a place in this schematization as a primary concern over the relations between the objects and extensions of terms. If we combine the above two figures, we get another concise summary of these last three sections, and a structural diagram that will be found useful when we attempt to use the new language to explore the bounds of taxonomic theory in Chapter V.

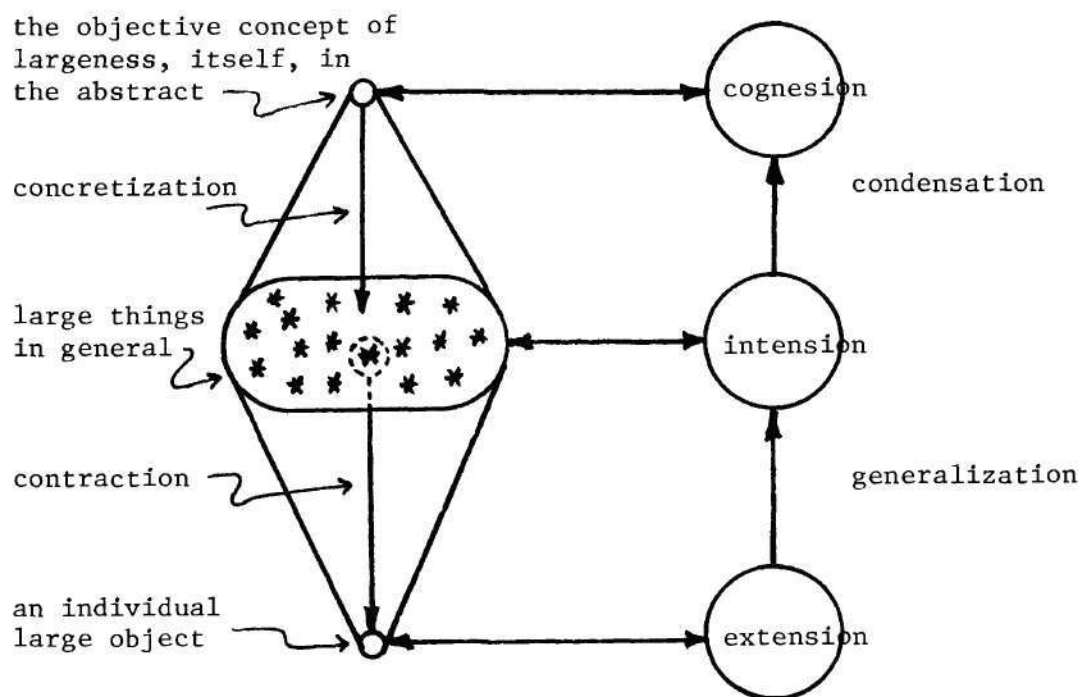


Figure 10. Abstraction-Generality Diagram.

We note the additions of the terms 'generalization' and 'concretization' *mutatis-mutandi*.

L. Observational Support for Contension (The Meaning Related
to the Social or Behavioral Context): Illustrating the
Methods of Language in Use and Creation of Games

Every language is a temple in which the soul of those who speak it is enshrined.

_____ O. W. Holmes

This component of meaning was introduced in III.B.8 and defined in III.D.3. It is further explicated in V.B.8 and V.C.7.

Many observers have noticed the close relation between meaning and the social context, altho perhaps Malinowski's name is most closely related to this thesis. The Sapir-Whorf hypothesis is also closely related to this thesis but is well known and will not be discussed here. I have chosen only two of the many observations of this relationship, altho they are distinctly different and may thereby give some idea of the range of empirical phenomena supporting this relationship. Malinowski's Behavioral Context Observation, L.3, illustrates the method of language in use which has been discussed previously and needs no additional discussion. The Katz-Fodor Rule of Contexts, L.2, illustrates a new method, called the Method of Game Creation, which I proceed to discuss in L.1.

1. The Method of Game Creation

The Method of Game Creation is related to the Method of Paradox altho lacking the illustrious philosophical tradition of its kin. In game creation, as in paradox, what one discovers, or invents, is not the facts, or the data upon which the facts are built, but an instrument

for observing these facts. Also, as in paradox, once the instrument has been designed, the data is trivial; being immediately observed thru simple recognition of the instrument of observation. But altho the paradox has had a long and honorable history in philosophic analysis, game creation has not, being almost exclusively limited to parlor entertainment. Perhaps the most notable exception to this failure to take advantage of a most useful method is a footnote which appeared in Katz and Fodor's Structure of Semantic Theory, thus introducing, almost accidentally as it were, a most useful methodology into semiotic analysis.

2. The Katz-Fodor Rule of Context, (1963).

Every NNS of a NL can construct an ambiguous sentence in his own NL whose resolution requires the representation of any item of information about the world he chooses.

It can be seen that in this form the K-F Rule does not distinguish between the social context and the environmental context, or rather it can be interpreted as two rules saying the same thing about each context.

The empirical evidence for this rule is supplied by a game created by Katz and Fodor:

The reader will find it an easy matter to construct an ambiguous sentence whose resolution requires the representation of practically any item of information about the world he chooses.
... We have convinced ourselves of the truth of this claim by making it the basis of a party game. One person supplies a fact, however obscure, and the others try to construct a sentence which that fact disambiguates. The game is not remarkably amusing, but it is surprisingly convincing. [146, pl79fn].

3. Malinowski's Behavioral Context Observation, (1923).

Altho Malinowski carefully distinguished between linguistic context and behavioral context, he did not distinguish between the social and environmental contexts. However, using this terminology, we can say

that Malinowski observed that meaning in NL is highly dependent on social context.

The following is a sample of an actual utterance taken down by Malinowski from a conversation of natives in the Trobriand Islands. Trobriand is a Melanesian Language. The native statement is given first and under each word its nearest British equivalent, [213, p300f].

<i>Tasakaulo</i>	<i>kaymatana</i>	<i>yakida;</i>	<i>tawoulo</i>	<i>ovanu;</i>
We run	front-wood	ourselves;	we paddle	in place;
<i>tasivila</i>	<i>tagine</i>	<i>soda;</i>	<i>isakaulo</i>	<i>ka'u'uya</i>
we turn	we see	companion ours;	he runs	rear-wood
<i>oluvieki</i>	<i>similaveta</i>	<i>Pilolu.</i>		
behind	their sea-arm	Pilolu.		

Malinowski notes that the literal British translation of this utterance sounds at first like a riddle or a meaningless jumble of words; certainly not like a significant, unambiguous statement. To understand even the general trend of this statement one would have to know the situation in which the words were spoken. He would need to have them placed in their proper setting of native culture. This utterance refers to an episode in an overseas trading expedition of these natives, in which several canoes take part in a competitive spirit. The last mentioned feature explains also the emotional nature of the utterance: it is not a mere statement of fact, but a boast, a piece of self-glorification, extremely characteristic of the Trobrianders' culture in general and of their ceremonial barter in particular.

Only after a preliminary instruction is it possible to gain some idea of such technical terms of boasting and emulation as *kaymatana* (front-wood) and *ka'u'uya* (rear-wood). 'Front' or 'leading canoe' and 'rear canoe' are important terms for a people whose attention is so

highly occupied with competitive activities for their own sake. To the meaning of such words is added a specific emotional tinge, comprehensible only against the background of their tribal psychology in ceremonial life, commerce, and enterprise.

The sentence where the leading sailors are described as looking back and perceiving their companions lagging behind on the sea-arm of Pilolu, would require a special discussion of the geographical customs of the natives, of their use of imagery as a linguistic instrument and of a special use of the possessive pronoun (*their* sea-arm Pilolu).

To Malinowski all this shows the wide and complex consideration into which we are led by an attempt to give an adequate analysis of meaning. Instead of translating, of inserting simply a British word for a native one, we are faced by a long and not altogether simple process of describing wide fields of custom, of social psychology, and of tribal organization which correspond to one term or another. One needs to be completely familiar with the social and behavioral context of the Trobrianders in order to completely understand the above example and to appreciate the argument. These customs are more fully described in [968].

The data given earlier relative to the fusing of syntactic and semantic elements of meaning within the same words can only be understood relative to an additional, connotative, component of meaning which sorts them out and gives the total meaning its structure. Malinowski shows that 'to be punting' is the perfective tense of 'to sail' because in the Trobriander society, given the knowledge of their social and behavioral customs, the only thing one can do when he has finished sailing is to punt. Likewise 'to be mooring' is the perfective tense

of 'to punt' because when one is mooring his canoe, he must have finished his punting. It is the knowledge of these customs, i.e. the social context, that gives the word its connotative component of meaning. The phrase 'paddle in place' serves as a locative to indicate proximity to their destination because all Trobrianders know that you only paddle in place when you have arrived at your destination.

M. Observational Support for Purposivism (The Meaning Related to the Interpreter): Illustrating the Methods of Logical Analysis and Observation of Behavior.

For of course the true meaning of a term is to be found by observing what a man does with it, not by what he says about it.

_____ P. W. Bridgman: The Logic of Modern Physics

This component of meaning was introduced in III.B.9 and defined in III.D.3. It is further explicated in V.B.7 and V.C.8.

Altho there has not been anything like the amount of effort spent on logical analysis in semantics put into logical analysis in pragmatics, a movement is now growing in that direction. Subsection M.2 contains an example of this kind of effort by W. V. O. Quine; altho the basic observations are probably not original with him. See Chisholm [478; 479 (especially chap. 11)] and his references to Brentano for possible earlier statements of these observations. Chiaraviglio's analysis of the logic of success and failure [52] and Baralt-Torrijos' analysis of the logic of commands and programs [16], altho formalistic in approach, appear to be a vital part of this movement.

But if the literature on the logical analysis of pragmatic meaning has not been overwhelming, the literature on behavioral analysis of

pragmatic meaning has. This field appears to have been the special province of the General Semanticists. Altho they are mostly engineers (in the sense of appliers of knowledge rather than discoverers of knowledge), if the General Semanticists have contributed anything to our understanding of menetic nature it is in the area of pragmatic meaning. Subsection M.1 contains an example of this kind of analysis by S. I. Hayakawa; and again the basic observations may not be original with him.

Purporsion is the ergotic component of meaning and is related to, but abstracted from, the interpreter of the term. This can be either the source interpreter, the receiving interpreter, or both. Purporsion plays a role in the meaning of rhemes; but it appears that it may play the predominant role in the meaning of phemes (eg. clauses and sentences). However, this is beyond the scope of the present thesis which is restricted to the meaning of words, which are rhemes. The two methodologies illustrated in this section have been discussed previously and need no further discussion.

1. Hayakawa's Meaning of Ritual Observation, (1939).

The meaning of ritual utterances is the reaffirmation of social cohesion. ... directive utterances with collective sanction, which try to impose patterns of behavior upon the individual in the interests of the whole group ... are usually the central purpose of ritual. [123, p93].

Hayakawa gives seven features of directive utterances under collective sanction, and relates them to ergotic language and memory. Thus the widespread existence of rituals and ritualistic behavior thruout all human society becomes central evidence for a menetic theory that contains a purporsion component.

Sermons, political caucuses, conventions, pep rallies, and other ceremonial gatherings always include a number of speeches, either traditionally worded or specially composed for the occasion, whose principle function is not to give the audience information it did not have before, not to create new ways of feeling, but something else altogether. What their principal function is, is the cementing together of the social bonds of the group.

Consider a pep rally which may precede a football game.* The members of "our team" are "introduced" to a crowd that already knows them. Called upon to make speeches, the players mutter a few incoherent and often ungrammatical remarks, which are received with wild applause. The rally leaders make fantastic promises about the great victory to be won on the following day. The crowd utters cheers which normally consist of animalistic noises arranged in extremely primitive rhythms. No one comes out any wiser or better informed than he was before he went in.

Religious ceremonies are equally puzzling from a menetic viewpoint. The priest or clergyman in charge utters set speeches, often in a language incomprehensible to the congregation, with the result that, as often as not, no information whatsoever is communicated to those present.

If we approach these mentic events from a detached point of view, and if we also examine our own reactions when we enter into the spirit of such occasions, we cannot help observing that, whatever the words used

*More likely at Ohio State than Georgia Tech.

in ritual utterance may signify, we often do not think very much about their signification during the course of the ritual. Most of us, for example, have often repeated the "Lord's Prayer" or sung "The Star-Spangled Banner" without thinking about the words at all. As children we are taught to repeat such sets of words before we can understand them, and many of us continue to say them for the rest of our lives without bothering about their signification.

Only the superficial or nihilist will dismiss these facts as "simply showing what fools human beings are". We cannot regard such utterances as meaningless because they have a genuine effect on us. We may come out of church, for example, with no clear memory of what the sermon was about, but with a sense nevertheless that the service has somehow "done us good".

What is the "good" that is done us in ritual utterances? It is the *reaffirmation of social cohesion* the Christian feels closer to his fellow-Christians, the Elk feels more united with his brother Elks, the American feels more American and the Frenchman more French, as the result of these rituals. Societies are held together by such bonds of common reactions to sets of linguistic stimuli. [123, p83].

2. Quine's Relativity of Meaning for Propositional Attitudes Observation, (1960).

The meaning of indirect quotation, belief sentences, and other propositional attitudes is relative to the purposes of the sign user (speaker).

Quine gives his evidence for this law partly in the form of data of the kind that everyone is familiar with and partly in the form of an appeal to common sense (for more of the same kind of data).

For the case of sentences generally, however, or even the case of eternal sentences generally, surely there is nothing approaching a fixed standard of how far indirect quotation may deviate from the direct. Commonly the degree of allowable deviation depends on why we are quoting. It is a question of what traits of the quoted speaker's remarks we want to make something of; those are the traits that must be kept straight if our indirect quotation is to count as true. Similar remarks apply to sentences of belief and other propositional attitudes. Thus even if we eternalize the contained sentence and also rid the containing sentence of such sources of truth value variation as inadequate descriptions, indicator words, and the like, still the whole may in some cases remain capable of varying in truth value from occasion to occasion, counting as true on occasions where no capital is to be made of the contained sentence's divergences from direct quotation, and false otherwise. ... We tend, even if we hear a remark directly and not by hearsay, to forget its exact words and remember only enough to report by indirect quotation. ... When we quote a man's utterance directly we report it almost as we might a bird call. However significant the utterance, direct quotation merely reports the physical incident and leaves any implications to us. On the other hand in indirect quotation we project ourselves into what, from his remarks and other indications, we imagine the speaker's state of mind to have been, and then we say what, in our language, is natural and relevant for us in the state thus feigned. An indirect quotation we can usually expect to rate only as better or worse, more or less faithful, and we cannot even hope for a strict standard of more and less; what is involved is evaluation, relative to special purposes, of an essentially dramatic act. Correspondingly for the other propositional attitudes, for all of them can be thought of as involving something like quotation of one's own imagined verbal response to an imagined situation. [245, p218f].

N. Observational Support for Emotion (The Meaning Related to the Emotive Mentellect): Illustrating the Methods of Observation of Behavior and Logical Analysis

In my mind's eye, Horatio.

Shakespeare: Hamlet.

The ideas and images in men's minds are the invisible powers that constantly govern them; and to these they all pay universally a ready submission.

Jonathan Edwards.

This component of meaning was introduced in III.B.10 and defined in III.D.3. It is further explicated in V.B.6 and V.C.9.

The emotic component of meaning has probably received the least systematic study of all nine components treated in this study. It is common for serious scholars of meaning to claim that emotion is unmeaningful (usually in an emotionally-charged voice). However, emotion as a component of meaning, and by whatever name, has begun to be studied seriously within many of the traditional disciplines. The examples chosen here were taken from General Semantics and Logical Analysis. The logical analysis by Aldrich is especially interesting because it combines the empirical power of logical analysis with observation of behavior to gain a penetrating (and even *entertaining*) insight into this most nebulous of emotive components.

I would like to introduce this section with a definition framed by the logical formalist Abraham Kaplan in his Ph.D. dissertation [139, p98]. But first I should explain why I call Kaplan a logical formalist rather than a logical analyst and include these comments in the section introduction rather than in a numbered subsection proper. It is because his goal is simply the formalization of a particular aspect of logic, not the empirical analysis which generates or motivates that logic. Kaplan gives no data or empirical laws to justify his definitions. For all we know, from what Kaplan tells us, his concepts, tho mathematically interesting, may be empirically quite empty. In this particular case, however, we have alternate sources of information which tell us that fortunately this is not so. Since this information is the content of N.1 and N.2, I now proceed with Kaplan's definition of emotive content.

Def: The EMOTIVE-CONTENT of a term is the emotions or more or less vague affective tones which pertain to the users of the sign and of which we take account when we fully interpret the sign.

... the emotion is involved in the interpretant, not merely in occasional interpretations.

He uses 'affective' in conjunction with the emotive interpretant if it is actually felt. Kaplan is ambiguous about the nature of the interpretant but it seems that his 'emotive-content' is fairly close to what I have called the 'emotive-mentellect' of the term while his 'interpretant' may be close to my term 'emosion'. It is clear that the emotive-content cannot be the emosion since the emotive content is part of the external structure of the term and the emosion, tho related to this, must be abstracted from it.

1. Hayakawa's Observations on Affections, (1939).

All words have some affective character.

Hayakawa defines the 'AFFECTIVE-CONNOTATIONS' of a word as the aura of personal feelings it arouses, and then goes on to observe:

All words have, according to the uses to which they are put, some affective character. [123, p64].

Sometimes the word 'affective' is used in a way that would make it a kind of purporsion, and at other times to mean a kind of emosion. Here it appears to be emosion that is referred to. Hayakawa usually supplies copious examples as a database for his conclusions, but here he has supplied very few, relying mainly on our own intuitions about language and the feelings it arouses. However, for those of us who lived thru the second World War, 'autocrat' and 'dictator' will never have quite the same meanings since Hitler was usually called a dictator rather than an autocrat, so even tho the two words have the same dictionary meaning, they will never again generate the same feelings and emotions for us. This difference is one of affective connotations or emosion.

Adopting the Coleridge technique, Hayakawa cites the evidence that there are many words that exist more for their affective value than for their informative value; for example, we can refer to 'that man' as 'that gentlemen', 'that individual', 'that person', 'that gent', 'that guy', 'that hombre', 'that bird', or 'that bozo' --- and while the person referred to may be the same in all these cases, each of these terms emotes a difference in our feelings toward him.

2. Aldrich's Observations on the Emotive Meaning of Images, (1943).

Language can be used with the primary purpose of evoking images, and pictorial sense can be made of practically any term.

As evidence of this Aldrich combines logical analysis with observation of simple, but seldom analyzed, human linguistic behavior and notes that discourse frequently takes a turn that makes argument concerning its truth irrelevant. But this happens in at least two quite different ways. That there is a grain of sand in a watch is arguable. That there is a neutrino in the watch is also appropriately argued. But people would naturally refuse even to argue the proposition that the mechanism of the watch consists of nothing but thirteen hydrogen atoms, because the proposition is too plainly false. They would be annoyed with anyone who would continue elaborating such a position. This is *one* way in which argument becomes irrelevant. But suppose it were said that:

... the watch is the cosy habitat of an army of a million little archers, each armored in mother-of-pearl and bearing a bow made of a splinter of diamond, all too small ever to be observed; and when the watch is closed it is filled with a soft, iridescent radiance --- the light of their world; each tick of the watch marks

off a day in their lives and an hour a life-span; they are unerring marksmen, capable in that twilight of knocking the spinning electrons out of their orbits with their golden arrows ... [2, p177].

Now in this case also we would find argument irrelevant, but is it because the utterance is too plainly false, ...? This would be an inadequate estimate, since there is *no* possible evidence against the utterance, and it may be 'poorly confirmed' in just the sense that 'please go away' is poorly confirmed, neither expression being the sort with respect to which the demand for evidence is relevant. But the important point is that in this case of the archer, far from being annoyed at the elaboration of such a position,

... we *want more*. It is as if the sense that is now being made lies in a different dimension of meaning, or differs in kind, from that of the expressions concerning the grain of sand, the neutrino, and the thirteen hydrogen atoms. We have shifted gears into a different form of discourse, which in its own way may be highly intelligible and even important (if charged also with emotive and motivational significant) without formulating an empirically significant 'possibility' awaiting confirmation. We shall call such meaning '*pictorial*' and we call its formulation '*picture thinking*'. [2, p177ff].

The archer-situation has been so counched (or could be) as to not only make proof or disproof impossible but to make the demand for either irrelevant, while retaining a very clear-cut intelligibility of the emotional sort. From this Aldrich concludes that language can be used with the primary intention of expressing or evoking feelings and emotions, and in a way that differs from the sign usage that formulates empirically significant possibilities. Pictorial sense can be made of practically anything --- including 'muchness'. On the other hand, blue-devil sense (pictorial) might readily be made even of the expression about the grain of sand in the watch. Tom might teasingly

say, upon not observing one inside, that there is one there anyway, only of a peculiar invisible sort, etc. This is what we meant by saying that practically anything can be construed pictorially, in a way that does not limit or define even a *possible* state of affairs for matters of fact. Thus, pictorial sense can be made even of objects in the field of sense-perception, and the artist makes a profession of this.

O. Observation of Menetic Regularities at the
Lexical-Projective Level

Concentration is the secret of strength.

_____ R. W. Emerson

A chain is as strong as its weakest link.

_____ Old saying

We must all hang together, or assuredly we shall all hang separately.

_____ B. Franklin

Union is the great fundamental principle by which every object of importance is to be accomplished.

_____ Daniel Webster

We have thus finished exemplifying the use of the Language of Menetics for each of the individual components of meaning. I would like now to give a very few selected examples of the use of the language to discuss relations between components. In this section I will give two examples of relations between the same level components of two term combinations, what Katz and Fodor have called the lexical-projective level. In the next and last section of this chapter I will give several examples of relations between two components of the same term.

In O.1 I describe how one aspect (mass vs. count) of the

tagmension of each of two terms must combine to give the same aspect of the tagmension of the resulting term combination. In 0.2 I describe how three aspects of pragmatic meaning of each of two terms must combine to give those aspects of the pragmatic meaning of the resulting term combination. But as to which component of pragmatic meaning these aspects pertain, I have not been able to determine. This is an example (and the only example I have found so far) of a pertinent concept of meaning which I have not been able to resolve into individual components in the terminology of the Language of Menetics, altho it very definitely falls in the realm of pragmatic meaning--- the interrelated components of contension, purporsion, and emosion. Perhaps this resistance to analysis stems from the factor analytic method by which Osgood derives his three menetic aspects. In any case the example is useful and the resolution task can be left for later analysts with more refined tools than myself.

1. The Law of Attribution

This law was described by Quine in 1960 [245, p103f], however, I suspect that it is not original with him (he lays no claim to priority, but also cites no other author). In fact I would guess that knowledge of this law goes back to the Scholastics and that the same investigator discovered it as who first framed the mass/count distinction. The law itself states that: *Adjectives which may act either as count or mass terms act as count terms before count nouns and mass terms before mass nouns. Adjectives that can act only as count terms cannot (do not usually) appear before mass nouns.*

Thus when an adjective can mean either count or mass, the choice of meaning is made via the tagmension component of the noun it modifies.

Quine cites enough data to motivate his conclusion for us and to allow us to understand it, but mentions no crucial empirical study to back it up. I suspect that his conclusion is correct, but that a conclusive study of the data needs to be made in order to verify it.

Def: An adjective is joined to a substantive in what is called 'ATTRIBUTIVE POSITION' when a composite general term is formed and is true of just the things of which the components are both true.

'Red' has attributive position in 'red house', as against its predicative position in 'Eliot House is red.'. But in attributive position next to a mass term the adjective must be treated as a mass term, (eg. 'red' in 'red wine'). The two mass terms unite to form a compound mass term.

... When we think of the two component mass terms as singular terms naming two scattered portions of the world, the compound becomes a singular term naming that smaller, scattered portion of the world which is just the common part of the two. Red wine is that part of the world's wine which is also part of the world's red stuff. When the compound mass term occurs rather as a general term, as in 'That puddle is red wine' ... its parts likewise figure as general terms; they amount in such contexts to 'red thing' and 'bit (or batch) of wine' and then the compound is true of each of the things of which the two components are jointly true. [245, p104].

The formal resemblance between adjectives and mass substantives must not be allowed to obscure the fact that many adjectives, such as 'spherical', divide their reference as insistently as any substantive. Such adjectives are not cumulative in reference, not mass terms. But now what is to be said of such adjectives, under our precept that an adjective in attributive position next to a mass term be treated as a mass term? Quine notes that:

.... adjectives not cumulative in reference simply tend not to occur next to mass terms ('spherical wine', 'square water'). Such adjectives serve as general terms only. On the other hand adjectives which can function as mass terms will, as ween, normally function both as singular terms ('red' in 'red wine') and, in three situations, as general terms ('red' in 'Eliot House is red', in 'red house', and sometimes in 'red wine').

But 'red' as general term so far diverges from 'red' as singular term as to be true of things that are not even parts of the total red substance of the world. Red houses and red apples overlap the red substance of the world in only the most superficial sort of way, being only red outside. It is thus borne in on us that the distinction between a word as singular term and the same word as general term is no mere pedantic distinction in modes of reference; even the concerned regions of the world can diverge. [245, p104f].

This is just as we would expect if tagmension is regarded as part of the meaning of a term, and here we see a projective regularity between a particular tagmatic aspect of combination of two terms and the same tagmatic aspect of the two individual terms.

2. Osgood's Law of Congruity, (1957).

In 1957 Osgood, Suci, and Tannenbaum reported [215, p276ff] on an experiment to test their earlier conjectured [1087] Principle of Congruity. The principle, as stated by Osgood, Suci, and Tannenbaum, is:

... Whenever two signs are related by an assertion, they are congruent to the extent that their mediating reactions are equally intense, either in the same (compatible) direction of excitation in the case of associative assertions or in opposite (reciprocally antagonistic directions in the case of dissociative assertions. [215, p203].

When interpreted in terms of the operational procedures of the Semantic Differential [215] as applied to the combination of an attributive adjective modifying a common noun, the principle yields the following predictive formula for the three aspects of the Semantic Differential of the resulting phrase:

$$X_{Ri} = \frac{X_{Ai} X_{Ai} + X_{Ni} X_{Ni}}{X_{Ai} + X_{Ni}}$$

where X_{Ri} is the i th aspect of the resulting phrase,

X_{Ai} is the i th aspect of the attributive adjective, and

X_{Ni} is the i th aspect of the noun, and

$i = 1$ refers to the evaluation factor,

$i = 2$ refers to the potency factor, and

$i = 3$ refers to the activity factor.

Table 12. Words Used in the Osgood, Suci,
and Tannebaum Experiment

#	Adjectives	Nouns
1	ARTISTIC	NURSE
2	HAIRY	SCIENTIST
3	LISTLESS	THUG
4	AVERAGE	PROSTITUTE
5	SINCERE	HUSBAND
6	SHY	COMEDIAN
7	TREACHEROUS	IMP
8	BREEZY	SECRETARY

Eight nouns and eight adjectives, shown in Table 12 were chosen on apriori grounds to have meanings (semantic differential) as widely distributed throuout differential space as possible and whose combination would be as "natural" and credulous as possible. All nouns chosen denote classes of persons. The eight adjectives were combined in all

possible ways with the eight nouns yielding 64 attributive phrases.

Subjects were asked to measure the evaluative, potency, and activity factors for each combination. The combinations were divided up so that no S measured two different phrases with the same word in it. For instance if S measured AVERAGE PROSTITUTE, he did not measure either AVERAGE HUSBAND, or SINCERE PROSTITUTE.

Using the congruity formula above, and a S's measured values for each aspect of the two words in the phrase, the predicted scores for the combination were computed. The actual scores were computed directly from the same S's actual measurements of the combined phrase. Prediction accuracy was estimated by the correlation coefficient between predicted and actual mean scores across the 64 phrases. For the evaluative factor, $r = 0.86$; for the potency factor, $r = 0.86$; and for the activity factor, $r = 0.90$; --- all highly significant. They found that the obtained factor scores, as predicted with the congruity formula, are consistently within the limits set by the meanings of the components, deviate from predictions on the average by amounts attributable to unreliability (except for the evaluative factor), and correlate very highly with predicted factor scores.

For the evaluation factor, however, a majority of phrases show "clear failure" of prediction --- there is both a significant constant error and a significant number of S's yielding measured meanings reliably deviant from the predicted meanings. An analysis of the errors between predicted value and measured value as a function of the angular displacement between the individual components in differential space shows that there is a significant regularity giving a negative correlation of 0.69 between the size of the error and the cosine of the angle between

the adjective-noun pair.

The results of this study show that lexico-projective effects of pragmatic meaning are neither haphazard nor unique. In terms of the average meanings of the word combinations, pragmatic effects follow the expectations from the congruity formula quite closely. Analysis of the data from individual S's, however, reveals consistent errors in prediction with the congruity formula: particularly on the evaluative factor, the measured meanings of combinations regularly deviate by being more unfavorable than predicted. It was also shown that the congruity formula predicts less and less well as the angular displacement of word components in the differential space increases.

P. Observational Support for Relations Between Components:

Illustrating the Methods of Psychological Observations and Statistical Linguistics.

"That's enough to begin with", Humpty Dumpty interrupted: "there are plenty of hard words there. '*Brillig*' means four o'clock in the afternoon---the time when you begin *broiling* things for dinner.

"That'll do very well" said Alice: "and '*slithy*'?"

"Well, '*slithy*' means 'lithe and slimy'. 'Lithe' is the same as 'active'. You see it's like a portmanteau --- there are two meanings packed up into one word."

_____ Lewis Carroll: Humpty Dumpty

So far in this chapter we have applied the language to individual concepts. However, the language really begins to show its power only when talking about several concepts and the relations between them. Because of the large number of different sets of concepts associated with natural language menetics, it will be impossible to give examples of the language applied to all of them. In this section we will look

at only one pair of concepts, the menetic components of ontosion and eidension, and some relations between them. The relations we will look at stem from two sources: the experimental labs of the perceptual psychologists, such as Wendell Garner; and statistical observations both by linguists, such as George Zipf, and by psychiatrists, such as Carl Jung.

We have already discussed the method of psychological observation so we start immediately in section 1 with Garner's experiments motivating the concepts of integral and separable dimensions and following this in section 2 with Garner's selective sequential processing hypothesis. In section 3 I take up Garner's *nonlinguistic*, *linguistic*, *state*, and *process* concepts.

In section 4, I introduce another methodology---statistical linguistics---and discuss it briefly. This leads in section 5 and 6 to a discussion of the Zipf-Jung phenomena. Finally, the structures suggested by the preceding discussion lead to the suggestion of new psychological experiments. These are discussed in section 7.

1. Garner's Concepts of Integral and Separable Dimensions

Experiments in direct similarity scaling, free classification, dimensional preferences, and dimensional discriminability all converge on the concept of a distinction between integral and separable dimensions. Psychologically, if dimensions are integral they are not really perceived as dimensions at all. On the other hand if a dimension is separable, distances along this dimension do not exist psychologically. This distinction may be softened somewhat since both dimensions and similarities are in some sense perceived both for integral and separable

dimensions. Phrasing the difference in terms of primary processes and more derived, or cognitive processes, we may say that for integral dimensions, similarity, with properties of ordinary distance, is the primary process. However, a dimensional structure can be extracted cognitively. It will, however, not destroy the primary similarity or distance structure, with its Euclidean properties. For separable dimensions the situation is reversed. The dimensional structure is the directly perceived structure. A similarity structure does exist, but as with the city-block metric, it requires the maintenance of the primary dimensional structure. The term 'integrality' was introduced by Lockhead [942] for the one pole of this distinction while in [102, p351] Garner introduced the term 'separability' for the other pole.

The results of all the above mentioned experiments may be summarized as follows:

1. The structure of sign systems may be based on similarity relations between signs, or on dimensional relations between signs.
2. Stimulus dimensions that produce sets of signs in which similarity is important are termed integral. Those that produce sets in which dimensional structure is important are termed separable.
3. In direct similarity scaling, integral dimensions produce interstimulus relations with a Euclidean metric; separable dimensions produce interstimulus relations with a city-block metric.
4. In perceptual classification, sign systems defined by integral dimensions are classified primarily in relation to similarities;

systems defined by separable dimensions are classified in relation to dimensional structure.

5. In perceptual classification, dimensional preferences or saliencies exist only for separable dimensions.
6. Manipulation of relative discriminabilities of dimensions has little effect on the dimensional preferences exhibited with separable dimensions, while almost completely determining classification with integral dimensions.
7. Both similarity and dimensional structure of sign systems exist for both integral and separable dimensions. However, with integral dimensions, the primary structure is similarity in the sense of distance, while the dimensional structure is based upon a more derived cognitive process. On the other hand, with separable dimensions, the primary structure is dimensional, and the similarity structure is based upon a more derived, cognitive process. [103, p120f].

Integral dimensions may be characterized as the dimensions of the medium, or ontotic dimensions, while separable dimensions correspond to the parameters of shape, or eidontic dimensions.

2. Garner's Selective Sequential Processing Hypothesis

When the consequences of the integral-separable dimension distinction on Garner's theory of semiosis (sign processing) are investigated some interesting conclusions follow. He finds that the separability-integrality of pitch and phonemic contour is asymmetric. When pitch was relevant for discrimination, essentially no interference was

caused by irrelevant variation in phonemic contour; but when phonemic contour was relevant for discrimination considerable interference occurred when the fundamental pitch of the phoneme was varied as an irrelevant dimension. Garner summarizes:

...there is improvement in performance when the subject needs it, as with correlated dimensions. There is, however, avoidance of interference only when the subject is judging the nonlinguistic (i.e. ontotic) dimension; the subject cannot avoid interference when judging the linguistic (i.e. eidontic) dimension. [103, p131].*

Thus when eidontic and ontotic properties of phonemes were used, the relationship between properties was asymmetric in that interference was produced in one direction only. Such a situation would make sense if pitch, as an ontotic dimension of a phoneme, is processed at a lower level than the eidontic dimension of phonemic contour. One possible modification of the processing theory that would explain such results as these is what Garner calls "selective serial processing", which means that the interpreter processes one property before the other, but can sometimes do so selectively so as to maximize performance. Thus, pitch is processed prior to processing of any eidontic properties and can be discriminated without interference from irrelevant variation in the eidontic property. If the eidontic property is itself the relevant dimension, then pitch variation will interfere with discrimination of the eidontic property, because processing of it is required before the eidontic properties are perceived.

However, this theory predicts a result that had not been observed before: that with separable dimensions, when the two dimensions are unequally discriminable, then if the two dimensions can be selectively attended to, the discrimination ought to be carried out entirely

*parentheses inserted

on the basis of the easier of the two dimensions which would result in an improved performance with respect to the poorer of the two dimensions. Prior experiments had been run with approximately equal discriminability. When a new experiment was run with separable dimensions of unequal discriminability this result was conclusively born out. Garner concludes that:

...the fact that dimensions are separable does not mean that an average facilitation with correlated dimensions cannot occur. If selective serial processing is used, there will be a gain, but it will not be a performance level beyond that provided by the better of the two dimensions alone. [103, p133].

Garner suggests that we have here a valuable tool for separating process levels. This also gives us a useful methodology for investigating the components of meaning. Pitch is an ontotic variable. A phoneme cannot exist without pitch; but in American, pitch is nonphonemic and hence pitch can exist without phonemic contour. On the other hand phonemic contour is by definition eidontic. Hence we see once again independent evidence leading to a separation of these same two semiotic dimensions. Pitch is integral to the phoneme, but the phoneme is separable from the pitch. We might expect that the comparison of Chinese S's on these experiments might alter the results drastically.

His final statement on the subject of processing levels is "if ever there was a need for more converging operations to clarify these concepts, it is in this area [103, p138].

Garner credits the hypothesis of levels of processing to Day and Wood, who in several experiments [533; 534; and 1401] discovered that the ontotic levels of the phoneme were processed at a lower level than the eidontic dimensions. This also would explain the

results of Posner and Mitchell [1129] who discovered that it takes longer to respond to two signs alike in everything except the ontotic dimensions than to two signs exactly alike. The name 'selective serial processing' was given by Garner [639; and 588].

3. Garner's Nonlinguistic, Linguistic, State, and Process Concepts

There is an unfortunate confusion in a new distinction required for an understanding of how redundancy improves human semiosis when the dimensions do not satisfy the more rigorous criteria of being integral. The distinction is between state and process limitations. The confusion comes about because while process concepts in Garner's metaphysics are organismic concepts (psychological) as opposed to stimulus (semiotic) concepts: the process axis and the state axis are both stimulus (semiotic) concepts and here the language of semiotics is really needed to untangle the ambiguity. State limitations are ontotic limitations: limitations due to inadequate perception of all sign vehicles. The interpreter's alertness level may be too low, or he may even be asleep! Or the available energy may be too low, given the sensitivity of the particular S, to develop an adequate interpretant. Process limitations on the other hand are eidontic limitations: limitations due to inadequate distinctions in shape so that the subject perceives some token but fails to distinguish it as a token of type A rather than a token of type B.

Failure to distinguish a *U* from *V* because someone wrote the letters so sloppily that even the best of us cannot tell them apart altho both can easily be seen by the interpreter, is due to a process limitation (eidontic limitation - or a limitation on the discriminability between the two shapes). On the other hand, suppose that two letters are

so beautifully and clearly written that anybody can identify each of them perfectly as long as each is presented at a sufficiently high contrast and a long enough duration that it can be seen. Now suppose the contrast and duration of presentation are decreased until the interpreter can no longer perceive either of them. Such a failure is due to a state limitation (ontotic limitation---or a limitation on the perceptibility of the basic medium and/or occurrence of the signs).

In analyzing the effect of redundancy on human semiosis when performance is limited, it is not enough just to know that performance is limited and that we provide redundancy. Improved performance may or may not occur, and whether it does depends on whether performance is limited by state or process factors and whether the particular form of redundancy resolves that particular deficit problem. It should also be noted that the experiments which distinguish between state and process limitations could also be used to help separate the postulated ontotic and eidontic processing levels. These would then represent converging operations for Garner.

If we relate learning processes, processing levels, modes of limitation, from Garner's experimental results and components of meaning, semiotic dimensions, modes of failure, and unique determination from semiotics we get a consistent and remarkably unified picture of semiosis.

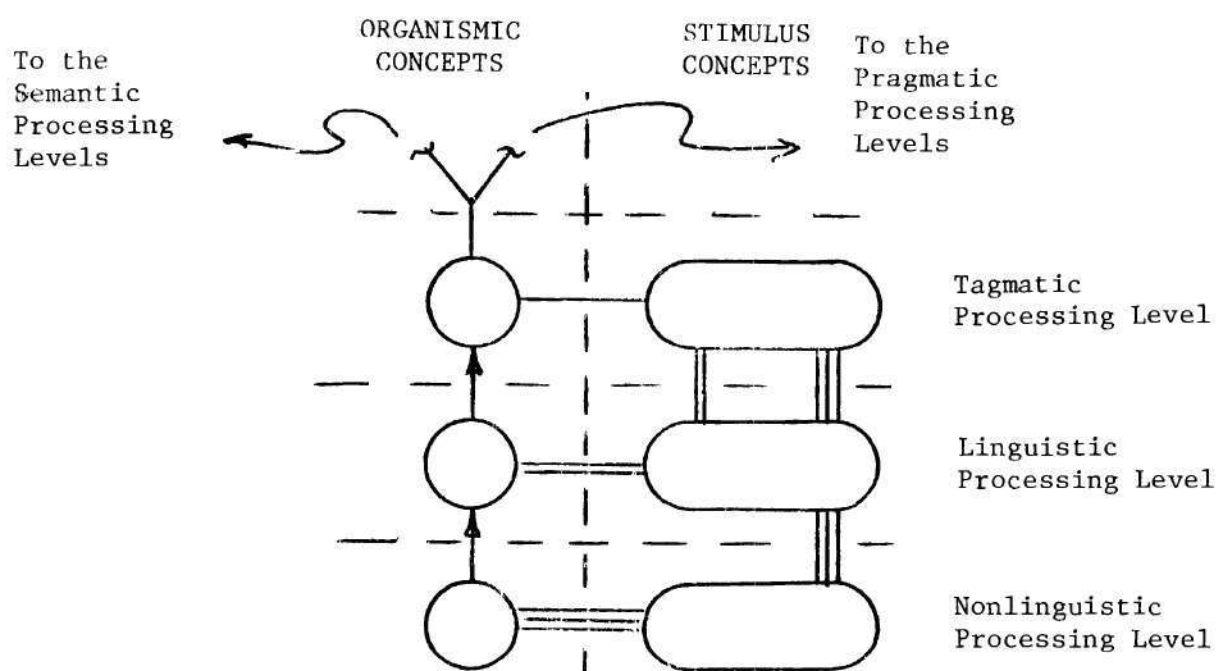


Figure 11. Garner's Perceptual Processing Concepts.

Garner's stimulus concepts relate to the external semiotic concepts while his organismic concepts relate to the internal semiotic concepts. Garner's 'nonlinguistic' processing level corresponds to the ontotic semiotic level along with the ontosion component of meaning, the medium of the sign occurrences, state limitations, failure at the ontotic level, energetic variables, and learning *what* exists. Garner's 'linguistic' processing level corresponds to the eidontic semiotic level along with the eidension component of meaning, the shape of the sign, process limitations, failure at the eidontic level, informational variables, and learning to discriminate the items *that* exist.

Garner alludes to further levels when he mentions the so-called 'semantic' effects on learning experiments. He is using the word 'semantics' here as synonymous with 'menetics with the exclusion of ontosion and eidension', i.e., 'all meaning components with the exclusion of the first two levels'. However, his terminology is in a bind. He

has already identified the 'informational' level with the eidontic effects so he must now resort to such adhoc means as using the metaphysical word 'real' as in 'real words'. These effects simply imply semantic and pragmatic levels of processing and learning in addition to the two syntactic levels already identified as well as not ruling out a third syntactic level (the tagmatic level) as predicted by semiotic theory.

This diagram will play an important role in understanding the structure of signs. I will withhold comment on it at this point, but I will have more to say about it in Chapter V where the same structure is derived by purely menetic means and is used to motivate a theory of sign structure.

4. Statistical Linguistic Methods

There is virtually an astronomical amount of data that must be taken into account in order to completely model the menetic phenomena of natural language, and a great many mathematical tools that can be used for this analysis. One tool that is often appropriate in the face of so much data is statistics. Here, the goal is not so much a complete analysis of the subject, but to find perhaps a way to condense a great deal of data into a few parameters, such as a mean, variance, or uncertainty, which can model a few salient features of the phenomena. We would thus expect statistical techniques to prove useful in developing the menetic model.

The use of statistical techniques in the analysis of language is called 'STATISTICAL LINGUISTICS' and the names of George Kingsley Zipf, A. A. Markov, Claude Shannon, Benoit Mandelbrot, Henry Kuchera*,

*Kučera

G. U. Yule, and to a much lesser extent Gustav Herdan are traditionally associated with this field. Also traditionally the observations made by statistical linguists have been primarily restricted to language performances as opposed to language competence concentrated on by mainstream linguistics. Measurements are carried out on samples or running text and the primary theoretical concepts are word tokens (wk) and word types (wt).

The restriction to samples of running text and word types and tokens is non-essential and has begun to be removed in several directions. Patrick Suppes has generalized the concepts of word types and tokens to phrase structure types and tokens [285], various psychologists and psychiatrists have extended the interest in tokens and types to tones [69; 156; 423; and 808], while I have distinguished elsewhere between text statistics and dictionary statistics.

The detailed nature of the theoretical concepts of word tokens and word types have not usually been of much concern to the statistical linguist. The phenomena to be investigated is so stark and dramatic that it stands out against the background of nature so long as any reasonably intuitive interpretations of these concepts are used. The Law of Zipf and Estoup has been tested and verified using morphemes, holophrases, lexical entries, fully inflected words, etc. and the same relationships are invariably found. The same may be said of the other basic concepts of statistical linguistics. In fact it may very well turn out that statistical linguistic methods prove an ideal way of explicating such concepts as word types, word tokens, word length, etc., for classical linguistics.

5. The Constellation of Zipf-Jung Phenomenas

If there is one statement that the literature is agreed upon calling a law and if there is one law that the literature is agreed upon as to who to attribute its first discovery to then these are one and the same, the so-called Zipf's Law of Least Effort, [29; 289; etc]. However, in attempting to dig up the original data and the experimental design (the observational conditions) I was shocked to see how pervasively wrong the literature was on this point.

The Principle of Least Effort is not a law of any kind, but a theory meant to explain many laws of language, much phenomena of language not yet systematized into laws, and much other human phenomena not directly connected with language. For instance, the rank-frequencies of responses to the psychological word association test invented by Carl Jung, and other Jungian associational data, appear to be part of this same general group of phenomena. For this reason I have referred to the total collection of this phenomena, laws describing the regularities within this phenomena, and theories intended to explain and relate the phenomena and laws as the Zipf-Jung Constellation.

The empirical content referred to by the literature when using Zipf's name is the rank-frequency law of words, and Zipf did not discover this law (or even claim to, he attributed it to Estoup); his principle contribution lay in publicizing it as an empirical verification of his theory and in adding to the empirical data-base supporting the law by a great many of his own observations as well as by showing that a great many other workers' data could be interpreted as also validating the law.

Associated with the Theory of Least Effort are several other laws which bear a statistical resemblance to the Estoup-Zipf Law (one of these has even been described as a byproduct (theorem?, corollary?) of the Rank-Frequency Law) and one conjecture that appears to be related to these four and which would have an important bearing on menetic theory. Associated with each rank-frequency relationship is a type-token relationship. In this section I will include the Rank-Frequency Law of Zipf and Estoup, Zipf's Law of Meanings, Fowler's Law of Repetition, the Law of Word Abbreviation, and Baker's Law of Restriction. In the next section the Rank-Frequency Law for Word-Association data, and the verbal summator and letter-star data linking the Jung data to the Zipf data will be taken up.

The Law of Zipf and Estoup says very loosely that in any natural language text there are relatively few words which are used extremely often and a very large number of words which are used relatively infrequently. This relationship is described approximately by a straight line on log-log coordinates. There is necessarily a negative relationship between the frequency and the frequency rank by definition, but there is no reason to assume apriori that it is bilogarithmic simply from a consideration of the definition alone, i.e., the simplicity of the relationship is the empirical content of the Estoup-Zipf Law. The law is usually discussed in terms of Zipf's Equation

$$RF_R = C$$

where R is the rank of a given word type, F_R is the occurrence frequency of that word, and C is a constant [29, p24 & 46; 289, p138; 325; 330] . However, the most accurate expression for this law in common usage is

Mandelbrot's Equation

$$f_R = P(R+m)^{-B}$$

where P , m , and B are constants, R is the rank of a word usage and f_R is the relative frequency of that usage. For $m = 0$ and $B = 1.0$ this reduces to the Zipf Equation.

Zipf's Law of Meanings has often been confused with the Estoup-Zipf Law and both have been advanced as empirical evidence substantiating Zipf's Principle of Least Effort. However, from an empirical standpoint, both the data whose regularities the law describes and the empirical import of the law are completely independent of those for the Rank-Frequency Law. This law was discovered by Zipf around 1945 [329] in an effort to test a prediction of the Principle of Least Effort that the more frequently a word is used, the more meanings that it will have. The result of his observations appears to support the following equation very well.

$$\bar{m} = \sqrt{F}$$

where \bar{m} is the average number of meanings of all words of frequency F . This indicates some relationship between information and meaning, and also forms a basis for conjecturing a law of restriction which will be discussed later. This law has also been called the Law of Economic Versatility (mainly by Zipf) but strictly speaking this refers not so much to the law itself but to its motivation from the Principle of Least Effort. Hence I shall use only 'Zipf's Law of Meanings' in referring to this law. Baker [15, p63] has proposed calling this the

Law of Sense-Increase but I can see no good reason for either deleting Zipf's name or for substituting the word 'sense' for the word 'meaning'. Indeed there is reason for not using the word 'sense' which since Frege's time has received a more specific meaning close to what I have called 'intension'. Zipf's use of the word 'meaning' is very close to the all-inclusive, very general way in which I have used it, hence it seems more appropriate in this respect.

In 1937 A. M. Fowler undertook as a seminar topic, under the direction of Zipf, the preliminary exploration of the length of intervals between the repetition of all the different words that occurred 5, 10, 15, 20 and 24 times in Joyce's Ulysses. He found a significant inverse relationship between the length of intervals and the number of intervals having that length as expressed by

$$N^p_{FI_F} = C_F$$

where N is the number of intervals of size I_F for all words of frequency F and C_F and p_F are constants that are determined for each frequency. The range of p_F is from 0.96 to 1.29 with a median of 1.20. He also determined that these intervals fall in random order thruout the text. It is not the case that all the short intervals appear first, or last, or concentrated in any other one place. Short intervals, as well as long intervals and all others, are distributed evenly thruout the sample, [330, p40ff; 328]. This investigation was continued by Zipf and finally reported by him in 1938 [326, p363f].

We should first notice that this is indeed an independent law and not derivable from the Estoup-Zipf Law. We could easily imagine

(and such artificial samples have actually been constructed) the case where, altho the words and their frequencies have been chosen to satisfy the Estoup-Zipf Law, the occurrences were patterned such that there were a large number of large intervals and very few or no short intervals between each repetition, or where all the large intervals occurred first and then all the short intervals later. The Zipf-Fowler Law says that neither of these cases can happen in a random sample of natural language: there are many short intervals and fewer long intervals and the intervals of each size are randomly distributed thruout the sample.

Zipf's Law of Word Abbreviation describes an inverse relationship between the length of words and the frequencies of their usage. Zipf presents this relationship in [330, p63ff] as partial validation of his Principle of Least Effort. He first reported this law in 1935:

...the evidence of language seems to indicate unequivocally that the larger a word is in length, the less likely it is to be used. [325, p22ff].

Zipf presents data to show that there is indeed an inverse relationship without determining the quantitative nature of this relationship. In fact, he says,

...the correlation is so obvious to students of comparative philology that there is little incentive to pursue the matter further quantitatively. [330, p65].

By a simple examination of the data it can be seen that the following equation fits to a rough approximation both sets of data that he offers:

$$F(\bar{L}_F)^8 = C$$

where \bar{L}_F is the average length of all words of frequency F . The length

for the Eldridge-newspaper data is measured in phonemes and the length for the Plautus data is measured in syllables. Both of these data sets have large variances. Almost all of the scatter can be explained by the standard error of the mean. However, a different equation also fits to an equally rough approximation both sets of data:

$$\overline{L}_F = A - B \ln F.$$

In fact, in all data relative to this law compiled to date both functional forms fit about equally well but form what is obviously a first approximation. Mandelbrot has derived a similar relation,

$$L_R = A + B \ln R$$

where R is the rank of the word, in one of his theories explaining the Law of Zipf and Estoup [51, p213].

Since phonemes and syllables are not simple scalar multiples of each other, like feet and inches, but represent different dimensions, one wonders if a unit of length based on some other dimension such as meaning may prove more fundamental. If this were so one would expect significantly less scatter when the length is measured in morphemes. Another trick that would show off the data in a better light would be to lump frequencies into classes such that the number of total words in the class is a constant for a data set. This would yield a constant standard error of the mean for the whole curve rather than the steadily increasing values that we see in these curves. One also wonders whether it is the rank-length or frequency-length relationship which

is more fundamental.

In my thesis proposal seminar given in 1972, I conjectured that when we combine Zipf's Law of Meaning in the form

$$\overline{m}_F = \sqrt{F}$$

with the Law of Word Abbreviation in the form

$$F(\overline{L}_F)^8 = C$$

we get

$$\overline{m}_F(\overline{L}_F)^4 = \sqrt{C}$$

which predicts the longer the average length (measured in phonemes) of the words of a given frequency, the fewer the average number of meanings of those words (measured in dictionary entries). Other interpretations of this conjecture are available too. As stated, it says that we should average all the lengths for a given frequency, average all the number-of-meanings for that frequency and relate these together. But it is conceivably possible to take all words of a given length and average their number-of-meanings, independently of frequency, and get the same sort of relationship.

$$\overline{m}_L L^4 = K$$

and even to take all the words with a given number of meanings and average all their lengths and get

$$m(\overline{L}_m)^4 = K'$$

Now the principle difference in the result of these approaches will be the scatter of the data, or the F value which is a measure of the scatter. If the phenomena we are looking at is principally a menetic phenomena then both of these last two relations should have less scatter than the first one measured in either phonemes, letters, syllables, or morphemes. Both of the last two relations should be testable directly from the dictionary without appeal to usage since frequency has disappeared as a parameter. This is an instance of what Herdan has called "Type Statistics", as opposed to Zipf's "Token Statistics". I have elsewhere called this "Dictionary Statistics" as opposed to "Sample Statistics".

As we saw, however, the Law of Word Abbreviation is given equally well by the relation

$$\bar{L}_F = A - B \ln F..$$

Using this form with the same reasoning yields

$$\bar{m}_F = \exp \left\{ \frac{A - \bar{L}_F}{2B} \right\}$$

which has the same interpretations and predictions.

The reason we are interested in this law from a menetic standpoint is for what it implies about the function of length. The law states that there is a general trend that the longer a word, the fewer meanings it can take on. Thus, we see that in general (but not universally) one important function of the menetic atoms is to restrict or select meanings.

I have recently discovered an article by S. J. Baker [15]

disclosing such a relationship, which he found in 1950, by motivation, however, quite different from above. Baker was concerned not with linguistics, or semiotics, but with the Darwinian theory of evolution as evidenced in language. He counted the average letter length and the average number of meanings for the first 4,000 words of the Thorndike-Horn list (in groups of 400 words) and found within experimental accuracy that the Law of Restriction is given by

$$\bar{L}_F = A - B\bar{m}_F.$$

This is slightly different from the two forms conjectured above, but again has the same interpretations and predictions. Combining this result with Zipf's Law of Meanings gives

$$\bar{L}_F = A - B\sqrt{F}$$

for the algebraic form of the Law of Abbreviation.

Before going on to the word association, or Jungian portion of the Zipf-Jung constellation of laws, we should note that these eight laws (called the Zipf Constellation) together indicate an intimate relation between meaning, medium, and shape. A menetic theory that contained an ontosion and an eidension component would be well on the way to predicting (explaining) these relationships.

It is seen that the crucial problem for both the establishment of Baker's Law of Restriction and for design of a unifying theory is the determination of a proper and consistent basic classificatory unit and a unit of length for all laws mentioned above. Since this unit is likely to be the morpheme (at least this conjecture must be

tested), the principle problem of experimental design will revolve around the definition and measurement of morphemes. It is very desirable that a way be found for the computer to analyze and record morphemes. It is assumed that all computing, analytical, as well as bookkeeping chores will be done by the computer. It is assumed that the orthographic analysis of words given by most dictionaries coincides with the syllabic analysis. It might be possible to start with the original Thorndike count of ten million words and thus avail the use of the Thorndike Century Dictionary. At least this possibility should be investigated. Otherwise, this presents an additional complicating factor, the development of a logically consistent dictionary for the corpus chosen. A microfilm copy of an unpublished study of usage of word meanings and dictionary entries by Lorge and Thorndike is available in the Atlanta area. It is possible that this could serve as the foundation for such a study.

The testing of these laws for various languages and corpuses would not seem to be critical since some of the preliminary analyses (the Estoup-Zipf Law in particular) have been confirmed in so many instances. Therefore the effort would be directed towards a single, well designed, crucial experiment to verify 1) the basic classificatory unit, 2) the basic unit of length, and 3) the form of all eight laws simultaneously. Should the detail morpheme counting have to be done manually, the final experiment would almost certainly take several years. Should the Thorndike data not be available, or for any other reason a new dictionary have to be constructed, the final experiment could run nearly ten years.

Mandelbrot's theory (which will not be discussed in detail here) is presently the only quantitative explanatory theory concerning the Zipf constellation. An assessment of the status of theory for the Zipf constellation requires an analysis of what Mandelbrot's theory (in its various forms, assumptions, and derivations) does and does not explain.

a) Mandelbrot's theory can account for relations between purely external components at the ontotic and eidontic level:

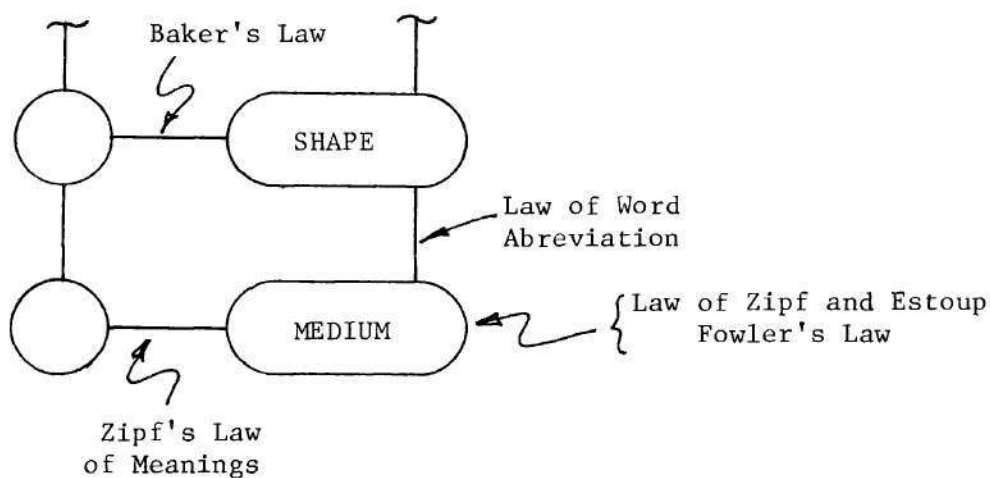
- i) The Law of Zipf and Estoup, or the rank-frequency law - a restriction on embodiments - is explained by all versions of Mandelbrot's theory.
- ii) Fowler's Law of Repetition - also a restriction on embodiments - can possibly be explained by one or more versions of Mandelbrot's theory, altho I know of no attempt to do this.
- iii) The Law of Word Abbreviation - a relation between the shape and embodiments of words - can possibly be explained by one or more versions of Mandelbrot's theory. Mandelbrot himself in several versions of his theory has derived predictions on the form of this law, but these predictions must be subjected to critical empirical analysis.

b) Mandelbrot's theory cannot account for any relations involving internal components:

- i) Zipf's Law of Meanings - a relation between internal components and embodiments.
- ii) Baker's Law of Restriction - a relation between internal components and shapes.

c) Possible hypotheses for theory construction:

- i) Use meanings (morphemes, menetic atoms) as the theoretical population
 - ii) Meanings are always embodied by the same word form but a given word form can embody more than one meaning.
 - iii) Meanings are chosen independently and randomly according to their probability distribution.
 - iv) When a meaning is selected by a NNS, its proper word form is also automatically selected.
 - v) The observed frequency of word forms is the sum due to the frequency of all meanings that have that form.
- d) A possible model for theory construction is as follows:



6. The Jung Constellation of Psychological and Psychiatric Phenomenas

Skinner's Law relating the rank-frequency of latent words was enunciated by the famed behaviorist in 1936 in a study of the latent strength of speech [280]. It has the same mathematical form as the Law of Zipf and Estoup

$$f_R = C(R + \rho)^{-\theta}$$

however, the terms stand for the relative frequency and rank of tokens of latent words rather than word tokens in running text.

Altho the Zipf Constellation of laws gives us an indication of the relationships holding between the internal and external components of the ontotic and eidontic levels, there is no way to isolate the effect of the semiotic context, since the property which characterizes the entire Zipf Constellation is the location of the words in the context of running text. In other words, words are constrained in NL for instance to follow the relationship

$$f_R = C(R + \rho)^{-\theta}$$

but what part of this constraint is caused by the relation between medium and embodiments and what part is caused by the relation between signs and their semiotic context? Skinner's verbal summator presents an ideal instrument for evaluating this effect altho the original experiment was not so designed. Skinner's original purpose was to investigate the latent strength of verbal responses [280, p71f] and therefore he made no attempt to isolate individual words nor to have his words match the syllabic length distribution of actual words. Such

modifications are easily made however. Note that the latent strength of words is in itself desirable knowledge for the construction of a theory of Zipf-Jung phenomenas.

The verbal summator is a device for repeating arbitrary samples of speech obtained by permuting and combining certain elemental speech-sounds. Its use may be compared with that of ink-blot and free-association tests. The experimental stimulus does not fully correspond to any conventional pattern in the behavior of the subject, but it functions as a sort of verbal ink-blot. When it has been repeated a sufficient number of times (the number corresponding to the time of exposure of the blot), S makes a conventional verbal response resembling it. Since the response is not evoked by any stimulus acting at the moment, its emergence may be said to be due to its own relative strength. By presenting a wide variety of skeletal samples, an investigator is able to obtain a list of the especially strong responses of his subject. This is essentially what is done in ink-blot and free-association tests.

The summator is based on two principles: 1) the presentation of a vocal stimulus tends to evoke a response resembling it; and 2) similar responses summate, presumably in proportion to their resemblances; and, if each is subliminal in strength, summation may result in the evocation of a response. Thus the verbal summator evokes latent verbal responses thru summation with imitative responses to skeletal samples of speech. The summator draws upon the reserve of verbal behavior which lies behind and controls the ultimate character of normal speech. This reserve of verbal behavior may be characterized by a relative frequency associated with each word type in an individual's vocabulary

at a given time. The summator is designed to obtain verbal responses *in vacuo*, so to speak. Stimuli which dictate the elicitation of one response rather than another are eliminated so far as possible. The ideal condition in which they are altogether lacking cannot be fully achieved, but it is realized to a considerable extent. The advantage of the summator is that it brings the subject into the lab and thru better control of the stimulating material improves on casual observation as a means of discovering the basic laws governing these aspects of semiosis.

A block of 1000 responses containing 3046 words was analyzed by Skinner. When the ranks and relative frequencies were plotted on log-log coordinates the values closely approximate a straight line. In fact this data comes closer to fitting Zipf's original equation

$$f_R = C \cdot R^{-1}$$

than Zipf's data itself. The value of ρ is very nearly zero and the value of θ is very nearly one. The only significant deviation is for points representing words occurring very rarely. In the modifications to this experiment which I suggest later, it would be interesting to see if this relation continues to hold, i.e. the effect of the semiotic context is to increase ρ above zero and increase θ above one.

Another result of this experiment is the observation of what may be called the 'SKINNER-EFFECT'. The stimuluses are initially meaningless and when they take on meaning it's all of a sudden. A typical response by a S is "Funny, they sound like nothing at all until suddenly they sound like something." [280, p79]. This probably involves

Garner's sequential selective processing mechanism at work and shows that the onset of eidension can be summated.

It was also discovered that the responses themselves set up a condition which affects subsequent responses and which works against the free emergence of a response according to its latent strength. Such a condition can be called 'PERSEVERATION', - a word or theme makes its appearance, persists for a time, and disappears. Perseveration acts to pull together responses which would be distributed in another way if their elicitation were left to chance. Skinner demonstrated the existence of perseveration by analyzing the 'attraction' of one word by another when the forms occur exactly twice in a single experimental period. He found a "clear tendency for the second member of a pair to occur within five responses following the first". In other words, all of the intervals between pairs of words occurred at about chance rate except intervals of five responses and less which occurred at much higher than chance rate. This appears to have some relation to Fowler's Law of Word Repetition but the exact nature of this relation needs to be investigated.

There is evidence that perseveration is not limited to either the eidontic level or the external structure [280, p95ff]. There are examples of perseveration of shape only without perseveration of sense. Alliteration and rhymes are examples of perseveration below the level of the word, for instance "Trial by another", and "Is he your brother" were successive responses. Internal rhymes and assonance also occur. Preseveration above the level of the word, for instance, of phrases and so on, is also demonstrated. Other kinds of formal perseveration

occurring in this experiment were: grammatical structure - questions, commands, and so on tend to occur in groups, dialect or tongue - a phrase in French or German is often followed closely by another. It appears then that this experiment has isolated yet another technique for studying semiotic structure.

It has now become obvious that there are many ways in which Skinner's experiment can and should be redesigned. Many of these as suggested by the above discussion of perseveration could take advantage of such phenomena to map out semiotic structure in general. However, a discussion of general semiotic structure is beyond the scope of this work and the purpose of this section in particular. We want to investigate the relations holding at and between the ontotic and eidontic levels of rhemes. A redesigned Skinner experiment could eliminate the effect of the tagmatic level (the semiotic context) on the relationship shown by the Zipf Constellation, and this is the aspect of redesign I shall concentrate on.

The most obvious point is that Skinner's experiment as carried out by him, did not restrict responses either to single words or to single phrases. Indeed many responses were complete clauses and almost all were multiple word. In multiple word responses, the occurrence of words is still affected (to an unknown degree) by tagmatic relationships. The experiment should be designed to elicit only single word responses. The distribution of syllables among the stimuluses could easily be made to match the actual single word distribution of syllabic lengths in American.

Another improvement suggested by Skinner himself would be to use the phonemes in proportion to the frequency with which they occur in

normal speech, instead of using all the elements equally often as in the above described experiment. Also all of the vocoid phonemes of General American should be used rather than the restricted set of seven used here. In addition, after several hours of experimentation S may come to realize that the number of different sounds being given is actually quite small. This is an important objection if the illusion of real speech is to be maintained, and a larger number of stimuli is therefore indicated for prolonged work. External stimuluses were minimized by Skinner but not eliminated completely. It is suggested that these be further reduced by use of sound-proof rooms with restricted visibility, and by removing E from direct contact with S. This would aid the interpretation of summated responses as due to latent strength rather than external stimuluses. Recorded data should include not only the verbal responses but the number of repetitions required relative to the average for the individual S and the distortion of the response both as to phonemic distribution and syllabic length. All of this additional data contributes to the interpretation of the relative strength of a response, altho other factors doubtlessly enter in.

Skinner's experiment has served to show how the results of the Zipf Constellation can be further refined and interpreted to aid in our analysis of the ontotic-eidontic structure of words. It can also serve as a bridge between the statistical linguistic results of the Zipf Constellation and the Psychiatric results of the Jung Constellation.

Skinner's method involved the controlled experiment of the psychological lab but gave results similar to those obtained from

statistical linguistic observation on running text samples. Skinner's method also has some similarities to the method of word association invented by Jung and used extensively by the psychiatrists. Since the method was invented near the end of the nineteenth century interest has centered on concern with the normative or group uniformities in response, and concern with the clinical and diagnostic significance of individual responses. It was not until 1937, however, that the similarities between the rank-frequencies of word associations and the rank-frequencies of statistical linguistics was recognized in a paper by Skinner closely following his verbal summator results [1283]. Skinner found that the rank-frequency relation among associated words could be described by

$$F = CR^{-\theta}$$

which is the Mandelbrot equation with $\rho = 0$. I was not aware of Skinner's results in this area (and still have not been able to obtain a copy of his paper) and had been led by my analysis of a theory for the Zipf Constellation to suspect that there would be a close relation between Zipf's rank-frequency results and a similar analysis of word association data. I had accordingly already begun to collect and analyze word association data. The analysis of five different sets of data support the relation

$$F = CR^{-1.5}.$$

Skinner's Law of Word Association may not give as good a clue to the latent strength of individual words as the Zipf Constellation,

however, because as noted by many observers, adults tend to respond in word association tests with words of the same tagmatic category (part of speech), thereby confounding the tagmatic effect on the relationship between the ontotic and eidontic properties. However, for this reason, the Skinner Word Association Law may be useful for comparing and evaluating the usefulness of Skinner's Law of Summation for eliminating the tagmatic effects on the ontotic and eidontic relations.

Skinner's Law of Word Association is not an isolated result within the word association complex. Many other relationships have been discovered which have some bearing on the ontotic and eidontic structure of NL words. The sum of these regularities can be called the 'Jung Constellation' in analogy to the Zipf Constellation.

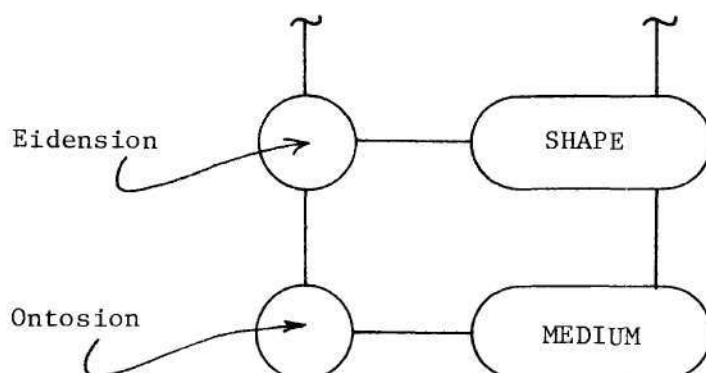
Thumb and Marbe were among the first to point out that the frequency with which a response is given in word association by a group of subjects is related to the speed with which that same response is given by the individuals in the group [1407, p340ff]. This phenomena which has come to be known as Marbe's Law can be summarized by: responses given more frequently by the group are given more rapidly by the individual member of the group. Schlosberg and Heineman [1254] were able to show that both latency of response of the individual and frequency of a response in a group were measures of response strength of a response within the individual. Bousfield and Barclay [429] found that when S's were asked to list the names of as many of a class of items as possible, there was a marked tendency for associations of high frequency in the group to occur early in the associations of the individuals and for those of lower frequencies to occur later. Laffal [156, p49]

used the Thorndike-Lorge frequency study [1328] to choose words of nearly equal frequency in the written language at large which they administered to college undergraduates individually during carefully controlled testing sessions in which they measured response faults of the kind typically used in clinical application of the word association test. He found that response faults tended to occur on responses which were given rarely by the group, whereas responses which were given with great frequency in the group were seldom accompanied by response faults.

Studies such as these show that the frequency of occurrence of a response in a group of normal S's is highly related to such characteristics of the individual's response as order of occurrence of the response in a sequence of responses, latency time of response, and frequency of response faults. However, when Kent and Rosanoff [156, p50] compared word association responses of normal S's with those of psychotic patients, they found that the verbal associations of psychotics are characterized by a large number of low frequency responses. This is seen to have implications for the shapes of the rank-frequency and type-token curves of psychotics not only in word-association tests, but in summated tests and running text as well.

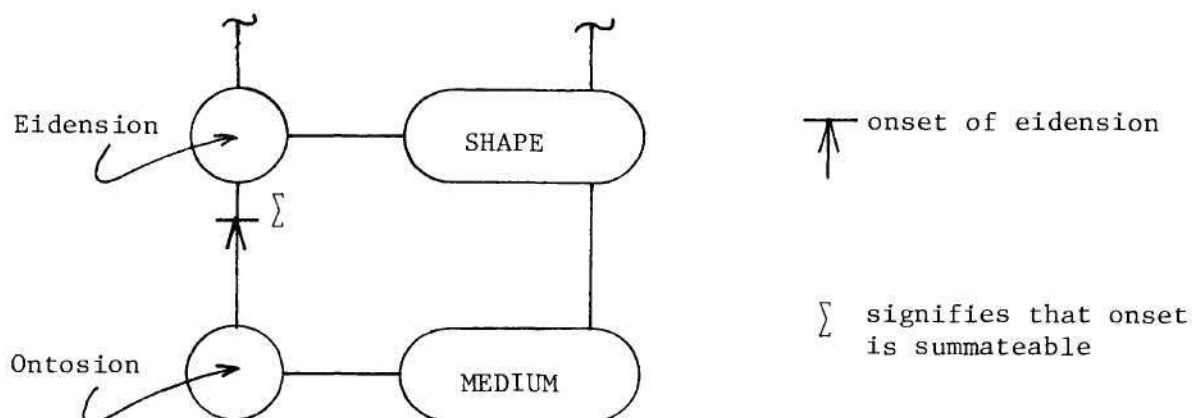
While these relations are useful for studying the ontotic and eidontic structure of words, many of them have implications far beyond this purpose such as involving the ideosyncracies of the interpreter and other pragmatic aspects of semiosis. For the purposes of this section tho, it is not necessary to elaborate further on the Jung Constellation other than to note that here again we have seen the same

apparent relationships involving the ontotic, eidontic, internal, and external structure of words.



7. Suggested Empirical Studies to Further Investigate the Relationships Between Ontotic and Eidontic Structure

We have analyzed four rather broad sets of phenomena: 1) perceptual psychology; 2) statistical linguistics; 3) behavioral linguistics; and 4) clinical psychiatry. In this analysis we have concentrated on the ontotic and eidontic level of words and have found a common structure repeating among the general regularities isolated by many different investigators.



This leads us to view all the phenomena discussed as interrelated and all the methodologies as different methodologies for investigating the same phenomena. This leads to some suggestions for conducting additional experiments to refine our understanding of this common structure.

Skinner's Rank-Frequency Law of Summation is similar in mathematical form to the Rank-Frequency Law of Zipf and Estoup. If there were a necessary or analytical connection between the two we might argue that this necessary connection also required a Law of Word Abbreviation to hold among the summation phenomena. Such a regularity has never been proposed to my knowledge. However, since the methods of Zipf and Skinner are empirically independent we cannot carry out this argument. If the words holding the various ranks in both experiments were the same, then Zipf's Law of Word Abbreviation would of necessity have to hold for the summation phenomena. But again we know this not to be the case. Such words as 'you' and 'do' occur about ten times as often in summated responses as they do in ordinary text while such words as 'the', 'that', 'in', and 'is' occur less than half as often in summated text as ordinary text. 'Are' has rank 4 in summated text vs. rank 24 in normal text. Again the desired argument cannot be carried out. But the notion of a common ontotic and eidontic structure among the two sets of phenomena is a theory of sign structure (even tho rudimentary to the extreme) and theories can only suggest, not argue recitatively. We must turn to experiment and observation to test theoretical suggestions. Therefore since our theory of common ontotic and eidontic structure suggests a law of abbreviation holding for summated

text, this suggestion should be investigated in detail at the earliest possibility. Our theory also suggests laws of repetition, meaning, and restriction holding for summated text. These should also be investigated. In fact a single analysis, similar to the one mentioned for the Zipf Constellation, can be designed to check for all of these relationships. The relationship between Skinner's analysis of perseveration and Fowler's Law of Repetition has already been mentioned.

A similar discussion could be carried out for the word-association phenomena leading one to expect, and therefore to test for, regularities among word associates similar to Zipf's Law of Abbreviation. Here, however, the difference in the nature of the word generation process leads me to question whether a law of repetition and a law of meanings also exists or how one should design an experiment to test for this but these possibilities should also be examined.

A modification to the original Skinner summator experiment has already been suggested in order to eliminate the tagmatic effects on the ontotic-eidontic relations.

The Miller-Bruner-Postman, Skinner, and Terwilliger methodologies involving the T-scope, summator, and flicker box represent various means of separating the effects of the ontotic and eidontic relations. Another way of doing the same thing is to mask an audible or visible message with a certain amount of white noise. The S listens to (or looks at) the message and tries to understand and repeat it. If he cannot, noise is reduced one increment and message is repeated. This is continued until S can repeat message without error (alternately until he can repeat *any* message at all). Measurement is amount of noise

still left in the signal (noise perceptibility) when S repeats the message. Typical messages include single words, morphemes, phrases, clauses, etc. It would be interesting to explore the relation between the noise perceptibility and the eidontic deviance of artificial word forms.

In carrying this last experiment we might expect some characteristic anomaly in the relationship at the point where onset of eidension occurs. This point is so interesting that it is worth a special experiment in its own right. In fact there are so many ways of investigating this effect and so many instruments and methodologies available that what I am proposing in effect is a whole schema of experiments all directed at improving our understanding of the onset of eidension. We discovered that the onset of eidension is summable (Skinner Effect); we could investigate the nature of this summing by requiring the S of Skinner's experiment to give a single word response on each and every repetition until S feels he has the proper meaningful response. By investigating the way this response approaches an actual meaningful word (both in number of repetitions required and in kinds of responses) as a function of the eidontic deviance of the stimulus we could learn more of the nature of this onset. The Miller-Bruner-Postman experiment leads us to expect a linear relation between interpretation failures and eidontic deviance. I personally do *not* believe this is the case. I think this is only due to the artifact that M-B-P could not measure non-integral eidontic deviances. I would expect an anomalously high number of mistakes in the region of eidontic deviance where onset of eidension occurs. In fact this effect, if it occurs, could be used to

establish a natural origin for the eidontic deviance scale, thus converting it to a full fledged ratio scale (assuming that the basic M-B-P phenomena has been used to establish an interval scale already).

Many other techniques are available and an almost endless number of combinations may be envisaged. However, eidontic deviance is the one parameter which spans the onset of eidension point and we may just briefly list each of these methods as an experiment in conjunction with a measurement of the eidontic deviance of artificial words.

Table 13. Eidometric Experiments

1.	$^{\circ}\text{ED}$ vs. Flicker Stability
2.	$^{\circ}\text{ED}$ vs. degree of summation (# of repetitions)
3.	$^{\circ}\text{ED}$ vs. % errors tachistoscopically
4.	$^{\circ}\text{ED}$ vs. time to measure $^{\circ}\text{ED}$
5.	$^{\circ}\text{ED}$ vs. % noise perceptibility
6.	$^{\circ}\text{ED}$ vs. # free associations in fixed time
7.	$^{\circ}\text{ED}$ vs. time to associate one word
8.	$^{\circ}\text{ED}$ vs. shape of rank-frequency and/or type-token curves for summation and association
9.	$^{\circ}\text{ED}$ vs. generalizability of conditional association
10.	$^{\circ}\text{ED}$ vs. time required in an associative learning task (ALT)
11.	$^{\circ}\text{ED}$ vs. # of mistakes in ALT
12.	$^{\circ}\text{ED}$ vs. Garner effect.

Note that such things as interpretation errors which are included in the above could be related only by internal relations.

One of the motivations for the onset of eidension hypothesis was Garner's data leading to the Serial-Sequential-Selection Hypothesis. This could be modified to search for the specific point where onset of eidension takes place by modifying the nature of stimuli used. The classical stimuli involved phonemic shape and pitch. If artificial word forms were used as stimuli then perhaps forms with low $^{\circ}\text{ED}$ (high deviance) would act as ontotic (energetic) stimuli while forms with high $^{\circ}\text{ED}$ (low deviance) would act as eidontic (structural) stimuli. Thus by varying the eidontic deviances of the stimuli in these experiments, the crossover point could be found.

Finally we might ask how our understanding of the onset of eidension effect can be used to discover (or explore for) the onset of tagmension? We first suggest a way in which a tagmatic deviance scale might be developed similar to the way the eidontic deviance scale was developed. Shannon has given examples of finite order Markov generators for text using real words, similar to his Markov generators for words using n-gram frequencies. Text could be generated using these devices and the resulting forms sorted into sets in which all the forms have approximately equal departure from normal grammatical text. These sets could then be ranked by S's and rank-correlation measures used to test for the significance of the ranking. Next arbitrary artificial text could be produced and given to S's to measure with the instrument so developed. The behavior of S's during this measurement process should be observed to determine any unusual behavior associated with any particular localized region of the tagmatic deviance scale. Garner's test may also be generalized by separating the tagmatic from the eidontic

aspects of the stimulus. If these are varied independently the same Selective-Sequential-Processing hypothesis may be found to be necessary to explain all the data altho the nature of the separable-integral distinction may vary radically from the previous level or not be applicable at all.*

8. Summary

In this section we have seen the power of the language of menetics when used to investigate two semiotic levels simultaneously. Phenomena from many disparate domains are suddenly seen to possess similarities and interrelationships not previously suspected. Fruitful theories and hypotheses can be framed in the language and experiments contemplated for increasing our understanding of semiotics in general and meaning in particular. The full power of the language can only be seen, however, when multiple semiotic levels are contemplated simultaneously; when attempting to untangle the full complexity of meaning phenomena at all levels of semiosis, for instance. A discussion of such an example, however, is far beyond the purposes of the present section, or even the present work as a whole.

*Jenkins has noticed effects [137] that could require such an explanation.

CHAPTER V

SOME PRELIMINARY THEORETICAL RESULTS

The beings of the mind are not of clay;
 Essentially immortal, they create
 And multiply in us a brighter ray
 And more beloved existence.

 Byron

A. Introduction

Choose your words, but think not whether
 Each to other of old belongs;
 What so dear as the dim gray song
 Where clear and vague are joined together?

 Paul Verlaine:
 Ars Poetique.

In Chapter IV, I was concerned with giving some examples to show how the language of menetics presented in Chapter III could be used to discuss the empirical concept of meaning for natural language words from an experimental standpoint. In this chapter I first give two examples to show that the same language is equally adequate to the task of developing an empirical theory for the concept of meaning; and then I discuss the results of these examples: an adumbration of a menetic theory and a suggested structure for the symbolic rheme. This allows me finally to explicate Morris' concepts of *syntactics*, *semantics*, and *pragmatics* in terms of concepts developed within the language of menetics and to identify a subtle confusion that is often made in using the terms 'syntactics', 'semantics', 'pragmatics', 'meaning', 'form', and 'content'.

The theoretical direction of this chapter raises again a methodological question that was first broached in IV; namely the nature of the relation between empirical data and theory. The question of interest then was the type of language used in theories and how theories are founded on empirical data. Now we are interested in the question of how theories are "generated" from the data they are meant to explain.

1. Abduction vs. Induction or Deduction

There is no necessary relation between theories and the data or laws they are intended to explain. This can be seen by the fact that both Newtonian mechanics, special relativity, and general relativity are distinct theories that explain the laws of nonaccelerated motion at low speeds. Hence a theory cannot be "derived" from the data and laws it is intended to incorporate. Neither do theories usually have any form similar to their data or laws (except perhaps in the case of phenomenological generalizations). Hence no amount of "induction" will transform laws into theories. If this conclusion did not hold, theories would be a lot easier to come by because of the large number of scientists who are very good at inducing the empirical generalizations, or descriptive laws of nature.

Peirce has called the process of generating theories from laws and data "abduction".* Abduction produces a hypothesis, or reasoned guess, as to how a surprising observed fact may have come about, and is a suggested explanation for that fact. Man seems to Peirce to be possessed of

*Elsewhere he called the same process "retroduction". Early Peircean disciples generally used the word abduction, while the current generation seems to prefer retroduction. My preference is for the shorter word.

an "instinct" for guessing the correct hypothesis out of the myriad of possibles in any situation.

The abductive suggestion comes to us like a flash. It is an act of *insight*, although of extremely fallible insight. It is true that the different elements of the hypothesis were in our minds before; but it is the idea of putting together what we had never before dreamed of putting together which flashes the new suggestion before our contemplation. [1109, 5.181].

We observe, for example, a fact that surprises us and seems to demand explanation. The observation has excited connections with old facts that trigger the suggestion. Peirce sees abductive inference as taking the following form: The surprising fact, C, is observed;

But if A were true, C would be a matter of course.
Hence, there is a reason to suspect that A is true. [1109, 5.189].

Peirce is said to have regarded Kepler's development of the elliptical theory of planetary orbits as the "greatest piece of abductive reasoning ever performed", [1431, p153] Also see p47f.

There are thus three modes of scientific inference: 1) induction; 2) deduction; and 3) abduction. As an inference, however, abduction differs from deduction and induction in that it only "suggests that something *may be*" and unlike other inference it introduces a new idea. Abduction also differs from the others in that "no reason whatsoever can be given for it," yet because it merely suggests rather than asserts, "it needs no reason". A hypothesis is justified by the fact

...that from its suggestion deduction can draw a prediction which can be tested by induction, and that, if we are ever to learn anything or to understand phenomena at all, it must be by abduction that this is to be brought about. [1109, 5.171].

The purpose of abduction then is to introduce a new idea that serves

as the basis for explanations and predictions; the purpose of deduction is to infer those predictions; and the purpose of induction is to test them. These are roughly the steps we employ in developing and testing empirical theories. It seems to follow, then, that scientific efficacy involves the employment of modes of reasoning that will facilitate the use of these methods. And since abduction is produced only by a flash of creative insight that combines elements of our imagination in new and unforeseen ways, the most important step we can take to aid it is to arrange our thinking systematically and completely in concise ways that may encourage imagination and insight. This has motivated my attempts to both systematize and to idealize the two experiments in this chapter and my use of matrices to display the results and progress of this process.

2. Development of Theory

One result of this idealization is an examination and refinement of my concepts of meaning components. In my survey of the senses of meaning in the literature, my explication of semiotic structure, and my exposition of the language of menetics, I was careful to keep each term as vague as possible while still serving the intended purposes and deliberately withheld any attempts to bias the language by explication before the empirical purposes of explication were fully understood. Chapter IV has helped us develop an understanding of many of the empirical properties of these terms while the development of theory in this chapter gives us a disciplined purpose for one explication.

The analysis led to the splitting of the cognition component into two new components -- cognition (in a new sense), and emotion. It has

also led to a questioning of certain aspects of purporsion --- namely the practical consequences of a term which appear to be a combination of the goal and the intensional aspects of meaning --- perhaps an intensional-purporsional plane.

The main result however, has been the adumbration of a menetic theory which suggests a structure for the symbolic rheme. This structure leads to the prediction of new and interesting experiments (which are however beyond the scope of the present thesis) which would either verify the present theory or lead to modifications which would improve it. There seems to be a very great possibility that some of these modifications would lead to quantitative predictions as well as the relational predictions engendered by the present theory.

Because of the refinement of the concepts of meaning *in vivo* thruout the present chapter, an additional problem of termionology is presented. That is the question of how to present these results in a way consistent with the language as finally presented in Chapter III. The research reported in V.B. and V.C. was carried out after the initial survey of the literature, explication of semiotic structure, and initial development of the language were completed. However, as a result of changes and additions to the language structure required by the results of V.B., these tasks were redone with a heightened sensitivity enabled by these results. Thus the language as finally presented in Chapter III is consistent with the final results of this chapter. However, this raises the question of how to present the intermediate results of the experiments reported here. One possibility would have been to completely revise the

experiment (principally the language used in performing it) and report it in final form only. However, this would have lost an aspect that I consider extremely informative: the epistemological insight into my methodology in action. I therefore have chosen to present V.B. in its original language which conflicts with Chapter III only slightly but exhibits the ways in which thinking is forced to change its ways, by the semiotic facts, independently of the analyst or his language. I therefore start Section B with only eight components of meaning. Cognition and emotion are confused together under one concept called 'cognition' (in the "old" sense). However, by the end of Section B, the language is fully consistent with its final form. The listing of the components also attained its final order in this section.

Since the experiments we are performing are semiotic in nature they may appear to some to not be experiments at all. However, the lessons about semiotic data and methodologies learned in Chapter IV should make us alert to the possibility of radically expanded ways of performing experiments and ultimately of theory building. The experiments reported here are not mere observations as when I say that sentence 1) has been observed but that 2) has not.

1) The quick brown fox jumped over the lazy dog's back.

*2) The the over jumped fox dog's brown quick lazy back.

The observations that I may make are controlled by the design of the experiment in that only those conditions brought into consideration may affect the result. The results are also independent of the observer in that they must match results previously obtained under semiotically similar

conditions.

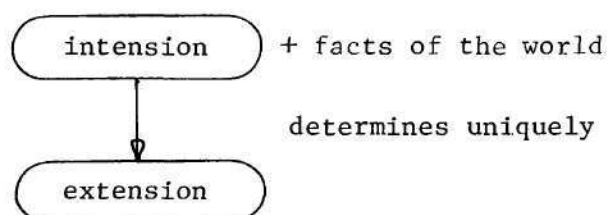
We may therefore call these 'thought experiments': what would happen if we did such and such under this or that conditions. Physicists call these 'gedanken experiments'. Often they serve to tell us the result of combining the conditions of previously known theories in new and unusual ways; but they also can lead the imagination to the flash of creative insight needed to arrive at new theories, as when we are able in thought to carry out idealizations that would be impossible in practice.

The thought experiments used here are systematizations of two previously known concepts: Ogden and Richards' *Levels of Failure* concept; and the Frege-Carnap *Unique Determination* relation. What is original in my analysis is the attempt to systematically examine these relationships for each pair of purported internal components of the symbolic rheme and thereby to gain insight into a theory of menetic structure.

There are two distinct hierarchical relationships which occur naturally between components of meaning. One of these may be loosely referred to as 'failure of understanding', the other as 'unique determination'. In some sense they are obverses of one another in that one relates the failure or lack of understanding of one component to the failure or lack of understanding of other components while the other relates the understanding or determination of one component to the understanding, or knowledge of other components.

However, the two relations are independent and both need to be looked at. We can see this by a look at the intuitive notions of extension and intension. Carnap [45] and Frege [100] as well as many others

since have recognized that the intension of a term uniquely determines its extension but not vice-versa, altho it takes a knowledge of the facts of the world to spell out what the extension is that has been determined by a particular intension. This observation was mentioned in Chapter IV. Thus the unique determination relation between extension and intension can be diagrammed as follows:



Now the question arises as to whether failure of understanding can be related to this diagram in a unique way? Suppose we fail to understand the intension of some term, does this block us from understanding its extension? Not at all! We may have a good understanding of the extension of some term and yet not have the vaguest idea of its intension because we lack a knowledge of the proper generalization features or essential properties. I myself am not unusual among the Silent Generation in lacking a detailed familiarity with Greek Mythology and altho I know perfectly well that both 'griffin' and 'sphinx' have null extensions, I can never recall whether it is a lion's head and a human body that the one has or a lion's body and human head, nor which it is that is half lion and half human and which is half lion and half eagle. Hence it may be fairly said that I do not understand the intension of either term. There are still other terms, such as 'harpy' which I also know to have a null extension but for which I have absolutely no idea of the intension. Thus a failure

to understand the intension of a term does not block one from understanding its extension.

Well then, is it the case that if we fail to understand the extension of a term we are prevented from understanding the intension of a term? Again the answer is 'no'. One may be well aware that the intension of 'uncle' concerns the property of being the brother of a parent but yet not be able to construct a set of just those people who are uncles. It is not obvious from looking at a man whether he is a brother or not and given that he is a brother, this alone is not enough to determine if his sibling is a parent. What may be said to have failed here is our knowledge of the facts of the world. Certainly if we knew the facts of the world and the intension of a term we must understand its extension, so a failure to understand a term's extension must result from a lack of knowledge of either the facts of the world or the intension of the term. But the failure may be localized in either one or both; not just in the intension only. Now this may indicate that there is a relationship involving failure of understanding and something else --- such as knowledge of the facts of the world --- which is not independent of unique determination, and it may be advantageous later to search the specific form of this relationship out as an inverse for unique determination, but 'failure of understanding' by itself is not this relationship and as we have seen we can not draw for failure of understanding such a diagram as we did for unique determination and hence these two are independent relations. But altho they are independent, this does not mean that no relation at all can be found between them. In fact this is what we just saw in

the above argument. Both relationships are related to meanings and each may have its own usefulness for searching out relations between the components of meaning. In fact, the structure, so determined by each relation, may be different! We must be prepared to discover two different structural diagrams between meaning components if we use two independent relations as exploratory tools. If, indeed, these turn out to be the same structure, that would be independent evidence for the menetic "reality" of such a structure. I begin my examination with the failure of understanding relation.

Perhaps I should mention one note that may prevent some confusion. Since Hayakawa's primacy of context rule was mentioned in a previous section, it may mistakenly be thought that it could be applied here and determine the outcome. However, Hayakawa's primacy of context rule involves not the failure to understand the right word, but the use of the wrong word and the override of contension. But this generates an entirely different kind of experiment.

B. An Idealization of O & R's *Levels of Failure* Concept

I hear the sound of words; their sense the air
Dissolves unjointed ere it reach my ear.

Milton:
Samson Agonistes

This relation was mentioned several times thruout Chapters III and IV. Ogden and Richards [213], and since then others have drawn up lists of ways we can fail to understand meaning and the various effects of this failure. What is original in this section is the attempt to systemati-

cally examine this relationship for each pair of all eight* purported components. Since the relation is irreflexive there are $n(n - 1) = 56$ different pairs to be examined. Those already examined by Ogden & Richards and others and discussed previously in this work, will be listed again here for completeness and systematization.

1. Failure to Understand the Ontosion of a Rheme

This component of meaning was introduced in III.B.2 and defined in III.D.3. Empirical evidence was given for it in IV.F and it receives further theoretical explication in V.C.1.

The ontosion of a rheme is that component of its meaning that is abstracted from but related to its medium. Therefore most failures to understand the ontosion of a rheme will stem from a failure to somehow interact properly with the medium. In spoken language there are thus two obvious causes of such failure: deafness of the sink interpreter and a lack of a proper vibratory medium between the source interpreter and the sink interpreter.

My term 'failure of understanding' is closely akin to Ogden and Richards' 'levels of interpretation'. They define their term as follows:

One interpretative process is said to be on a higher level than another when its occurrence requires the preceding occurrence of that other... Whether the level is said to be higher or lower is immaterial. Here it will be said to be higher. [213, p209fn].

This definition is reminiscent of Garner's definition of separable dimensions, see IV.P, and Malinowski's phrase "stages of meaning" [213, p324]. Ogden and Richards discussed failure at the ontosion level. It

*See remark in Section A.

is of interest now to read their words on this subject:

As a preliminary to any understanding of words, we necessarily have a very simple kind of interpretation which may be called sensory discrimination, or sensory recognition. At this level we can be said to be discriminating between sounds as sounds ... [213, p209].

That a failure to understand the ontosion of a rheme can block the understanding of all other components is implied by Ogden and Richards' words "preliminary to any understanding of words". However it can easily be seen if we imagine a simple experiment. Let a Speaker A and a listener B be connected only by a telephone and let the electrical connection be suddenly broken by either a power failure or break in the line. If A is unaware of the failure, he will continue to speak uninterruptedly but B will now fail to hear any sound and thus will no longer understand the ontosion of A's terms. Now, let us wait for a sufficient time for the boundary effects or what may sometimes be called the 'edge' effects to die out and B will no longer understand any meaning of A's terms at all. The ontotic failure has blocked all understanding. The need to wait for the transient period can be seen from the fact that B may have understood the tagmension of A's first word after the failure simply from hearing his words up to the failure point. He may have been able to predict that the first word he did not hear was a noun, or verb, etc. However - to the extent that he can do this he has not failed to understand all of the ontosion. The ontosion has a certain natural decay effect.

Again, if A is speaking to B face to face and B is stone deaf, what of the total meaning of A's words can B understand? First, he may understand the ontosion of *other* signs than A's words themselves. He may understand the ontosion of A's lips --- see that A is talking to him ---, etc.

To the extent that B cannot understand *any* ontosion of A's words, he can understand none of the rest of A's meaning. B upon failure to understand A's ontosion must remain totally ignorant of all of A's meaning. A failure at the ontosion level blocks any understanding of all other meaning components. As Ogden and Richards claim, an understanding of ontosion is preliminary to an understanding of any other component of meaning.

Let us diagram our conclusions thus far by listing a matrix of menetic components as before where we interpret the component on the left as the one whose failure is examined and the one at the top whose understanding is either blocked or not blocked. Let us use a '+' to indicate that understanding is blocked and a '-' to indicate not blocked. A blank for any entry will simply indicate an as yet undetermined effect while zero's will be used on the diagonals to indicate the irreflexivity of the failure relation. We thus have at this point:

	onto- sion	eiden- sion	tagmen- sion	exten- sion	inten- sion	cogni- sion	purpor- sion	conten- sion
ontosion	0	+	+	+	+	+	+	+
eidension		0						
tagmension			0					
extension				0				
intension					0			
cognision						0		
purporsion							0	
contension								0

2. Failure to Understand the Eidension of a Rheme

This component of meaning was introduced in III.B.3 and defined in III.D.3. Empirical evidence was given for it in IV.G and it receives further theoretical explication in V.C.2.

The eidension of a rheme is that component of its meaning that is abstracted from but related to its shape. Therefore most failures to understand the eidension of a rheme will stem from a failure to somehow interact properly with the shape. The shape of a word is that by which we recognize two different words as being *different*, altho they are both embodied in the same medium. When we understand the eidension of a communication, we know where one words ends and another begins and can distinguish one word from another token of the same word or from a different word. Poets rely to a great extent on eidension thru the devices of rhythm, rhyme, assonance, consonance, and a great many other conscious and unconscious devices by which a work of art is distinguished from a work of prose. When we say that a common form for the words of some given language is CVCV we are saying something about the shape of words in that language and therefore about eidension for that language. It is by an understanding of the shape, and therefore by its eidension, that a person can tell one language from another even tho he cannot understand one word of either. I once had an experience that left an indelible impression on my mind. During my late 30's I had the opportunity to live in Holland for a month altho I could not speak a word of Dutch and in fact did not pick up any during that time owing to the propensity of the Dutch people to display their "English". And altho I had had German in school, that

had been so long ago that I thought I had forgotten almost every word I ever knew. One day at the train station while standing in line to buy a ticket, the person ahead of me began speaking German to the ticket seller. The effect was instantaneous and dramatic. "Oh what a musical language.", I said to myself even tho I understood nothing he said, "I wonder if that is German.". I was sensitive to the difference in shape and understood, but perhaps only partially, the eidension --- as well as the ontosion --- if not any other part of his meaning.

The psycholinguist Roger Brown commented on this eidontic phenomena:

The most startling aspect of speech in a completely unfamiliar language is the fact that it does not "segment" to our ears. Segmentation emerges on the perceptual level when we begin to detect recurrences. [438,p255].

Segments of speech acquire the status of words by a process of "active understanding": temporal strings of speech sounds are chunked into words in accordance with our understanding of the morphological and morphophonemic rules of the language. It seems safe to conclude, therefore, that words emerge in acts of decoding iff appropriate perceptual-menetic operations are performed upon temporal strings of speech sounds or, in the case of written speech, upon particular visual forms. These perceptual-menetic operations must somehow involve a process of eidontic understanding, for instance, a checking of the accoustic or visual stimulus input against a previous eidontically understood vocabulary. But an understanding at the eidontic level does not necessarily imply comprehension of meaning at any higher level. Sometimes I may recognize a pattern of speech sounds as an empty eidontic form only, as "a word I have heard before, but do not understand". And in the case of homonyms ---

two or more different words with the same eidontic shape --- recognition of shape alone leaves me in a state of indecision. The psycholinguist Ragnar Rommetveit describes the eidension process thusly:

...Sequences of speech sounds and written strings of letters are as such devoid of meaning, but words emerge in acts of decoding when such stimuli are met with an internally provided request for some meaningful message element. [259, p19].

Ogden and Richards have this to say about eidension:

The next stage of interpretation takes us from the mere recognition of the initial sign as sound of a certain kind to recognition of it as a word. The change is due to a change in the psychological context of the sign. To recognize it as a sound with a distinctive character we require a context consisting of the sign and of other past sound sensations more *and* less similar. To recognize it as a word requires that it form a context with further experiences other than sounds.... One of the chief distinctions also between poetry and strict scientific prose is that in poetry we must consciously attend to the sensory characters of the words, whereas in prose we need not do so. This conscious attention to words as sounds does, however, tend to impede our further interpretation. [213, p210].

In fact Rommetveit, in the same article quoted above, suggested that this interpretation impedance phenomena could be used as an instrument to explore the hierarchial structure of meaning.

The hierarchial structure of the word may also be explored in terms of which part processes are "attended to" and "accessible to awareness". In general, we would expect residuals of lower level operations to fade away once they have provided appropriate input for higher levels: We attend to the message conveyed by linguistic stimuli rather than to the perceptual tactics by which messages are generated. [259, p20].

He gives as an example of this interpretation impedance phenomena, the dilemma faced by all proof readers. This dilemma seems to arise from a lack of capacity to attend to more than one level of the hierarchy at a time. Typographical errors tend to go unnoticed if they

attend to higher level meaning, whereas a careful attention to eidension prohibits comprehension of higher meaning.

The kind of study suggested here is similar in many respects to the experiments reported by Jenkins [137] which I had analyzed in Chapter IV, but edited out in order to save space. This phenomena deserves a systematic and comprehensive experimental treatment and will undoubtedly have much to tell us about the menetic structure of words. However, since it is not the failure of understanding relation that I am examining here, I will ignore it, along with several other excellent instruments, such as the Ogden and Richards generalized truth test, and make no further consideration of them in this section.

We are especially sensitive to eidension when a foreigner tries to speak our language and does so with an "accent". Our concentration and understanding is greatly hindered by attention to his accent. What the accent is, is merely a difference in shape. People vary greatly in their ability to understand someone with an accent as indeed they do in their ability to "understand" pure poetry. This is no different from people's variability in understanding the cognitive meaning of words.

What happens if we fail completely to understand the eidension of a word or phrase? First this does not block out the medium. We may still understand the sound to be human speech. As an example, when I was first learning German, our professor would sometimes lecture for the whole hour without our understanding a single word. The first time he did this it sounded as if he had uttered one single word --- run together --- an hour long. We had not understood the eidension, but had received the

medium and understood the ontosion. By the last time he did this, near the end of the quarter, we could identify each individual word so that even though we didn't know what the word 'meant', we could look it up in a dictionary successfully and find out. We had succeeded in learning part of the eidension. Years later --- in the train station in Holland --- this understanding showed itself when suddenly confronted with the proper situation.

Secondly, when we fail to understand the eidension completely, there is no way to understand any other component of meaning. We certainly cannot understand the tagmension, since we have no way of identifying the semiotic context and cannot identify tagmatic features of any type. Nor can we understand *the extension* if we think the word is 'standtheex', or any other component of meaning for every component except ontosion depends to a certain extent on our ability to properly identify certain discreet units such as 'understand' as opposed to 'standtheex'.

Thirdly, we may have certain vague feelings when we listen to conversation without understanding the eidension; but these feelings are all part of our understanding that the sound is human conversation and our interaction with the medium. In other words this is just our understanding of the ontosion which has already been discussed.

Our diagram now appears as follows:

	ont-	eid-	tag-	ext-	int-	cog-	pur-	con-
ontosion	0	+	+	+	+	+	+	+
eidension	-	0	+	+	+	+	+	+
tagmension			0					
etc.	.	..						

3. Failure to Understand the Tagmension of a Rheme

This component of meaning was introduced in III.B.4 and defined in III.D.3. Empirical evidence was given for it in IV.H and it receives further theoretical explication in V.C.3.

The tagmension of a rheme is that component of its meaning that is abstracted from but related to its semiotic context. It is that part of the the total meaning of the word that is coded in what grammarians call 'syntax'. Therefore most failures to understand the tagmension of a rheme will stem from a failure to somehow interact properly with the semiotic context, or syntax. The syntax of a word is that by which we recognize its setting in two different semiotic contexts as being significantly different or not.

- 1) We had fish for supper last nite.
- 2) We will have fish for supper tonite.
- 3) We will fish from the pier.

The syntax of 'fish' in 1) and 2) is not significantly different and its tagmension is the same. In 2) and 3) the syntax of 'fish' is not only significantly different, the same shape is part of two different words with completely different tagmensions.

Ogden and Richards say of tagmension that:

Complex symbols with the same referent may be given alternative forms even when the simple symbols, the names, contained remain unaltered. The study of these forms is a part of grammar, but a more genuine interest in, and awareness of, psychological problems than it is usual for grammarians to possess is required if they are to be fruitfully discussed. [213, p212].

An experimental effect of the tagmension component of meaning has been reported by Rommetveit and Strømnes. They used the Norweigan word

shape 'STRENG' which is the common shape of two Norwegian words with different tagmensions. When the shape was used as a stimulus in a word association list and preceded by nouns referring to cords, ribbons, etc. it generates a noun meaning *string*. In a word association list of Norwegian adjectives for personal attributes, on the other hand, it is usually experienced as an adjective with the same meaning as the American word 'severe'. Thus:

...Entirely different word association responses to the very same letter sequence in the two different settings provide evidence that different words emerged in decoding of the same visual stimulus input. [260].

We are especially sensitive to tagmension when we try to speak a foreign language and cannot keep the syntax straight; when we can't remember that 'prognosis', 'calculation', and 'sling' are feminine in German --- 'Prognose', 'Rechnung', and 'Schleuder', as opposed to 'filly'--- neuter --- 'Füllen' --- and 'forest' --- masculine --- 'Wald'. We can also fail to understand the tagmension of a foreign language when for instance we hear a phrase such as '*meinen Vätern*' and fail to recognize the '___en___n' as an example of tagmatic agreement marking case, gender, and number; or confuse the dative plural --- 'for or to my fathers' with its accusative singular --- '*meinen Vater*' --- 'my father' as direct object.

What happens when we fail to understand the tagmension of a word or phrase? Here we have deliberately not used the phrase 'fail completely' as before. We will find that in analyzing failure to understand tagmension a serious modification to this relation must be made.

First of all, even a complete failure to understand the tagmension does not block an understanding of the ontosion. The medium may still be recognized as the carrier of human speech. We can hear the sound and recognize that it is meant as significant communication.

However, when we fail completely to understand the tagmension of a word or phrase, we may understand part, most, or all of the eidension of that word or phrase. We may recognize the word boundary of '*meinen*' and simply not understand whether the '___en' marks the masculine, dative, plural or the masculine, accusative, singular. In this case we may be completely sensitive to the total shape component of meaning, including word boundaries, rhythm, rhyme, assonance, etc. On the other hand Kelly suggests that Halle and Stevens [696] have shown in a

...general way that such segmentation is actively imposed by the listener in accordance with his developing interpretation of the sentence, and not passively received or constructed independently of or prior to the rest of the interpretive process, as our idealization suggests. [147, p2].

Thus a complete failure to interpret the syntax, to understand the tagmension, could result in a failure to properly segment the word --- to interpret the word boundaries --- to understand part of the eidension. Nevertheless, Kelly reports that:

...despite such qualifications this somewhat restrictive idealization preserves most of the essential context of the comprehension problem. [147, p2].

In other words, this interactive effect is small compared to the overall problem of understanding. Thus the failure to understand the tagmension of a word or phrase may or may not significantly block the understanding of its eidension.

We may anticipate several ways of avoiding this ambiguity. First, in all scientific investigations the intuitive concepts with which thinking starts must be examined and often refined --- changed in ways that make them consistent or more useful for organizing the data of experience. We may now be at the point where the concepts of 'eidension' and/or 'tagmension' need to be examined and refined. There may actually be more components involved than I have anticipated. Eidension may be a cover concept for several discreet components. Perhaps eidension and tagmension do not split the menetic pie as well as some three or more other components would. Or perhaps the only problem is the splitting of the pie. Perhaps by a more careful defining of the distinction between eidension and tagmension, this difficulty could be resolved. However, there is another way to avoid the present ambiguity. We may idealize the relationship under investigation to take the limit (the use of this word in this context is no more imprecise than the other concepts being manipulated) as our failure to understand a particular component becomes small or negligible. This so-called limit process may serve to remove the bothersome interaction or at least to make it so negligible as to make it insignificant compared to the gross structure of the components themselves under investigation. I choose this latter method because it appears to work. In addition the problem of refining the eidension concept appears to be at least an order of magnitude more difficult than the mapping out of the gross component structure. The method of idealization appears to give us a way of proceeding with the main problem while avoiding the much harder but more subtler and deeper problem. If eidension and tagmension must be broken down into several, more refined, components then I shall be glad to leave

this for some other investigator to achieve. I shall be happy just to split the atom. The structure of the proton can be left to someone else, I am not greedy. Peirce expressed this well with his 'backwoodsman' example. The forest has too many trees to fell to worry about plowing the ground as well.

When we reexamine each of the prior determined matrix elements we find them unchanged. The results still hold and for the same reasons stated. Thus we are back now to a determination of the effect on the understanding of the eidension due to a failure in the understanding of the tagmension in the limit as the failure in the understanding of the tagmension becomes negligible. Since even in the new language this usage is awkward, let us call such a failure a 'test-failure'. The language of menetics provides just such capability. What is the effect on the understanding of the eidension due to a test-failure in the understanding of the tagmension?

Now we can see the advantage of the limit process method and the *test-failure* concept because the Halle-Stevens effect is thereby avoided. This is what Kelly means when he says that despite such restrictions the essential problems of understanding are preserved. Just because a single genitive ending is confused for a plural --- an ['s] for an [s], a sense of word boundaries is not destroyed nor is a feeling for other eidension factors --- rhyme, rhythm, etc.

On the other hand, a test-failure in understanding the tagmension of a word can have a noticeable effect on the understanding of the extension of that word. A confusion of 'dogs' with 'dog's' leads to an

uncertainty as to whether the referent is one dog or many or whether it is even a dog at all, but some property of being related to a dog.

Similarly, a test-failure in tagmension leads to noticeable errors in intension. In our dog example, the confusion is between two concepts one of whose essential properties includes being alive and being multiple in quantity, while the essential properties of the other includes being related to a single dog.

All of our mentalistic aspects of understanding, ideas, images, thoughts, feelings, emotions, etc., are equally affected by a test-failure in tagmension. If this causes us to reference the wrong referent, to conceive the wrong concept, then how is our mind to be prevented from cogitating the wrong cogcepts. Mental associations are made to the wrong entity and are thus in error. Only the physiologically instigated feelings, emotions, or mental reactions may take place unerringly but these are in response to the form as pure shape and sound and hence part of the ontosion and eidension which we have already decided are not affected by the test-failure in tagmension.

How does a test-error in tagmension affect purporsion? Here we may imagine some kind of failure that would confuse for instance 'fishes' as in 'he fishes' with the same form as in 'the fishes'. Our muscular training would be entirely different for these two especially if our sustenance depended to any great extent on a watery catch and hence part of our understanding of the purporsion is confused by the test-failure in tagmension. In rereading this I notice that I have dropped into the

Sandhills dialect and hence the above example is nonstandard American. A good example can be made out of any word shape which has both a verb and noun tagmension. Perhaps 'runs' as in 'he runs' and 'the runs' as affecting the behavior --- especially the muscular reaction --- of a baseball player would be as good as any. This is standard American.

Now finally, we must inquire as to the effect of a test-error in tagmension on contension. But here the result is most obvious since [P1] and [Gen] require knowledge and understanding of an entirely different set of social conventions or agreements.

Our diagram now appears as follows:

	ont-	eid-	tag-	ext-	int-	cog-	pur-	con-
ontosion	0	+	+	+	+	+	+	+
eidension	-	0	+	+	+	+	+	+
tagmension	-	-	0	+	+	+	+	+
extension				0				
etc.	...							

4. Failure to Understand the Extension of a Rheme

This component of meaning was introduced in III.B.5 and defined in III.D.3. Empirical evidence was given for it in IV.I and it receives further theoretical explication in V.C.4.

The extension of a rheme is that component of its meaning that is abstracted from but related to its object, objects, referent, or denotatum. It is a codification of the physical context, or environment, relevant to the meaning of the rheme. It is that part of the total meaning that is

determined by the pertinent facts of the physical world. Therefore failures to understand extension must be due to a failure somehow to interact properly with the physical context either thru lack of knowledge of the environment, or the facts of the world, or thru lack of knowledge as to which physical aspects of the environment are relevant or which facts of the world are pertinent to the meaning of the rheme. The extension of a rheme is that part of its meaning by which we interact with the environment thru use of the rheme, it is that by which we determine if two different physical contexts are significantly different or not with respect to a particular symbolic rheme. There are thus seen to be two principle modes of failure to understand extension: lack of worldly knowledge and/or lack of knowledge of menetic relevancy.

Extension is perhaps the best understood component of meaning. More has been written about it than about any other component. These writings have stemmed from interests as diverse as science, epistemology, ontology, logic, philosophy, and set theory. Aristotle, if not the first, was certainly one of the earliest to talk of extension, even if he did not use this particular term. Hispanus, the Port-Royalists, Locke, Leibniz, Hume, J. S. Mill, Frege, Peirce, Russell, Carnap, Church, and Quine are a few other investigators who have discussed extension.

A child is sensitive to extension when it hears a new word, for instance 'elephant' as in

The elephant is large and gray.

and recognizes it as a noun --- perhaps because it is preceded by 'the' --- but does not at first know how much of his world counts as 'elephant' and how much consists of something else large and gray --- perhaps 'whale' ---

until he has visited a zoo, or looked at a picture book.

What happens when we fail to understand the extension of a word or phrase? We must somehow anticipate that this failure can occur in either one or both of the two modes of failure for extension.

First a failure in either or both modes will have no effect of the understanding of intension. Secondly, if we restrict failures to understand extension to test-failures only, then the Halle-Stevens effect is avoided and no failure to understand extension is thereby incurred by the extensional failure. Next, a failure to understand the extension of terms is no bar to an understanding of intension. This is one point of Lewis Carroll's famous poem 'Jabberwocky',

'Twas brillig and the slithy toves
Did gyre and gimble in the wabe;
....

where there is not just a test-failure, but a complete and total failure of extensional understanding (deliberate) and yet, a complete understanding of the intension. 'Slithy' is an adjective that attributes a property to 'toves' which in turn is a substantive kind of thing which is distinguished by number and in this case is plural.

On the other hand, when we consider the relation between a test-failure of understanding of extension and any failure to understand the intension, we must explicitly recognize the two modes of failure for extension. We may very well understand the intension of 'unicorn' and yet fail to understand its extension simply by not having visited enough zoos, participated in enough hunting expeditions, gone on enough safaris, or simply not have studied a good text book on zoological taxonomy. Any one

of these would have been sufficient to determine for us that the extension of 'unicorn' is null and thus have prevented a failure to understand the extension of the term. In other words a failure to understand the extension of a term due to a lack of worldly knowledge is no bar to the understanding of the intension of that term. On the other hand let us consider a worldly wise demon --- one which knows every fact of the world. Due to the peculiar relationship between intension and extension of unique determination, it would be a contradiction to say of such a demon that it both failed to understand the extension of some term and yet understood the intension of that same term. Thus a failure to understand the extension of a term would bar such a demon from understanding its intension.

We thus have an equivocal result which must somehow be overcome. We should prefer a result that says that an extensional failure either is or is not a bar to the understanding of intension. But the result instead seems to turn on the sophistication of the interpreter; on the amount of his worldly knowledge. When we look at actual interpreters, we see a wide range of environmental knowledge ranging from complete naivette to extreme sophistication. The problem here seems to turn on this variability. This leads to the thought that perhaps another idealization is in order. Let us idealize the factual knowledge of the interpreter to the maximum possible. This leads right back to the demon. The demon is simply an idealized interpreter. We shall accordingly revise our concept of *test-failure* so that a test-failure is one whose interpreter is such a demon. Now looking back once again to all our previous results we see that none

of them depended on the factual knowledge of the interpreter and hence none of the previous results are changed --- or even affected --- by our refinement of the concept of *test-failure*.

But our equivocation over the effects of a test-failure in extension on the understanding of intension is now eliminated. When the failure to understand the extension of a term is a test-failure in the latest sense it is an absolute bar to the understanding of the intension of that term.

When we ask of the effects of a test-failure on the understanding of the cognition of a term a new problem arises, and one that is far different from any of our previous hurdles. Cognition is the mentalistic component of meaning and is related to the internal sign of interpretation that is created when the cognizing body interprets the original sign. Now when a test-failure occurs in understanding the extension of a term a failure in understanding the intension also occurs, and this failure is also a test-failure. Now this failure itself can occur in two modes related to cognition and logical knowledge. This will cause us to suggest another modification to the test-failure concept when we analyze the effect of intensional test-failures. But this is not the crucial problem we are concerned with here; it can wait until our study of intensional test-failures a few pages hence. In the meantime all our analysis of the effects of extensional test failures on the understanding of cognition will be carried out in a manner consistent with the refinement to the concept of *test-failure* there proposed.

The problem here is that in some ways the concept of cognition is

too broad to handle the test-failure relation. The concept of test-failure itself was developed to avoid just such a problem between eidension and tagmension. We avoided the difficult refinement of our vague concepts of eidension and tagmension by the much easier refinement of our concept of the failure relation. Can we perchance fall back on this same escape procedure? Unfortunately the problem with cognition is such that any attempt to modify the test-failure concept to make it useful for analyzing the effects of test-failures of either extension or intension on cognition will make it useless for analyzing the effects of test-failures of either purporsion or contension on cognition and vice-versa. The vagueness, or broadness, of the cognition concept is inherent and we shall have to refine our meaning component concepts after all. However as we shall soon see, there is no need yet to make a sophisticated, all encompassing, subtle refinement to our menetic conceptual system. A juryrigged patchwork will do. We can simply split the concept of *cognition* into two components. The one concept which shall fit in with extension and intension we shall call 'cognitive cognition', or 'cognition' in the new sense and the other concept which shall fit in with purporsion and contension we shall call 'emotive cognition' or 'emosion'.

There is even literary precedent for two such senses of 'meaning'. In discussing mentalistic aspects of meaning, Ogden and Richards distinguish between symbolic aspects and emotive aspects. The symbolic aspects correspond to what I have called cognition. Since there is no reason to delimit the meaning of symbols to cognitive meaning or to imply somehow that symbols are more properly allied with cognitive meaning, I believe my term 'cognition' is less prejudicial and therefore better suited for

this concept.* On the other hand since we presently understand very little of the noncognitive mentalistic aspects of meaning, I have paid homage to Ogden and Richards' priority in this area by adopting their name to my terminology and calling it 'emosion'.

Let us look at some of the data that forced this bifurcation. When a test-failure occurs in extension certain mentalistic aspects of my understanding are blocked and others are not. For instance when I don't understand the extension of a word I cannot say, "I *know* the referent of that word.". *Knowledge* of the referent is one mental aspect that is blocked by a test-failure in extension. As mentioned above, the concept of *test-failure* will be modified when we analyze test-failures in intension so that our Demon has a perfect knowledge of logic as well as a perfect knowledge of the facts of the world. Thus a test-failure in extension will cause a failure in intensional isomorphism [45] and thus in all the psychological aspects associated with intensional isomorphism.

On the other hand there are certain words used in philosophy whose extension I very definitely do not understand and yet this does not effect other --- more emotive --- kinds of mental association. For instance when I hear these words, I immediately form an evaluation --- I think that this message must be philosophic or learned in nature, it is not just idle street chatter. Certain words I *feel* at home with despite the fact I do not understand their referents, and others I am definitely ill at ease with. '*Qua*' gives me a good feeling --- perhaps because I know when to

*A later, more refined, analysis has shown that only symbols have a cognition component of meaning, but this had nothing to do with terminology which should remain unbiased in this respect.

use it --- despite the fact I do not know its referent, while '*pari passu*' makes me feel uncomfortable --- maybe because I do not even know when to use it in addition to not knowing its referent.

These are just a few examples, but they should give a good idea of the problem involved and why I attempt to solve it as I do. The reader can readily make up additional examples if he cares to explore the problem deeper. For the nonce let us intuitively associate cognition with such mental associations and mentalistic effects as the psychological aspects associated with intensional isomorphism, cognitive awareness, conscious knowledge, etc. I do not mean to rule out either subconscious or unconscious knowledge from this component explicitly. It is just that these are much more subtle phenomena than the ones presently mentioned and ones that I am not nearly familiar enough with to deal with intelligently. It is my hope that this work can be used as a tool by psychologists both to further explore mental phenomena and in turn to further refine our knowledge of the menetic structure of the symbol. We can similarly associate such mental phenomena as emotive evaluations, mental feelings, etc. with emotion. Again such technical phenomena of psychology as subconscious valuations, unconscious feelings, etc. we simply hold in abeyance for further study.

Given this classification, and in conformity with the refinement to the concept of *test-failure* to be made when we study intension, it can be seen that a test-failure in extension co-occurs with a failure in cognition, but that a test-failure in extension does not necessarily co-occur with a failure in emotion, the two are independent.

We next inquire as to the relationship between a test-failure in extension and failures in purporsion. But as we already saw in the discussion of cognition the two are independent. I know when and how to use '*qua*' as in philosophy, or 'canonical' as in physics without knowing the extension of either. But I don't know either the extension or '*pari passu*' or how to use it. The failure of purposion here is independent of the failure in extension. I may be well aware of all the practical effects of using a word without knowing its extension at all. For instance I don't know the extension of 'please' but every child in middle class American culture (and I would venture a guess that this holds in upper class culture as well) is taught the practical effects of using that word. One does not use it to describe a state, mention an object or to transmit information of any kind. One uses it to request a consideration and its practical effect is to increase the likelihood of that request being granted. To look at an example where the extension is certainly not negligible we may examine 'catalyst'. Now I certainly know how to use this word to help me communicate with a chemist and I certainly know its practical effects - that of speeding up a chemical reaction without itself taking part or of similarly increasing the yield of a chemical reaction --- but because I am not my menetic demon, I can never know the extension of this word. I know a few objects of this term, and most of those I have forgotten or at least am not consciously aware that I remember them. I do remember that platinum is denoted by 'catalyst' for some reactions. A trained chemist would certainly know more of the extension of this term and maybe a chemical engineer even more; but by

the very nature of the word and its relation to human knowledge, no one will ever have a perfect grasp of the extension of 'catalyst' or even so good a one as a zoologist's understanding of the extension of 'elephant', for instance. 'Catalyst' is a term that is defined by its purporsion and science and technology attempt to add to our understanding of its extension; while 'elephant' is a term that was originally defined by its extension and biology, zoology, and husbandry attempt to determine a better knowledge of its intension and purporsion. Thus a test-failure in extension is not a bar to understanding the purporsion of a word. This is not to say that simultaneous failures in extension and purporsion never occur, they certainly do. The one is just not a necessary consequence of the other. It is an independent and not a necessary co-occurrence. I know neither the extension nor the purporsion of the French word '*épanoui*', but this is because I know very little French at all. I don't know the intension, tagmension, cognision, emosion, or contension of this word either.

Finally we examine the test-failure relationship between extension and contension. Does a failure to understand the social conventions and behavioral context of a word necessarily accompany a test-failure to understand its extension? I must admit to a grave lack of data with which to analyze this portion of the experiment, both because I am unfortunately not fully aware of all the social conventions and behavioral contexts of my own language --- I have a general lack of understanding of contension because of my childhood homelife ---; and because I am not familiar with many nonIndo-European languages and especially those which

have a heavy burden of contensionality. But it would seem that Malinowski's data on the overriding of tense and aspect of word roots by the contension component indicate that one could understand say the contension of a word in Trobriand and still not understand the extension of that word. For instance, I as an outsider, might learn that *aykotasi* always follows *laymayse* without knowing that '*aykotasi*' denotes the same thing as 'mooring' and that '*laymayse*' denotes the same thing as 'coming'. Thus I take as a tentative result, open to revision against a wider range of data, that a test-failure in extension is no bar to understanding contension. Perhaps one example I just thought of would fit in here. I have said that I do not know the extension of 'please', and yet I do know that in Japanese society --- perhaps because it is more formal --- it is more customary to say the Japanese counterpart of 'please' --- customary to say it more often --- than in American society. In my undergraduate days at Ohio State there were many Chinese and Japanese exchange students on campus. The one sure way we had of telling the Chinese from the Japanese was the frequency with which they used 'please' and 'thank you'. And this I am sure is because of the different social customs and behavioral conventions of their own cultures. In other words, the words had different contensions for Chinese and Japanese. Thus I have some knowledge of the contension of please, altho none of its extension.

One other test that must be done before I can draw the next diagram is to go back and retest cognition and emotion as to the effects on them due to test-failures in ontension, eidension, and tagmension. The result is easily carried out and fits into the previous scheme with no change in

pattern.

Our diagram --- with suitable changes for emosion --- now appears as follows:

	ont-	eid-	tag-	ext-	int-	cog-	emo-	pur-	con-
ontosion	0	+	+	+	+	+	+	+	+
eidension	-	0	+	+	+	+	+	+	+
tagmension	-	-	0	+	+	+	+	+	+
extension	-	-	-	0	+	+	-	-	-
intension					0				
etc.								

5. Failure to Understand the Intension and Cognision of a Rheme

These components of meaning were introduced in III.B.6 and III.B.7 and defined in III.D.3. Empirical evidence was given for them in IV.J and IV.K and they receive further theoretical explication in V.C.5 and V.C.6.

The intension of a rheme is that component of its meaning that is abstracted from but related to its ground, which is the relationship or respect by which the rheme denotes the object which it does. It is that part of the total meaning that is determined by the way in which the rheme denotes its objects. Therefore failures to understand intension must be due to a failure somehow to interact properly with the ground thru a lack of knowledge of logic, or properties of signs, or thru a lack of knowledge as to which respects or relations are pertinent to a determination of a sign's extension. The intension of a rheme is that by which we determine if two different physical contexts are not just significantly

different but different in general nature as well. There are thus two principle modes of failure to understand intension: lack of logical sensitivity and/or lack of knowledge of relational relevancy.

If extension is the best understood component of meaning, then intension is the next best. Almost as much has been written about intension or intension-like components of meaning as about extension. Study of intension has also been occasioned by a wide range of philosophic interests. Plato was one of the earliest meneticists to discuss intension-like meaning components with his ideal forms. Again, Hispanus's 'signification', Mill's 'connotation', Frege's 'sense', and Carnap's 'intension' are a few of the other intension-like meaning components that have been analyzed.

We are sensitive to intension when we know the extension of a term but do not understand the respect or relationship that governs the applicability of that term to that extension. To use an example given by Carnap in another context [45], we may know that there are no unicorns and also that there are no centaurs, but are there no unicorns because there are no zebra-like looking animals with a single horn in the middle of their forehead or because there are no half-man, half-horse-like animals. The terms 'unicorn' and 'centaur' have the same null extension for different reasons. Their referents (if any) are denoted by them with respect to different considerations. The legendary animals of mythology serve as good examples of sensitivity to intension for the American student because altho he knows just enough about mythology to recognize most of the names --- unicorn, centaur, gargoyle, sphinx, etc. --- and to

know that none of them exist, he has not studied enough mythology to know the specific properties of any of them (and hence why they don't exist) except for 'unicorn' and perhaps 'centaur'. To use another example, an eighth grader could probably tell you that no harpies and no gargoyles exist, but if you showed him a picture of each he probably could not tell you which was which. He thus understands the extension of both terms and the intension of neither. This also solves the test-failure problem for that case.

We thus move to examine the effect of a test-failure in intension on the other components of meaning.

Test-failures in intension have no effect on extension, intension, and syntax, for much the same reasons as given above for the effect of test-failure in extension on these same components.

Now when we consider the effect of a test-failure in intension on the understanding of cognition we must take into consideration the two obvious modes of failure --- lack of logical knowledge and lack of knowledge of relational pertinency. As mentioned earlier, I will take the same approach as taken when allowing for the two modes of failure for extension. Now since the variability here is over more or less comprehension of logic, we can remove this variability by idealizing; that is we can endow the menetic demon with a perfect knowledge of logical relations. There are two problems here that must be recognized. We do not know enough about the menetic nature of logic to feel completely at ease with this last idealization. If logical knowledge turns out to be nothing more than a knowledge of syntactic relations, or even to involve syntactic

knowledge in some inherent way, then this step may very well be hiding an essential structural link between intension and tagmension and/or eidension. But at this time, we must boldly put this caveat behind us and blunder on. The pragmatists have also questioned the existence of such ultimate absolutes concerning logical relations. I also solve this problem for now by explicitly ignoring it. Therefore a test-failure in intension now involves only a lack of knowledge of relational pertinentcy. This has an inherent effect on knowledge, understanding, and other cognitional phenomena. Thus we must conclude that a test-failure in intension is a bar to complete understanding of cognition. In reviewing the previous results obtained with the previous concept of test-failure and comparing the results with the new concept, we see no change. This can be seen to be because the change occurred in the logical knowledge assumed of the menetic demon and no use of the test-failure relation before this involved logical knowledge, except for the analysis of the effect of extension on cognition and that analysis was made with this change already in view.

Now we are ready to analyze the effect of a test-failure in intension on an understanding of emotion.

But we very often have failures --- and more substantial ones than test-failures --- in intension and we continue to process emotion as if no caution flag at all were flying. We have our emotional associations and mental feelings and these are independent of any logic or facts of the world or any kind of cognitive or objective knowledge at all. Thus a test-failure in intension is no bar to processing emotion, and this result

is seen to hold for test-failures in cognition as to their effect on emosion as well.

Now the same arguments as used to show that understanding of purporsion and contension were independent of test-failures in extension and understanding of emosion was independent of test failures in cognition and intension will verify that understanding of purporsion and contension (with the same caveat) is independent of test failures in intension and cognition. And similarly just as a test failure in intension is no necessary bar to understanding extension, so a test failure in cognition is no necessary bar to understanding intension, or indeed any of the other components already analyzed --- ontosion, eidension, tagmension, and extension.

Our diagram thus is now:

	ont-	eid-	tag-	ext-	int-	cog-	emo-	pur-	con-
ontosion	0	+	+	+	+	+	+	+	+
eidension	-	0	+	+	+	+	+	+	+
tagmension	-	-	0	+	+	+	+	+	+
extension	-	-	-	0	+	+	-	-	-
intension	-	-	-	-	0	+	-	-	-
cognition	-	-	-	-	-	0	-	-	-
emosion							0		

6. Failure to Understand the Emosion of a Rheme

This component of meaning was introduced in III.B.10 and defined in III.D.3. Empirical evidence was given for it in IV.N and it receives

further theoretical explication in V.C.9.

The emosion of a rheme is that component of its meaning that is abstracted from but related to its interpretant, which is the sign internal to the cognizing body caused by the interpretation of the original sign. Emosion is distinct from cognition which is also abstracted from but related to the interpretant. The contrast is derived by cognition and emosion having been distinguished to account for the different interactions of the objective and cognitive aspects of mentalistic meaning and the emotional, individualistic, and affective aspects of mentalistic meaning with the test-failure relation. Like cognition, emosion is mentalistic. Unlike cognition, emosion is idiosyncratic, irrational, and affects the feelings and emotions. Thus failures to understand emosion must be due somehow to failure to interact properly with the interpretant thru the emotional and feeling aspect of the interpretation process.

Contrasted with extension which is the best understood component of meaning, emosion must be about the least understood component. It is at the very heart of psychological phenomena, with perhaps even a large part of emosional understanding being unconscious or subconscious.

What happens to our understanding of the other menetic components when an emosional test-failure occurs? In the first place, it is very hard to understand what a test-failure in emosion implies, since as has been stated it is so little understood. I doubt if there is such a thing as a wrong feeling or a misemotion. Suppose when I usually hear the word 'kitten' I have the feeling of a warm fireplace and a playful animal, but today I am tired or feeling ill so that when I hear the word 'kitten' I

have a feeling of disorganization such as might be felt upon seeing a tangled and upset basket of knitting yarn. How can this feeling be wrong, since it is merely my own personal reaction to the word 'kitten'; my own feelings, emotions, and mental associations? It would be silly to attempt to state that emotions and feelings are constant; or even emotional reactions to the same rheme. The indications against this are simply overwhelming. I doubt if any headway could be made in this direction unless someone were to come up with an entirely different structural relationship between the data than I have been able to see. To attempt to require that a word have a constant emotion would not only imply, I think, that no two words ever have the same total meaning, as has often been said, but that no one word ever has the same meaning at two different times. And I think that such an approach as this would be methodologically unsound, or at best inefficient.

But if no such thing as a wrong understanding of emotion exists, there is such a thing as a lack of emotional response. I may, under the influence of certain drugs, lack any emotional response to, or mental associations with, a given word at all, and this would surely not be normal. If we take such a tack, it is seen that such a failure in emotion may occur with no effect on any other component at all. I may lack completely all emotional responses to words and all mental feelings associated with words and still understand that my *uncle* is the brother of one of my parents; still understand the practical effects of a *catalyst*; still understand the social conventions associated with *my* ownership of something vs. *your* ownership of that same thing; still recognize a *dog* when I see one;

still realize that *quickly* is an adverb and thus attributes some property to a process; still follow the American rule of phonology, even if unconsciously, that the plural is unvoiced after an unvoiced consonant and voiced after a voiced consonant.

The only question might occur with respect to the effect of an emosional test-failure on cognition. Cognition is only slightly better understood than emotion. But it would seem that one could understand the objective and cognitive mentalistic phenomena associated with a word; recognize the intensional synonymy and logical distinctions of 'brother or sister' and 'sister or brother', etc. without being able to have a normal emotional response to either term. In any case, since the evidence is scant, I shall do as I did once before, for analyzing the effect of an extensional test failure on cognition, and take as a tentative result, open to revision upon evidence of more data, that a test-failure in emotion is no necessary bar to an understanding of cognition. Perhaps part of the motivation for both of these tentative results, aside from the naive intuition already mentioned, is the growing symmetry of our relational diagram as it unfolds before our analysis. Thus the diagram is now as appears on the top of the next page.

7. Failure to Understand the Purporsion of a Rheme

This component of meaning was introduced in III.B.9 and defined in III.D.3. Empirical evidence was given for it in IV.M and it receives further theoretical explication in V.C.8.

The purporsion of a rheme is that component of its meaning that is abstracted from but related to its interpreter. Purporsion is in part

ontosion	0	+	+	+	+	+	+	+	+
eidension	-	0	+	+	+	+	+	+	+
tagmension	-	-	0	+	+	+	+	+	+
extension	-	-	-	0	+	+	-	-	-
intension	-	-	-	-	0	+	-	-	-
cognision	-	-	-	-	-	0	-	-	-
emosion	-	-	-	-	-	-	0	-	-
purporsion								0	
contension									0

the meaning of a term that is coded into the way the interpreter operates with and to the term. It is also in part the practical effects or consequences of using a term. The extension of 'platinum' contains the consequence of speeding up certain chemical reactions without the platinum itself taking (a permanent) part in the reaction. Purporsion is the component of meaning upon which Peirce founded his philosophy of pragmatism (but not pragmaticism). When Malinowski said that one component of meaning was a word's use as a tool for accomplishing human purposes, he was talking of purporsion. Thus a failure to understand purporsion is a failure to be able to use a word, in human communication, as a tool, that is to achieve the proper consequences, to obtain a sought for goal.

What happens to our understanding of the other menetic components when a purporsional test-failure occurs?

It is hard to see how a test-failure in understanding the purporsion of a word could have any effect at all in understanding ontosion, eidension and tagmension. Purporsion is a technical kind of meaning; heavily used

in technology. Malinowski described the use of purporsion in the Trobriand technology of fishing. Chemical engineering is a western technology. I may not know that the practical consequences of 'platinum' include the speeding up of a certain chemical reaction, but this in no way keeps me from recognizing the word as an element of sound meant for human communication, from recognizing the word boundaries, from rhyming it with

'maximum' (I may be a poet --- not an engineer) as for instance:

/ ~ ~ / ~ ~ / ~ ~ / ~ ~ / ~ ~ / ~ ~
 Decomposition of hydrogen peroxide at the maximum,
 ~ / ~ ~ / ~ ~ / ~ ~ / ~ ~ / ~ ~
 Requires only finely divided into pulveriz-ed platinum.*

But since I've already told you I know some of the practical consequences of 'catalyst', your evidence will have to be that you can read the above two lines as a poem, with both rhythm and rhyme, despite the fact you may not know the practical consequences of 'platinum'. A test-failure in purporsion is no necessary bar to the understanding of ontosion, eidension, or tagmension.

One piece of evidence to show that a test-failure in purposion does not effect an understanding of extesnion has already been given in explaining purporsion. As a mining engineer I may have as nearly complete a knowledge of the extension of platinum as it is humanly possible to have, without having the understanding of the practical consequences of platinum that a chemical engineer might have.

When examining the effects of a test-failure in purporsion on the understanding of intension, a small problem arises, which unfortunately cannot be resolved here. It was mentioned that the extension of 'catalyst'

*I didn't say a good poet.

contains rings and bar stock, etc.; but that the purporsion of 'catalyst' contains a consequence *that* a chemical reaction is speeded up. The key word in the previous sentence is 'that'. This makes it appear that purporsion may be a collection of propositions or some kind of other intensional entities. This would put it in logical conflict with intension as a component of meaning. Philosophy has not clearly distinguished between purporsion and intension *that I know of*. On the other hand, our use of a word as a meaningful tool to accomplish human purpose is also a part of purporsion and this is in no way intensional. This involves internal or physiological sets and hence seems to be different from both intension and from the practical consequences of a term. In fact since possibly the one feature which distinguishes the practical consequences from intensions are the implications of human values inherent in the notion of goals, human purposes, and practically, it may be that the practical consequences of a term may involve a two dimensional plane consisting of intension and purporsion.* This is a problem that needs to be thuroly explored, but is beyond the scope of the present work. In investigating the effect of a test-failure in purporsion on the understanding of intension, I shall limit myself here to that part of purporsion which is beyond logical dispute --- the use of the term in the day to day job of human living.

When this limitation is made, it is hard to see how a test failure in purporsion could effect the understanding of intension. Purporsion involves human goals and physiological patterns while intension involves

*It may be claimed that the recognition of this distinction marked the difference between pragmatism and pragmaticism.

cognitive relations and non-human facts --- entities of the physical environment.

We know the intension of 'simultaneous'. Two events are simultaneous iff they have exactly the same time coordinate. The essential property that a pair of events must have to belong to the extension of the term 'simultaneous' is that they have exactly the same time coordinate. However, from the special theory of relativity we know that we can never determine how to use the term 'simultaneous' to accomplish practical human goals since there is no way of measuring in a practical way relative to any human goal when two events separated in space are simultaneous. This complete understanding of the intension of 'simultaneous' and lack of purporsionistic meaning, or at least lack of understanding of the purporsionistic meaning of 'simultaneous' shows that a test-failure in purporsion is no necessary bar to the understanding of the intension of a term. If the above mentioned limitation is not made, it is not clear that any consistent answer could be given to this phase of the experiment at all.

The analysis of the effect of a test-failure in purporsion on the understanding of cognition is similar to the last analysis of the effect on intension and yields similar results. A test-failure in purporsion is no necessary bar to the understanding of cognition.

A test-failure in purporsion, however, has a definite effect on the understanding of emotion. Emotions, in some way, are one's personal internal reactions to some sign relative to his own personal goals and objectives. If one fails to understand his goals, or fails to understand

what his own behavior should be either relative to his goals or for the purpose of achieving the goals, then his feelings, emotions, etc. towards these goals will also be affected.

My feelings and emotions toward the phrase '4-minute-mile' are completely different from Jim Ryun's simply, or at least in part, because he knows how to perform out the phrase better than I, has a different set of behavior experiences toward the phrase than I; he knows and experiences what his training behavior must be to perform out the phrase, I never have; his goals and objectives toward this phrase are obviously much stronger than mine, etc.

Thus a test-failure in understanding purporsion leads to a noticeable effect in understanding the emosion of a term.

In many ways the determination of the effect of a test-failure in purporsion on the understanding of the contension of a phrase is the most difficult and at the same time the most interesting problem in this experiment. So far as I know this question has not been raised in any prior analysis of meaning, yet it is every bit as important to an understanding of so called "pragmatics" as the relation between extension and intension is for so called "semantics". It is difficult because there are so many ways in which the question can be viewed and the data and the setting of the data are so complex. I give here what I feel are the best data I can find for the specific relation of this experiment --- the test-failure relation.

A test-failure in purporsion would appear to have no effect on the understanding of contension. A person may understand all the social

8. Failure to Understand the Contension of a Rheme

This component of meaning was introduced in III.B.8 and defined in III.D.3. Empirical evidence was given for it in IV.L and it receives further theoretical explication in V.C.7.

The contension of a rheme is that component of its meaning that is abstracted from but related to its social context. It is that part of the meaning that is coded into our knowledge of social and behavioral conventions. *My old car* may be parked on the street by the curb; but if I sell it to you, it is now *your new car*. There is no detectable physical difference in the car itself. The only difference in the meaning of the phrase 'my car' ten minutes ago and 'your car' ten minutes hence are the social conventions of ownership which regulate how you and I will behave toward use of the car in question. This is a contensional difference.

We can fail to understand the contension of a term in two ways:

1) thru lack of knowledge of the social customs and conventions of a *language* community, and 2) thru lack of knowledge of which conventions and customs are relevant to the use of the term and behavior with respect to the term. This is the typical kind of ambiguity that we have wrestled with in analyzing extension and intension and successfully solved by refining the notion of the menetic demon of the test-failure concept. We solve this the same way be refining a menetic demon to have a perfect knowledge of all social conventions and customs. This refinement of the concept of test-failure has no affect on any previous analysis and has the effect here of reducing analysis of contensional test-failure to the same pattern that has now become so familiar in all of the other components.

But this diagram is highly structured, which can perhaps better be seen by factoring it as follows:

ontosion	0	+	+	+	+	+	+	+
eidension	-	0	+	+	+	+	+	+
tagmension	-	-	0	+	+	+	+	+
extension	-	-	-	0	+	+	-	-
intension	-	-	-	-	0	+	-	-
cognision	-	-	-	-	-	0	-	-
contension	-	-	-	-	-	-	0	+
purporsion	-	-	-	-	-	-	-	0
emosion	-	-	-	-	-	-	-	0

Then if we make the following conventions:

$$\phi = \begin{bmatrix} 0 & + & + \\ - & 0 & + \\ - & - & 0 \end{bmatrix}$$

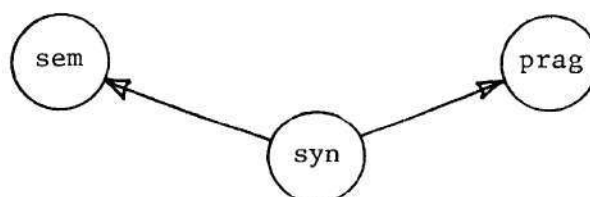
$$+ = \begin{bmatrix} + & + & + \\ + & + & + \\ + & + & + \end{bmatrix}$$

$$- = \begin{bmatrix} - & - & - \\ - & - & - \\ - & - & - \end{bmatrix}$$

the test-failure diagram can be reduced to:

	syn	sem	prag
syntactic	ϕ	+	+
semantic	-	ϕ	-
pragmatic	-	-	ϕ

with an obvious convention regarding the labeling of the rows and columns. But this is easily recognized as the digraph for the water molecule; again with obvious labeling:



We can now invert our conventions to re-expand the test-failure structure of meaning yeilding:

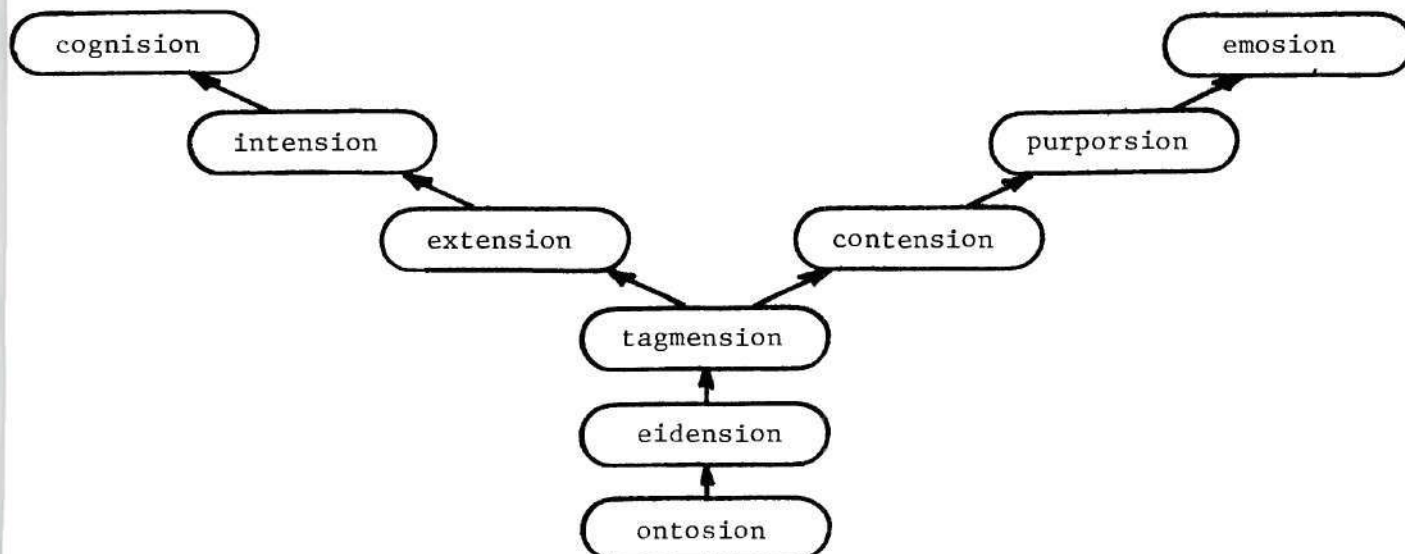


Figure 12. The Test-Failure Structure of Meaning of a Symbolic Rheme.

Several obvious symmetries should now be noticed and labeled on the diagram. First cognision and emosion are both mentalistic components of

meaning, while extension, contension, and tagmension are three different kinds of context components. Tagmension represents the semiotic context, extension the physical context --- called the environment ---, and contension the social and behavioral context, --- called customs and conventions. Thus those philosophers who claim that meaning is context are on to something. They are right in a vague sort of way as long as they don't try to distinguish various kinds of contexts, because when they do they invariably leave out one or more of the crucial contexts. In turn context seems to play an inherently crucial role in meaning, and if not constituting the total meaning, at least it plays a central role in the determination or generation of the total meaning. Finally we see a possible way of defining the vague terms which Morris first tried to explicate: syntactics, semantics, and pragmatics. We can tentatively define syntactic meaning as the ontosion --- eidension --- tagmension chain of meaning components; semantic meaning as the extension --- intension --- cognisition chain of meaning components; and pragmatic meaning as the contension --- purporsion --- emosion chain of meaning components. Perhaps if we held all rigorous criticism in abeyance we could even define syntactics as the ontotic --- eidontic --- tagmatic space; semantics as the deictic --- hypotic --- noetic space; and pragmatics as the contotic --- ergotic --- emotic space. This gives us the diagram illustrated in Figure 13.

Only one thing remains to be done now before we close out this experiment and move on to another. The *test-failure* concept which has proved so useful for mapping out this particular menetic structure needs to be summarized.

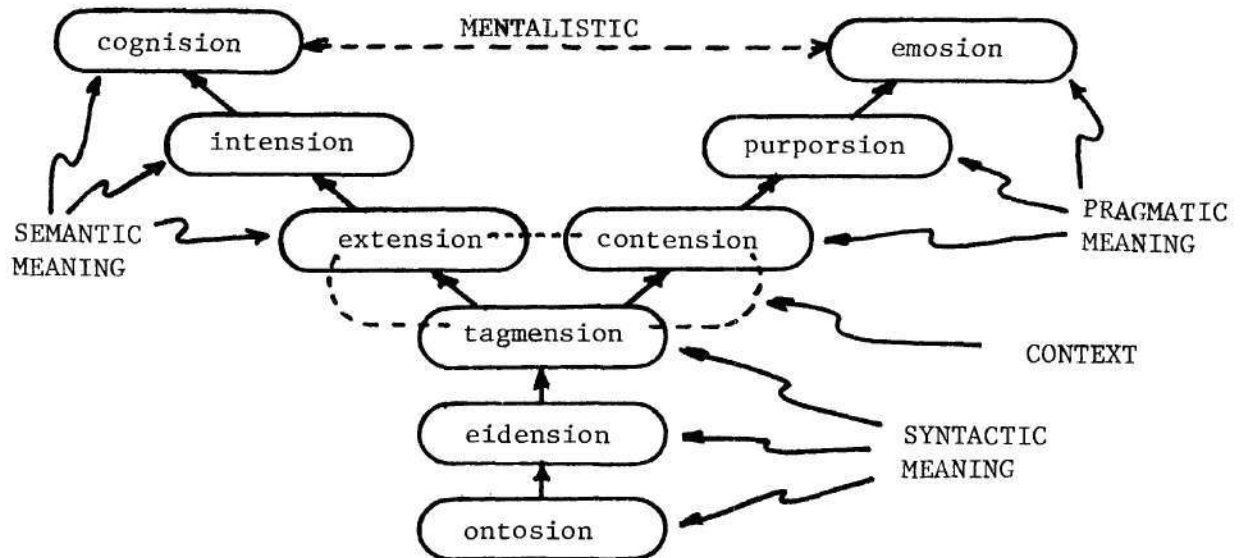


Figure 13. The Test-Failure Structure of Meaning.

Starting with the vague, but intuitive, notion of *level of interpretation* discussed by Ogden and Richards in [213], this was first modified into an equally vague, but intuitive, concept of *failure of understanding*. For analyzing the structural relation between ontosion and the other components we had to introduce the notion of boundary or edge effects and modify the *failure of understanding* notion to allow all transient effects to die out. The problem avoided at this point was the natural decay time of ontosion. Ideally this decay time might be infinitely long.

We next took the limit as our failure to understand a particular component became small or negligible in order to remove the bothersome Halle-Stevens effect when analyzing the interaction of other components with eidension. The name 'test-failure' was first introduced for this concept. In analyzing the effect of a test-failure in extension on the understanding of intension we had to cope with the variable range of

worldly sophistication in the interpreter. We therefore introduced into the *test-failure* concept the notion of an idealized interpreter with perfect factual knowledge of the world. The idealized interpreter was called a menetic demon, and a test-failure must be interpreted by such a demon.

In analyzing the effect of test-failures on cognition it was found that a refinement of the *test-failure* concept was not sufficient to settle the problems involved. A drastic splitting of cognition into two components was required, which we called cognition in a new sense and emotion. However, this splitting solved all of the problems associated with cognition and no modification of the *test-failure* concept was required.

But in analyzing the effects of a test-failure in intension on the understanding of cognition we again ran into a problem concerning the variability of the interpreter as to his comprehension of logic. We therefore revised our concept of *menetic demon* to include a perfect knowledge of logical relations. We accordingly revised the *test-failure* concept to require interpretation by the revised kind of demon.

We did not consciously modify the *test-failure* concept when analyzing the effects of purposional test-failures, whereas we might be led in symmetry with analysis of the other components to expect that a revision would be required for the analysis of the effects of a test failure in purposion on the understanding of emotion. And this may very well still be required. It was just that my understanding of both the purposion and the emotion components of meaning at this point was so vague as to preclude much rational analysis, or at least enough to specifically determine any revisions. This will probably need to be done

later as more properties of purporsion and emosion are discovered.

Finally, in analyzing the effects of test-failure of contension on the understanding of purporsion, a variability in our interpreter's knowledge of social customs and conventions was encountered. This was solved by requiring the demon to have a perfect knowledge of all social customs and conventions of a language community. The *test-failure* concept was modified of course to require this new kind of demon as its interpreter.

We can summarize roughly a test-failure as a failure by a menetic demon to interpret or understand a component of meaning in the limit as that failure becomes small or negligible and as all transient or edge effects decay away. A menetic demon is a sign interpreter who has a perfect knowledge of all facts of the physical context; a perfect knowledge of all logical relations; and a perfect knowledge of all social customs and conventions, or facts of the social context.

This experiment has led to the splitting of the cognition component into two new components --- cognition and emosion. It has also led to a questioning of certain aspects of purporsion --- namely the practical consequences of a term which appear to be a combination of the goal and the intensional aspects of meaning --- perhaps an intensional-purporsional plane. And it has led to the establishment of a concept of *idealized interpreter*, called a 'menetic demon'.

C. An Idealization of the Frege-Carnap *Unique-Determination* Relation

The results of this experiment show a structure amazingly like the structure isolated by the test-failure experiment. We may therefore start with the nine components of meaning as refined in the test-failure

analysis. As compared to the idealizations and refinements made to carry the last experiment thru to completion, we will find no additional idealizations or refinements needed. Altho the test-failure relation and unique-determination relation are not inverses of one-another the same menetic demon serves as the interpreter for both and the same idealizations and refinements of our concepts of the meaning components are required for both. And altho the structure of the two relations is not isomorphic, they are nearly so; in fact the only difference besides the obvious one of each arrow pointing in the opposite direction is that the three sections belong to the syntactic, sematic, and pragmatic dimensions are not connected in the center by the unique determination relation as they are for the test-failure relation.

Both Frege [100] and Carnap [45, p112, p203, p233f], have observed that a component of meaning, which we may call intension after Carnap, has the ability to uniquely determine another component of meaning, which we may similarly call extension, if all the facts of the world are known, but that this relation is not symmetrical. No knowledge of the facts of the world plus the extension of a term will determine its intension.

The object of this experiment is to generalize this observation and systematically extend it insofar as it applies to all nine meaning components to see how similar the structure it determines is to the structure previously determined by the test-failure experiment. These relations are somewhat the inverse of each other as can be seen by considering the menetic demon of the failure of understanding experiment. A menetic demon knows all the facts of the world and hence if he knows the

intension of a term he must know its extension. Hence if he fails to understand the extension of a term, he must also fail to understand the intension of that term which agrees with the results of the previous experiment. However this inverse relation is not complete and an independent determination of menetic structure will result from this examination, on the other hand these relations have so nearly the same structure that we have an alternate way of viewing this relationship and of verifying the common aspects of their structure.

Since a known component uniquely determines itself this relation is reflexive, but since we can assume neither symmetry nor antisymmetry, we must examine $n(n - 1) = 72$ individual pairs of components.

1. The Effect of Ontosion on Determining Other Components

This component of meaning was introduced in III.B.2 and defined in III.D.3. Empirical evidence was given for it in IV.F and it received initial theoretical explication in V.B.1.

Other than the single determination relation given by reflexivity, ontosion is unable to determine a single other component. As examples we may take the terms 'machine-gun' and 'loves'. Let them be both spoken by the same person and then the ontosion is the same but no other component is. The ontosion is the same since these are both words of the same natural human language and serve the same functions and/or purposes relative to the medium. Both may be used merely for clearing one's throat or to test a sound system. Both may be used to alert someone that another human being is present. Both have any affect on a person that the quality of one particular voice may determine by itself.

The recognition of a loved one's voice and thereby an emotional reaction to it would occur whichever word is uttered. Even taking the natural decay time of ontosion into consideration, this conclusion still holds. An interpreter may be able to partially predict the tagmension of a word due to its ontosion and the edge effects, or semiotic context, of the word, but this prediction is only partial and is not unique. Thus we are free to treat the ontotic transient effect in the manner which best resolves other questions if this becomes necessary.

The eidensions are different. They do not rhyme. In fact they do not even have the same number of syllables so that not even the meter or rhythm could be preserved by the substitution of one for the other. The tagmensions are different since one is a noun, the other a verb, present tense, 3rd person, singular. One is substantivized --- spoken of as a thing while the other is processized --- spoken of as an action.

The extensions are different of course as is obvious by the choice of terms and so are intensions and cognisions. The contensions are different since different social contexts are applicable. Different social conventions govern our relations with the term 'loves' and 'machine-gun'. We have different behavioral histories relative to the two. Of course the purporsions are different which is again obvious. We have different physiological sets relative to the two terms. We can know how to love without knowing how to use a machine-gun or what one is. To suppose that someone who had never heard of a machine-gun is incompetent to love would simply be silly. Obviously one could know how to use a machine-gun without knowing how to love altho this is not a necessary

relationship. The difference in emotions is almost as obvious. Our emotional interpretant or emotional reaction to these two terms are grossly different. Our feelings towards 'loves' are as a loved one or a lover, our feelings towards 'machine-gun' are as a soldier or a victim of war, etc. We thus have this relationship determined for ontosion.

	ont-	eid-	tag-	ext-	int-	cong-	con-	pur-	emo-
ontosion	0	-	-	-	-	-	-	-	-

2. The Effect of Eidension on Determining Other Components

This component of meaning was introduced in III.B.3 and defined in III.D.3. Empirical evidence was given for it in IV.G and it received initial theoretical explication in V.B.2.

Here we have our first interesting result. The eidension of a rheme uniquely determines its ontosion. This can be seen in several ways. First altho we are discussing internal structure, not external, the two are related. The eidension of a term is related to and determined by its shape. This shape in turn uniquely determines the medium, and the ontosion is related to and determined by the medium. That a shape determines a medium is seen as follows. The medium can not be inappropriate to the shape. We cannot have different hole configurations being the shapes and an electrically conducting wire for the medium neither can we have different voltage levels for the shapes when the medium is an 80 column pasteboard card. If the shapes are the different acoustical wave forms detectable by the human ear, the medium is variations in sound pressure in air. If the shapes are various temperature levels or dura-

tions, the medium must be thermally conducting. This argument cannot be reversed. For instance if the medium is an electrically conducting wire, the shapes may be pulse heights, pulse durations, pulse shapes, pulse combinations (for example the dot-dash combinations of morse code), or any combination of any of these.

The validity of the above argument is open to the question whether the eidension of a sign uniquely determines the shape of that sign. Since an answer to this question awaits an improved understanding of the relationship between eidension and shape we must use one of the more direct arguments involving internal sturcture only. However the direct argument is similar. If the eidension is an aural reaction say to the meter, assonance, dissonance, rhyme, etc. of a term this determines the ontosion to be a reaction to the term as being spoken. It might be argued that poetry is often written down in books for students to read in English classes. Apparently a reaction to the meter, assonance, dissonance, rhyme, etc. is intended altho the term is embodied graphically rather than orally. This is a typical misunderstanding of many English students and some English teachers alike. In this case, the written form is intended as a handy and practical coding of the audible language. The student is meant to act as a modem and translate it back into sound before reacting to it. Some modern poets have attempted to get around this problem by writing poems in such a way as to be reacted to visually as well as aurally. This is not to say that all written language is a recoding of spoken language. That would weaken the function of the ontosion component. Most written prose is written in a language that is

native to its medium. It is a separate language from the spoken, employing a distinct vocabulary and even distinct syntactic constructions.

Similarly if the eidension is a reaction to the graphical shape of the word, this determines the ontosion to be a reaction to the term as being written. In fact we could say as we did for the external structure, the ontosion cannot be inappropriate to the eidension; this just happens to be easier to see in the case of external structure.

Suppose the shape is given not by its sound or its graphical form, but by a mathematical representation such as the distinctive features matrix. The eidension of a word determines a unique sequence of sets of distinctive features and this in turn determines uniquely a medium which as was said before determines an ontosion.

Thus all reasonable ways of analyzing this pair of components yield the same result. The eidension of a term uniquely determines its ontosion.

But the eidension can not determine any other component of meaning. Suppose we represent the phonemic shape of a word by /wejz/. This we know uniquely determines the eidension. Hence if eidension were to uniquely determine tagmension, this component would also be uniquely determined by the phonemic shape. But both plurality and substantivity could be indicated as in 'ways' or we could have all of present-tenseness, singularity, third personness and action as in 'weighs'. And these terms have different extensions, intensions, cognitions, contentions, purportions, and emotions as discussed for 'machine-gun' and 'loves'. Hence the Uniquely Determines Matrix now looks like this:

	ont-	eid-	tag-	ext-	int-	cog-	con-	pur-	emo-
ontosion	0	-	-	-	-	-	-	-	-
eidension	+	0	-	-	-	-	-	-	-

3. The Effect of Tagmension on Determining Other Components

This component of meaning was introduced in III.B.4 and defined in III.D.3. Empirical evidence was given for it in IV.H and it received an initial theoretical explication in V.B.3.

It should be counted one of the chief achievements of transformational grammar that it can show explicitly the relation between the linguistic context of a rheme and its shape. In 1957 [55, p32] Chomsky called this the 'morphophonemic component' of a grammar, while in 1965 [64, p77] he called it the 'phonological component'. What such a theory is called makes little difference. The point is that once the linguistic context of a word is given, its phonetic shape is determined to phonetic equivalence and this in turn uniquely determines the eidension. The linguistic context of a rheme uniquely determines its tagmension and since the hearer can decode as well as the speaker can code we must presume that the tagmension of a rheme uniquely determines its linguistic context which then determines its eidension uniquely. By transitivity we know that tagmension then determines the ontosion uniquely. We may quote an example from [55, p32].

- 1) walk → /wɔk/
- 2) take + past → /tuk/

An example from [64, p32] is

- 19) [+continuant] → [+voiced] / ---- [+voiced]

This rule will rewrite a continuant as a voiced continuant in the linguistic context (environment) in which it is followed by a voiced sound and so converts [sm] into [zm] and [fd] into [vd], but would not affect [st] or [pd], for example, since the *s* is not followed by a voiced context and the *p* is not a continuant.

The details of this relationship are discussed by Halle [116; 117] and by Jakobson, Fant, and Halle [136].

One of the important aspects of this relationship, especially in view of the natural decay-time of the ontonion discussed in the test-failure experiment, is the need to evaluate more than just the single rheme under consideration. Since the linguistic context of this rheme includes its neighbors --- both near neighbors and in some instances even its distant neighbors both preceding and following, --- the tagmension of this rheme includes syntactic aspects of these neighbors and this is sometimes needed for a complete determination of the eidension of a term. However this does not contradict the original conclusion drawn here that the tagmension of a term uniquely determines its eidension, because these effects are all part of the tagmension of the term. This does not even conflict with the idealization of the test-failure concept that was made to allow all transient or boundary effects to die out. It simply compliments that idealization. The fact that these two considerations compliment each other will be an important point in the recognition that the *test-failure* concept and the *unique-determination* concept as both have been idealized by these experiments are approximately complements of each other, thus providing us with two independent but related sets

of tools and two viewpoints for examining the same menetic structure.

The *test-failure* concept was further idealized to avoid the Halle-Stevens effect. No special considerations need to be taken in the *unique-determination* concept for this effect since it too complements the observation already made that the tagmension of a term uniquely determines its eidension. In fact the Halle-Stevens effect makes at least a partial knowledge of the tagmension necessary for the unique determination of the eidension and this merely strengthens the desired conclusion. In fact, this strengthened conclusion is not necessary for the purposes of this experiment and I make no further use of it.

That the tagmension of a term does not determine its extension, intension or cognision is shown by 'lion' and 'unicorn' which have the same tagmension in American but vastly different extensions, intensions, and cognisions. Similar conclusions pertain to the other three components since the contension, purporsion, and emosion of 'lion' and 'unicorn' are so different. Our unique-determination matrix now progressed to this point:

	ont-	eid-	tag-	ext-	int-	cog-	con-	pur-	emo-
ontosion	0	-	-	-	-	-	-	-	-
eidension	+	0	-	-	-	-	-	-	-
syntasion	+	+	0	-	-	-	-	-	-

4. The Effect of Extension on Determining Other Components

This component of meaning was introduced in III.B.5 and defined in III.D.3. Empirical evidence was given for it in IV.I and an initial theoretical explication given in V.B.4.

Extension gives us no help in determining intension, even when the interpreter is our menetic demon from the test-failure concept. Given a null extension, the factual knowledge that there are neither unicorns nor centaurs in the world merely confuses us. The term could have been intended to determine its objects by their property of having one horn or by their property of being half-man, half-horse. More knowledge only confuses us further. Knowing that there are no harpies just adds to the already over-long list of options. Nor is less knowledge any more help. We might suppose an interpreter with no knowledge of the world whatsoever. If this concept were useful enough to demand a name we would probably have to call him a 'menetic dummy' or some such. But this cuts off too many options --- all in fact. With no knowledge of the world at all, the fact that a term has a null extension would simply be useless to a menetic dummy --- he would have nothing he could do with this information. 'Lion' and 'unicorn' alike are candidates for the name of the wanted concept, since it is neither known whether there are any lions in the world or any unicorns. All intensions become equivalent under these conditions.

Only if our menetic-dummy knew the one fact that there are no unicorns in the world could he uniquely determine an intension for his term with a null extension. But what is special about this peculiar fact. Suppose some other menetic-dummy knew only that there are no centaurs in the world. He could determine a different intension for the same term and who is to say which dummy is the smarter? Which is correcter? Perhaps another dummy knows only that the Earth has only one natural

satellite, in which case he would be as bad off as the dummy with no knowledge of the world because his one fact doesn't happen to be applicable. He would probably say that both of the two were wrong. Or given his menetic dumbness he might even say that both were right! In any case this is not a useful concept to work with and the conclusion to be drawn is that extensions do not determine intensions no matter how the interpreter is interpreted.

Similarly extensions do not determine cognitions. In addition to arguments that are similar to the argument against extensions determining intensions, there is a further argument. Consider the case where the extension of a rheme is known but a test-failure occurs in understanding the intension of the rheme. This is consistent with the results of the test-failure experiment. A test-failure in intension does not demand any failure in extension, but it does demand a failure in cognition. Thus if extension uniquely determined cognitions this would contradict the test-failure results.

Extensions do not uniquely determine contensions, purporsions, or emosions. Both 'fairies' and 'ghosts' have null extensions, but our social conventions regarding fairy stories and ghost stories are exceedingly different as well as our physiological sets, personal goals, and emotions and fantasies. Most parents will tell their small children fairy stories before going to bed, while many refuse to tell them ghost stories on the grounds it might cause nitemares. And the reality of these nitemares drives home the differences in purporsion for those who suffer them. The differences in fantasies and emotions is equally obvious.

What about the effect of a knowledge of the extension of a term on determining the tagmension of that term? All the previous results of both the test-failure experiment and of this experiment have led us to expect that extensions determine tagmensions uniquely; so it must come as a surprise to find out that this is not the case! But this probably could have been predicted by most linguists. Suppose we have a null extension. Does this determine a substantive quality for the term (unicorn), or an action quality (jumping across the Mississippi River); a concrete quality (unicorn), or an abstract quality (enlightened bigotry); animate (unicorn), or inanimate (golden-mountain); is the form absolute (because the extension contains no individuals) or relative (because the extension contains no ordered pairs), etc.? A knowledge of extensions does not help determine tagmensions. The meaning encoded in the syntax seems to be a peculiar result of the linguistic history of a people, and in general not uniquely related to the extension. But this topic is best suited for detailed discussion when the effect of extensions on tagmension is studied.

Neither does the extension determine the eidension. Each of the terms in the previous paragraph have the same extension and yet each have different eidensions. The extension does not even determine the ontosion! Suppose the extension is the set of all four legged animals from the canine family, then if the shape of the term is 'dog', the medium is graphic, while if the shape of the term is /dɒg/ the medium is pressure waves in air; and these determine different ontosions.

Notice that this last result is so clear-cut and obvious that it

might have been desirable to use it to derive the eidension and tagmension result. If extension cannot determine ontosion, then it cannot determine eidension or tagmension either or a contradiction would result.

There is possibly one way to save this result, i.e., make it complimentary to the test-failure result. I left the question of the ontotic transient effect open. If we were to require all edge effects to be taken into consideration we might just be able to do this in such a way that the extension of a term would determine its tagmension. But even if the total linguistic context of the term is taken into consideration there is still part of the tagmension left free, even tho a great deal of it is determined. And that part that is determined is determined not by the knowledge of the extension with which our general concern lies but thru taking into consideration the total linguistic context which is to say practically all of the tagmension anyway. It is felt that without further justification this is too high a price to pay for an incomplete result. If later we can find a way to reduce the cost, complete the results, or in some way gain some other additional benefit from this step we can come back and do it. For now I am content to leave the result as is described by the present stage of the unique-determination matrix:

	ont-	eid-	tag-	ext-	int-	cog-	con-	pur-	emo-
ontosion	0	-	-	-	-	-	-	-	-
eidension	+	0	-	-	-	-	-	-	-
tagmension	+	+	0	-	-	-	-	-	-
extension	-	-	-	0	-	-	-	-	-

5. The Effect of Intension on Determining Other Components

This component of meaning was introduced in III.B.6 and defined in III.D.3. Empirical evidence was given for it in IV.J and an initial theoretical explication in V.B.5.

Intensions by themselves cannot determine extensions. But it is the result of many observations stemming back as far as Peter-of-Spain and including most recently Frege and Carnap that the intension of a term and a complete knowledge of all of the facts of the world will uniquely determine the term's extension. In fact it was this observation that motivated this experiment. We have readily available an interpreter who has such a complete knowledge of all of the facts of the world. Previously we toyed with the idea of bringing in our menetic demon to be the interpreter for this experiment but finally decided to leave the question open pending further requirements. These requirements are now at hand. I would like to require that the unique-determination concept include the menetic demon as the interpreter of the term under consideration, if this causes no problems with those results already determined. This is readily verified. At no previous stage did the notion of *facts of the world* enter into consideration except in the consideration of whether a knowledge of extensions would determine an intension and there it was decided that no matter which way the menetic demon question was decided the answer was still the same: 'no'. Thus we are completely free to adopt the menetic demon requirement and do so. In this new light, the result quickly follows that if the intension of a term is known by a menetic-demon its extension is uniquely determined.

Now suppose that even a menetic-demon knows the intension of a term. Does it then follow that his cognitive response to the term is determined? Does he know for instance a unicorn when he sees one? This question is not clear-cut primarily because of differing interpretations of the word 'know'. We can avoid taking sides on this issue by asking if our demon is always aware that he knows a unicorn. Now we have placed well-nigh impossible (but not contradictory) demands on a menetic demon but at no-time did we ever require him to be aware of everything that he knew or that was happening to him. It may well be that the demon is asleep on the job --- we can afford to allow him this one human frailty. He may well know what a unicorn is and just have forgotten or perhaps just not be presently aware when the purported unicorn appears, (I have not examined the relation between purported and possible unicorns).

But if it were useful to require a menetic demon to always be aware of all he knows this could be done as easily as he was invented in the first place. Like Humpty Dumpty's words, we simply require the demon to do whatever needs doing in a menetic kind of way and pay him extra for the harder tasks. The problem here encountered is that there is no end to these extra tasks, if we try to make cognitions fully determinate from intensions, or even a way to specify them all. For as soon as we resolve the knowledge or awareness problem someone else could ask if he has any doubts about his awareness and when these questions are resolved, perhaps by requiring a demon to never have doubts about his awareness --- and thus displaying his true inhuman aspect, some perverse person could bring up another question, perhaps concerning his sureness of having no doubts

about his awareness, etc., and thus on and on. There appears to be no end to the cognitive attitudes engendered by a single given intension, just as there are an infinity of different phrases that are intensionally identical but not intensionally isomorphic or structurally isomorphic.

Perhaps this is best seen in its most hopeless aspect. Suppose the menetic demon knows that the intension of a term is the same as the intension of 'maternal-uncle'. Let us ask him to tell us how this intension was cognized. As a menetic demon he knows all the logical relations so that he knows that 'mother's brother' is logically equivalent (in Carnap's sense) to 'maternal uncle' and thus that they have the same intensions. But once again we are faced with an embarrassment of riches. He now has too many candidates for the cognition of the term whose intension was 'maternal uncle'. How is he to choose? The cognition is not uniquely determined.

Intensions do not serve to identify conceptions, purportions, or emotions for reasons similar to those for which extensions do not identify these three components. 'Round-square', and 'benevolent-despot', have, I believe, the same intension, namely the trivial intension. There is no consistent property that is possessed either by round-squares or by benevolent despots. Round squares are both round and not round; both not square and square. Benevolent despots are both benevolent and not benevolent; both not despots and despots. We may say that these terms determine no essential properties. On the contrary it would seem that a term with no essential properties would be satisfied by all objects rather than by no objects as these two are. In any case our social con-

ventions, physiological sets, personal goals, mental fantasies, emotions, etc., are all different towards squares that are not square and despots that are not despots, etc.

Taking a cue from the last section, we note first that intensions do not determine ontosions and then that this implies they cannot determine eidensions or tagmensions either.

This gives us our latest unique-determination matrix:

	ont-	eid-	tag-	ext-	int-	cog-	con-	pur-	emo-
ontosion	0	-	-	-	-	-	-	-	-
eidension	+	0	-	-	-	-	-	-	-
tagmension	+	+	0	-	-	-	-	-	-
extension	-	-	-	0	-	-	-	-	-
intension	-	-	-	+	0	-	-	-	-

6. The Effect of Cognition on Determining Other Components

This component of meaning was introduced in III.B.7 and defined in III.D.3. Empirical evidence was given for it in IV.K and an initial theoretical explication given in V.B.5.

Cognitions uniquely determine intensions, but like the relation between intensions and extensions what the intension that is determined by a cognition is cannot be determined without some extra knowledge. In the case of intensions and extensions it was a knowledge of the facts of the world that was required. In this case it is a knowledge of the relations of logic. Some logicians refer to this situation by talking about the "completely rational human being", meaning by this phrase a

person who knows all the laws, facts, and relations of logic. Of course this is an idealization since no real human being is ever completely rational. We, of course, have already made this idealization in connection with the *menetic demon* concept in the test failure-experiment. A menetic demon is completely rational in the logician's sense. Since we have already required the interpreter of unique-determination to be a menetic demon we see that he has no trouble in determining a unique intension once the cognision of a rheme is given. By transitivity, then a unique extension is also determined.

Since cognisions cannot determine ontosions any more than extensions or intensions can, we see that cognisions cannot determine unique eidensions or tagmensions either.

Similarly cognisions have no more ability to determine contensions, purporsions, and emosions than do extensions or intensions, especially when these three components vary from society to society in the first case and from individual to individual in the latter two cases.

The unique-determination matrix now has this appearance:

ontosion	0	-	-	-	-	-	-	-
eidension	+	0	-	-	-	-	-	-
tagmension	+	+	0	-	-	-	-	-
extension	-	-	-	0	-	-	-	-
intension	-	-	-	+	0	-	-	-
cognision	-	-	-	+	+	0	-	-

7. The Effect of Contension on Determining Other Components

This component of meaning was introduced in III.B.8 and defined in III.D.3. Empirical evidence was given for it in IV.L and initial theoretical explication in V.B.8.

Contension does not uniquely determine ontosion. Given all of our social conventions regarding the ownership of property, the word 'my' may occur in human speech sounds or the written word, with their different medium associated meanings. Neither can contension uniquely determine eidension or tagmension since this would contradict this last result together with the knowledge that tagmension uniquely determines eidension which in turn uniquely determines ontosion.

In discussing the affect of extension in determining tagmension it was suggested that tagmension appeared to be more related to contension than to extension. This is true, but this relation is neither unique nor determinable. The same social conventions apply to 'my' as to 'mine'; but only the grammatical knowledge as to whether a noun follows or not determines which form is to be used.

- 1) That is my book.
- 2) That is mine.
- 3) My book is green.
- 4) Mine is green.

Obviously the contension of a term does not determine its extension. 'My pencils' has a fixed, unique contension, but its extension varies from speaker to speaker. Since intension and cognisition each uniquely determine extension, this last result implies that contension

cannot determine these either.

Finally contension gives no help in determining purporsion and emosion for the contension of a given term is fixed for a given language culture while both purporsion and emosion vary from speaker to speaker.

Thus the unique-determination matrix now has this appearance:

ontosion	0	-	-	-	-	-	-	-
eidension	+	0	-	-	-	-	-	-
tagmension	+	+	0	-	-	-	-	-
extension	-	-	-	0	-	-	-	-
intension	-	-	-	+	0	-	-	-
cognision	-	-	-	+	+	0	-	-
contension	-	-	-	-	-	-	0	-

8. The Effect of Purporsion on Determining Other Components

This component of meaning was introduced in III.B.9 and defined in III.D.3. Empirical evidence for it was given in IV.M and initial theoretical explication occurred in V.B.7.

Purporsion does not uniquely determine ontosion for reasons similar to those which show ontosion not to be uniquely determined by contension. Hence purporsion does not uniquely determine eidension or tagmension either.

If, as in the case of some city dwellers, I have never seen or milked a cow, I may have the same physiological sets and personal goals towards 'cow' as towards 'unicorn'. This together with the observation that 'cow' and 'unicorn' have different extensions show that purporsions do not uniquely determine extensions and this in turn shows that they do not

determine intension or cognitions either.

Since our menetic demon learned all the social and behavioral conventions of our language society while conducting the test-failure experiment, it would not be possible for him to learn all the physiological sets and personal goals associated with the Trobriand word for *punt* without also knowing when and where to use, or how to use it appropriately. That is he would also know the social conventions and behavioral responses appropriate to the word 'punt', i.e., its contension. Thus it appears that purporsions uniquely determine contensions and in about the same way that intensions uniquely determine extensions.

However, purporsions do not uniquely determine emosions. An athlete may have a complete purporsion for the term 'four-minute-mile' and hence run such a race many times, yet there are occasions when he may just not be emotionally "up" for a race and not be able to achieve his standard performance. The emosion of the term has varied while the purporsion remained the same.

Our unique-determination matrix is now complete to the following extent:

ontosion	0	-	-	-	-	-	-	-
eidension	+	0	-	-	-	-	-	-
tagmension	+	+	0	-	-	-	-	-
extension	-	-	-	0	-	-	-	-
intension	-	-	-	+	0	-	-	-
cognition	-	-	-	+	+	0	-	-
contension	-	-	-	-	-	-	0	-
purporsion	-	-	-	-	-	-	+	0

9. The Effects of Emosion on Determining Other Components

This component of meaning was introduced in III.B.10 and defined in III.D.3. Empirical evidence for it was given in IV.N and initial theoretical explications in V.B.6.

Like contension and purporsion, emosion does not uniquely determine ontosion, eidension, or tagmension. Similarly, like contension and purporsion, emosion does not uniquely determine extension, intension, or cognition.

In trying to determine the unique-determination relation between emosion and purporsion and contension, we trod poorly surveyed lands. I take the expedient here of completing the already determined symmetry of the unique determination matrix. Thus:

ontosion	0	-	-	-	-	-	-	-	-
eidension	+	0	-	-	-	-	-	-	-
tagmension	+	+	0	-	-	-	-	-	-
extension	-	-	-	0	-	-	-	-	-
intension	-	-	-	+	0	-	-	-	-
cognition	-	-	-	+	+	0	-	-	-
contension	-	-	-	-	-	-	0	-	-
purporsion	-	-	-	-	-	-	+	0	-
emosion	-	-	-	-	-	-	+	+	0

This time the completed matrix has perfect symmetry and its rows and columns do not need to be rearranged as after the test-failure experiment. Again, factoring the matrix we can see that it has much structure:

	ont-	eid-	tag-	ext-	int-	cog-	con-	pur-	emo-
ontosion	0	-	-	-	-	-	-	-	-
eidension	+	0	-	-	-	-	-	-	-
tagmension	+	+	0	-	-	-	-	-	-
extension	-	-	-	0	-	-	-	-	-
intension	-	-	-	+	0	-	-	-	-
cognision	-	-	-	+	+	0	-	-	-
contension	-	-	-	-	-	-	0	-	-
purporsion	-	-	-	-	-	-	+	0	-
emosion	-	-	-	-	-	-	+	+	0

We then make the following conventions

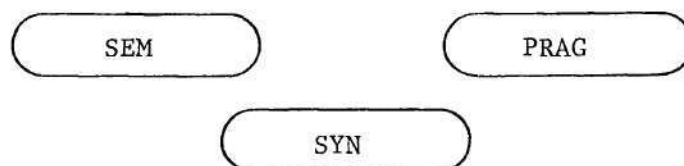
$$\phi = \begin{bmatrix} 0 & - & - \\ + & 0 & - \\ + & + & 0 \end{bmatrix}$$

$$- = \begin{bmatrix} - & - & - \\ - & - & - \\ - & - & - \end{bmatrix}$$

and see that the unique determination matrix can be reduced to:

SYNTACTIC	ϕ	-	-
SEMANTIC	-	ϕ	-
PRAGMATIC	-	-	ϕ

But this is the digraph of a completely separate (totally disconnected) diagram with three nodes:



This gives us the overall structure of the unique-determination relation:

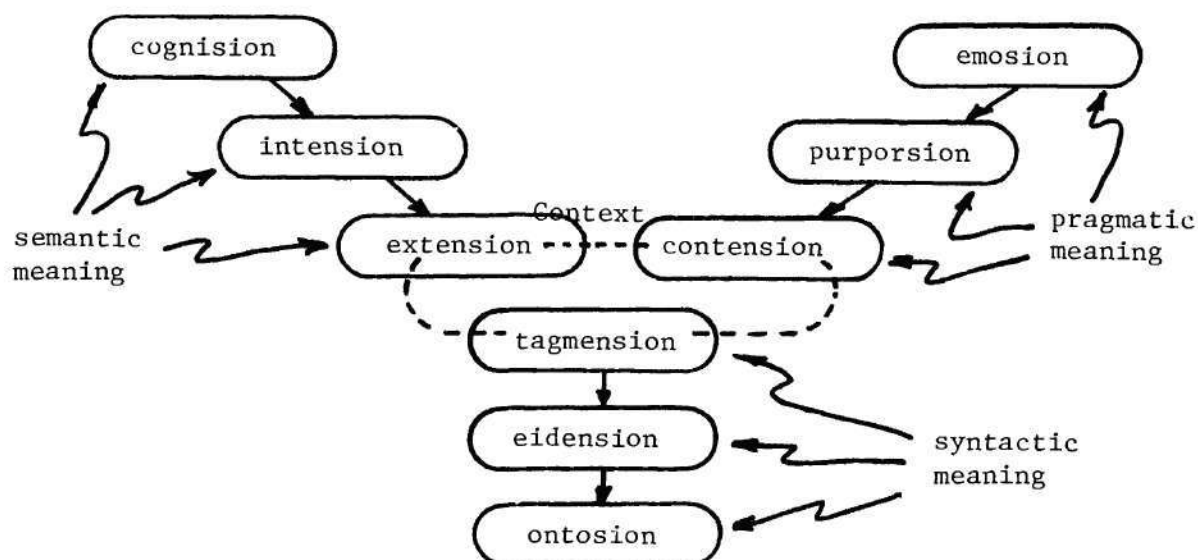


Figure 14. The Unique-Determination Structure of Meaning of a Rheme.

The similarities between this structure and the test-failure structure of meaning are obvious as are also some important differences. The difference in the direction of the arrows simply reflects the fact that these two relations are approximately inverses of one another. However the important difference is the lack of connectivity between the contextual components. This shows the two structures, as presently defined and understood, to be independent of one another. However, it may be possible to revise our concepts of menetic demon, test-failures, and unique determination in such a way as to make the two structures

exactly inverse to each other. This also appears to show the independence of the three contextual components of meaning, indicating that in any menetic analysis, all three contexts must be taken into account.

The similarities are the connectivity of each component arm --- the syntactic, semantic, and pragmatic meaning chains. This lends credence to my belief that I have captured some aspect of reality with this construction. The results of the two experiments may be summarized in one diagram as shown in Figure 15.

D. Adumbration of a Menetic Theory: A Suggested Structure for the Symbolic Rheme

The results of the two experiments of Sections B and C in combination with the previous observation of the close, but distinct, relation between the external and the internal components of the sign allow us to begin the development of a menetic theory. This theory is structural in that it predicts components and relations between components but it is not quantitative in that there is not yet enough structure built into the theory to predict the functional form or parametric values of these relations. It is but an adumbration of a theory; but as such it is useful in the same sense that Zipf's Principle of Least Effort was a useful scientific theory, despite not being quantitative. It is useful for predicting which concepts will be empirically fruitful; where to look for empirical relations; which relations will give us important insights needed for advancing theory; and as an integrative point of view for understanding all the diverse results already obtained in menetics and the relations between them.

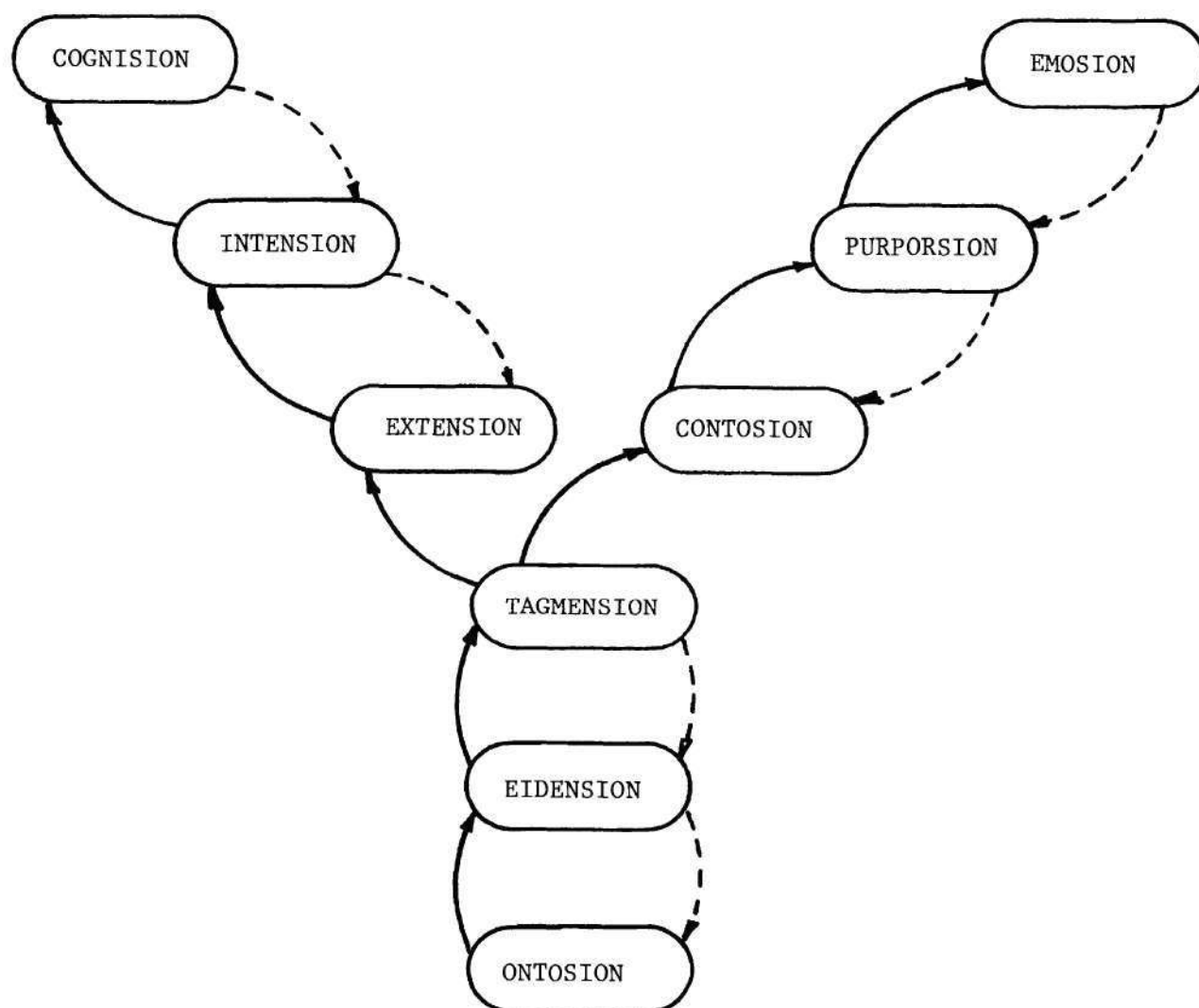


Figure 15. Menetic Structure of the Symbolic Rheme.

The theory may best be presented in summary form by the following diagram.

Since the syntactic, semantic, and pragmatic structure, whose explications was begun in Section B, has not changed, we may now complete the explication of Morris's three dimensions of semiosis.

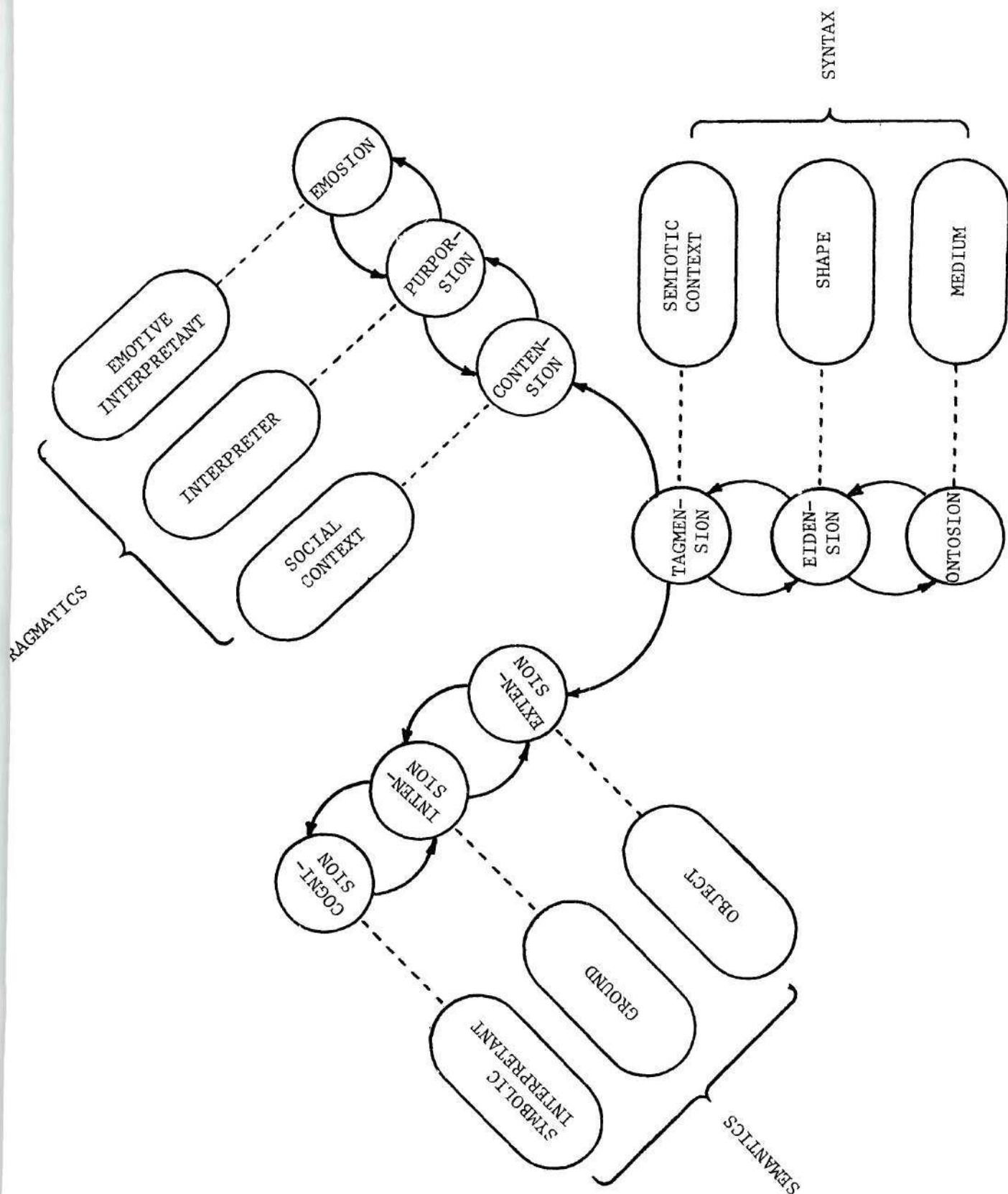


Figure 16. Structure of the Symbolic Rheme

E. Explication of *Syntactics*, *Semantics*, and *Pragmatics*

In Section B we began a tentative explication of Morris' three dimensions of semiosis by defining syntactic meaning as the ontosion-eidension-tagmension chain of meaning components; sematic meaning as the extension-intension-cognision chain of meaning components; and pragmatic meaning as the contension-purporsion-emosion chain of meaning components. The unique-determination experiment of Section C reinforced this structure as well as showing the independence of the three dimensions. In light of the tentative theory put forth in Section D, we may now generalize this definition to give a complete explication of Morris' dimensions. The Syntactic Dimension involves the semiotic context, the shape of the sign, and its medium as external components, as well as the three components of meaning --- tagmension-eidension-ontosion --- abstracted from them as internal components; and all the relations between any of these six concepts. Syntactics is the study of the syntactic dimension. Since the semiotic context, the shape, and the medium are the semiotic aspects of the being or existence of the sign, we can see once again the relation between Morris' syntactic dimension and Peirce's mode of existence, as well as an insight into Peirce's claim that existence is one of the three fundamental modes of semiotics.

The Semantic Dimension involves the object, ground, and cognitive mentellect of the sign as external components, as well as the three components of meaning --- extension-intension-cognision --- abstracted from them as internal components; and all the relations between any of these six concepts. Semantics is the study of the semantic dimension.

Since the ground and cognitive mentellect are means of determining the object of the sign, we can see once again the relation between Morris' semantic dimension and Peirce's mode of signifying, as well as an insight into Peirce's claim that signification is one of the three fundamental modes of semiotics.

The Pragmatic Dimension involves the social context, the interpreter, and the emotive mentellect of the sign as external components, as well as the three components of meaning --- contension-purporsion-emotion --- abstracted from them as internal components; and all the relations between any of these six concepts. Pragmatics is the study of the pragmatic dimension. Since the social context, interpreter, and emotive mentellect are the semiotic aspects of the interpretation of the sign, we can see once again the relation between Morris' pragmatic dimension and Peirce's mode of interpretation, as well as an insight into Peirce's claim that interpretation is the third fundamental mode of semiotics.

While this explication brings out Morris' relations and makes them more clear, it also contains a significant deviation from Morris' concepts. Morris defined his dimensions in such a way that pragmatics overlapped semantics and both overlapped syntactics, [205]. Cherry [51] portrayed this as follows in Figure 17.

The indication of my explication is that it may be more useful to define the three independently.

SYNTACTICS is the study of the ontotic, eidontic, and tagmatic relations.

SEMANTICS is the study of the deictic, hypotic, and noetic relations.

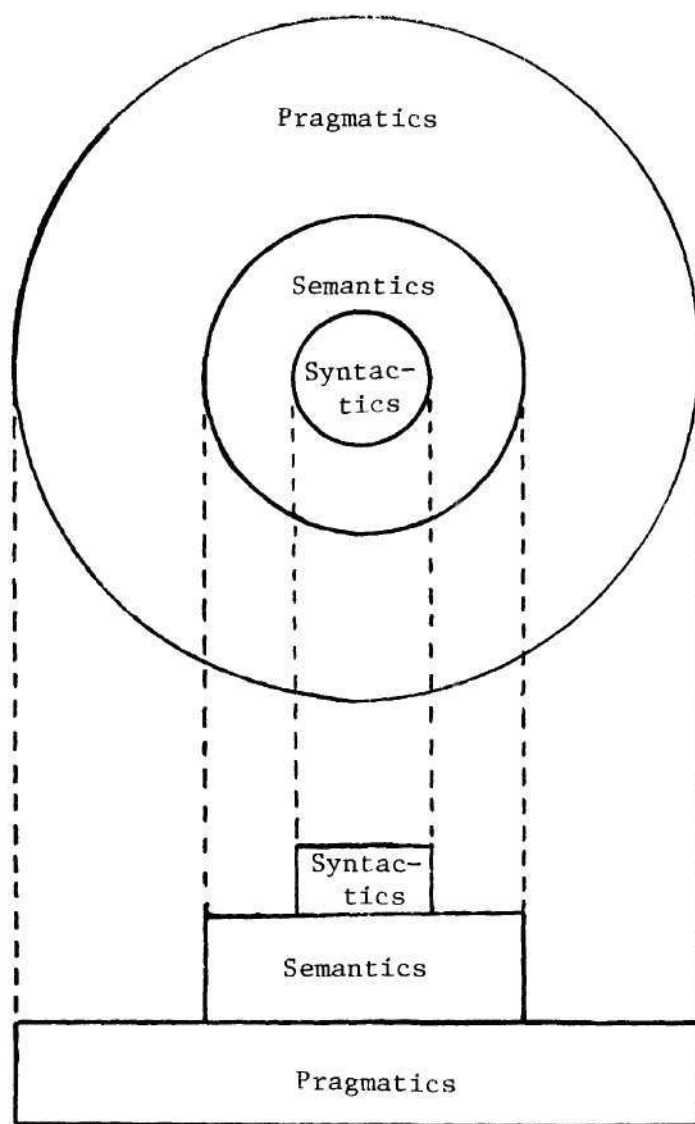


Figure 17. The Relationship Between Morris' Three Dimensions.

PRAGMATICS is the study of the contotic, ergotic, and emotic relations. However, the force of Figure 16 is to the effect that there is not a complete independence. Syntactics is still prior to either semantics or pragmatics. We could thus portray these relationships a la Cherry as:

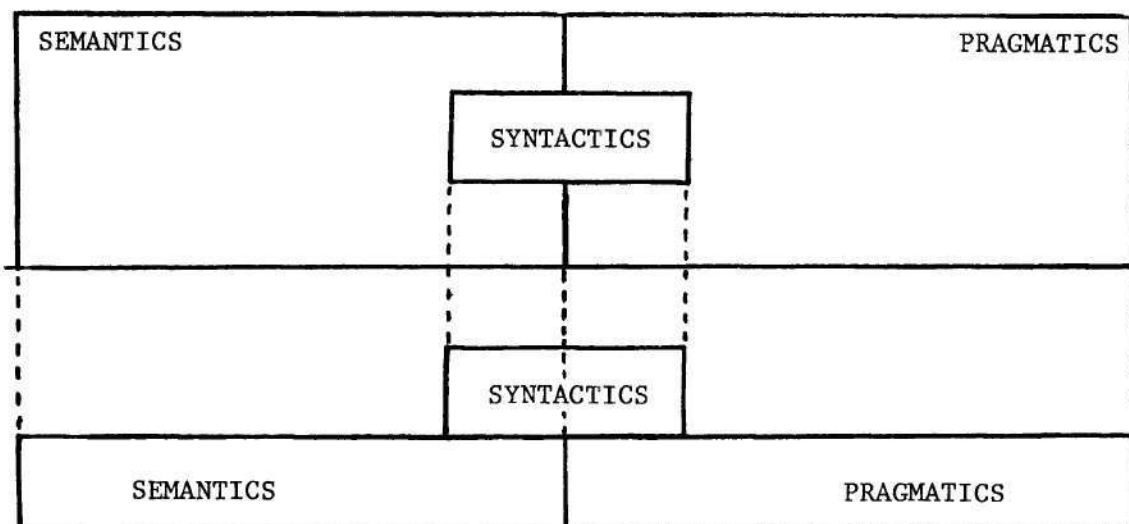


Figure 18. The Relationship Between My Three Dimensions.

That Morris himself had something like the kind of explication given here in mind can be seen from his diagram given in his discussion of esthetics [1432, p417]. Unfortunately there is a typographical error that interchanges the syntactic and pragmatic dimensions. With this error corrected, the diagram is topologically equivalent to Figure 19 in which the similarities to my diagram are obvious. This diagram was unknown to me until after I had shown my explication to Morris and he called my attention to it, for which I am extremely grateful. It can be seen that his diagram is a precursor of mine and that his explication adumbrates mine.

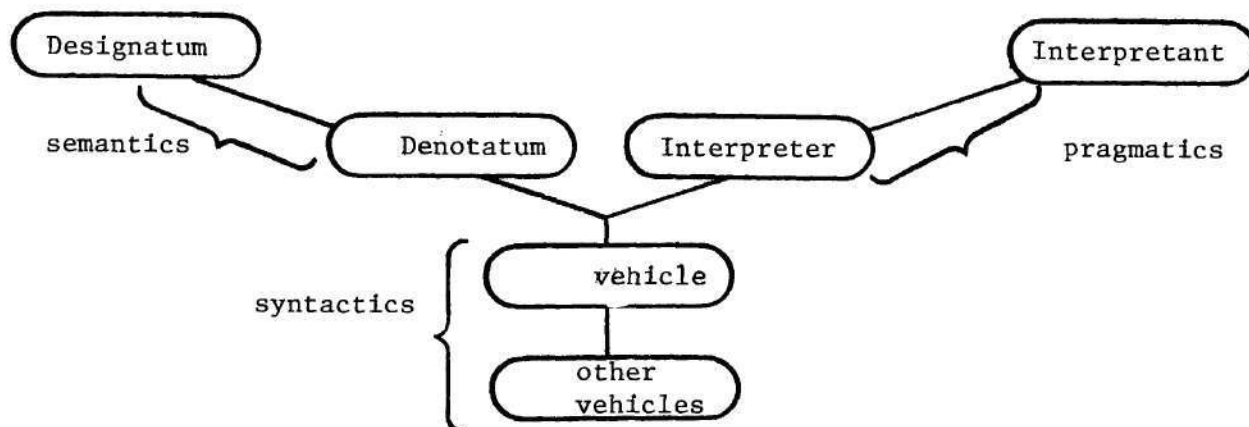


Figure 19. Morris' Explication of the Semiotic Dimensions.

F. Identification of a Subtle Confusion

The menetic theory thus adumbrated, along with the dimensions of semiosis thus explicated allow us to identify a subtle confusion that pervades not only the linguistic literature but almost all semiotic lieterature as well, but linguists are perhaps the most blatent about it. They often distinguish between syntax and semantics; meaning something like grammar and meaning, of form and content. This use of 'semantics' is simply different --- one cannot fault them for their terminology --- but they usually do not bother to mention they are using 'semantics' in a sense that is different from Morris' definitions --- often they do not bother to inform us of how they are using the word at all --- and they *can* be faulted for this. But this is not the confusion I want to point out. The confusion is caused by framing the distinction between form on the one hand and content on the other, thus giving an impression that the author wishes to distinguish between external syntactics on the one

hand and internal syntactics, internal and external semantics, and internal and external pragmatics on the other hand, thus identifying syntax with external syntactics. This may indeed be their intention, but they often proceed from there to treat various aspects of internal syntactics in their grammar as well. Also by identifying semantics with meaning they lead one to believe they are interested only in internal semantics and not in external semantics, whereas we have seen that external semantics has important relationships with meaning and it is often necessary to treat the entire semantic structure as a whole in order to get a handle on just the semantic components of meaning. Most authors are completely unclear as to just what they mean by pragmatics. While not every author makes all of these confusions, the large majority of them make one or more so that a reading of the literature gives an impression of a very confused body of investigators. These confusions could all be avoided by realizing that the syntactic dimension has an internal (menetic) structure as well as an external structure; that the semantic dimension has an external structure as well as an internal structure; and that the pragmatic dimension has both an internal and an external structure.

I have long been interested in understanding the difference between 'syntactics' and 'syntax', and to the extent I have been unable to find any systematic explication of this distinction in the literature it may be appropriate in helping to untangle the above mentioned confusions to define 'SYNTAX' as external syntactics, and then to keep these terms distinct and use them consistently. I do not have special terminological suggestions for internal syntactics, internal or external

semantics, or for internal or external pragmatics; perhaps the terms used in the first phrase of this sentence would do as well as any.

CHAPTER VI

SUMMARY AND SUGGESTIONS FOR FURTHER STUDY

Many ideas grow better when transplanted into another mind than
in one where they sprung up.

_____ O. W. Holmes

A. Summary of Results

Tis not enough no harshness gives offence,
The sound must seem an echo to the sense.

_____ Pope: Essay on Criticism

The main task of this thesis was to design a language of Menetics for use in empirical studies of meaning of signs. Natural language words were the principle tool for this task. This task has been successfully accomplished as evidenced by the examples of Chapters IV and V. Altho this result is highly significant in its own right, in constructing examples of how to use this language other results were achieved which may outweigh the main task itself. These will be discussed in later subsections.

1. Chronology

My original intention in starting research into the nature of meaning and its relation to semiotics was to conceive of my task as one in classical science. I though I could transform the study of meaning from a branch of philosophy to a branch of science by examining what empirical data was available and from it isolating certain laws (or

empirical generalizations) that would be useful for determining the problems that a theory of meaning would have to deal with and then developing such a theory. However, over a period of several years, I gradually came to realize that the languages that were available for discussing the necessary concepts were woefully inadequate for the task. I include here such languages as the language of physics, classical logic (20th Century), linguistics, general semantics, psychology, and several dialects of philosophy (notably logical positivism, British analytical philosophy, and American pragmatism -- the full scope of Peirce's writings were not yet available to me during these early studies).

The full force of this inadequacy was brought home to me about the time of my second reading of Ogden and Richards' [213], after I had attempted to develop a completely extensional theory of meaning, had begun to see the necessity for multiple components of meaning, and had begun to realize the polysplendored nature of the kind of data that would be pertinent to empirical studies of meaning.

However, many of the most crucial problems had already been tackled on an isolated basis or within a narrow framework, progress towards their solutions having been made possible by the technical advances in 20th century logic, linguistics, mathematics, and psychology. I therefore felt there was a strong possibility that enough was known of the requirements for designing a more adequate language so as to make it worthwhile to undertake this much restricted problem for my thesis research project.

All of these thoughts crystallized in my head during my second

reading of Ogden and Richards, so it was no wonder I was sensitive to their methodological suggestions for initiating a science of meaning. Their first suggestion, to survey the entire literature on meaning to discover all the senses in which the word 'meaning' is used, was already well underway and was, in fact, partially responsible for my realizing the inadequacy of the present state of language. Their second suggestion, to establish a distinct term for each possible concept for use until a better understanding would determine which were actually the important concepts from an empirical point of view, was ideally suited for solving the problem as I saw it -- the inadequacy of the current language for talking about meaning. Finally, their third suggestion, to base any study of meaning on an analysis of semiotic structure, merely reinforced the feeling I had started with, that meaning and semiotics were closely related.

2. The Language of Menetics

With this decision, the scope of the thesis research was narrowed to include just the design of the Language of Menetics, using the three point methodology suggested by Ogden and Richards. Later, however, it was decided to add two chapters of examples and the results of these final two chapters allowed me to come close to my original goal of analyzing the empirical foundations of a theory of meaning and developing a prototheory.

The results of the survey on the senses of 'meaning' are presented in Section III.B. Originally eight distinct concepts were found but the results of the test-failure experiment discussed in Chapter V forced a reexamination of the literature and a ninth concept of 'meaning'

was found in Ogden and Richards themselves [213] in their discussion of mentalistic meaning, the separate concept having been hidden by their own ambiguity in the term 'mentalistic meaning'.

The results of my analysis of the symbolic rheme is presented in Section III.C, where the close relation between the components of meaning and the structural components of the symbolic rheme was recognized. This result had a large effect on the way in which the language design took place.

The results of the language design is presented in Section III.D and is called the Language of Menetics.

The language was used to analyze literally hundreds of purported laws and the evidence upon which these generalizations are based. A few selected examples of these are presented in Chapter IV, showing the ability of the language to point out interrelationships in the laws and their data; analyze the weakness of much of the data on which these laws are based; discover the roughness of some of the edges where these laws should fit together, determine which concepts need to be revised, refined, or discarded, etc.; and point out the direction for new experiments to improve our understanding of meaning.

The language was also used to develop a tentative theory of the structure of the menetic rheme, thereby telling us which laws become crucial for testing the adequacy of menetic theory and how to design experiments that will add to our understanding of meaning. This theory is presented in Chapter V and leads to what I consider to be the three most important results obtained with the Language of Menetics so far: 1) a tentative theory for the structure of the symbolic rheme; 2) an

explication of Morris' three dimensions of semiosis; and 3) the identification of a subtle confusion in the use of the older terminology.

3. Prototheory for the Structure of the Symbolic Rheme

The symbolic rheme is seen to be made up of an internal and an external structure which fits intimately together. Each substructure is composed of nine components each of which is closely related to the corresponding component in the other substructure. The components of substructure are divided into three groups of three components making up the syntactic, semantic, and pragmatic dimensions, and all of the components are hierarchically related by two complimentary (but not precisely inverse) relations called the test-failure relation and the unique determination relation. This structural theory is shown in Figure 16 of chapter V.

4. Explication of Morris' Three Dimensions of Semiosis

The close relation between the tentative theory proposed in Chapter V and the three dimensions of semiosis proposed by Charles Morris [205] allowed me to explicate his three dimensions. We may regard syntactics as the study of ontotic, eidontic and tagmatic components of signs and their interrelationships, and being hierarchically prior to both semantics which is the study of the deictic, hypotic, and noetic components of signs and their interrelationships, as well as pragmatics which is the study of contotic, ergotic, and emotic components of signs and their interrelationships.

5. Identification of a Subtle Confusion

In using the terms 'form' and 'content', 'grammar' and 'meaning', and 'syntax' and 'semantics' authors are usually not clear as to

precisely where they are drawing the dividing line in their distinctions. This confusion could be avoided if it were always kept in mind that syntactic structure includes internal components as well as external; that semantic structure includes external components as well as internal; that pragmatic structure includes both internal and external components; and that there are syntactic and pragmatic meaning components as well as semantic meaning components.

B. What the Thesis Did Not Accomplish

"They were learning to draw," the Dormouse went on yawning and rubbing its eyes, for it was getting very sleepy; "and they drew all manner of things -- everything that begins with an M --- ... such as mouse-traps, and the moon, and memory, and muchness ... did you ever see such a thing as a drawing of a muchness!"

Lewis Carroll: A
Mad Tea Party

1. No New Laws of Information Science were Discovered

As has been pointed out several times, the point of view developed within the thesis would treat a law of information science as an observable regularity between external sign components. Many such laws were discussed in Chapter IV as examples of the ability of the language to describe observed regularities, but these were all extant in the literature prior to the present research. In fact, the one new law that was discovered during this research (the mathematical description of the Miller-Bruner-Postman effect - obtained by use of the eidometer, described in Chapter IV) was deleted from the thesis as being a purely quantitative result and not contributing to the exposition of the language - the primary goal of the thesis.

2. No New Laws of Meaning were Discovered

Strictly speaking, from the point of view adopted here, since meaning components are internal components and unobservable, and laws are descriptions of regularities between observables, there can be no such thing as laws of meaning. Theories of meaning, yes; but laws of meaning, no. However, from a practical standpoint, we often think of low level theories, whose concepts have very obvious and simple interpretations in terms of observables, as "laws". Even with this loose use of the word 'law', no new laws of meaning were discovered in this thesis. None were looked for, and none were found. The justification is the same as in the previous paragraph.

3. No Quantitative Theories were Developed

This subject will be discussed further in Section C inasmuch as the development of menetic theory is the overall goal within which the design of a new language and this particular thesis research was conceived. At this point it is sufficient simply to note that no quantitative theories were developed in this thesis, as within the restricted goals of the thesis research and the language design, it was not intended to do so. The theory of sign structure developed in Chapter V is purely a qualitative one and a very elementary one at that. Its primary purpose was to show that the language of menetics has the power to develop menetic theories and to talk about these theories. Any real theories of meaning will have to face up to the arguments presented in Chapter V and the theories developed there, but the theories themselves, I am sure, will undergo drastic refinements or complete revisions before they become accepted on any "scientific" basis.

4. No Applications were Developed that can Immediately Advance Information Technology

This point should need no mention in a work of science. However, due to the almost total emphasis on technology in the information and computer sciences, it may be well just to reemphasize that this was a piece of language development - a job of pure science, or even pre-science, and no technological applications should be anticipated or required.

5. Nothing but a Language

A discussion of negatives has the disadvantage that the subject does not obey a logic of individuals and there are at least a continuum of accomplishments that were not achieved by this thesis and very probably much more. Suffice it to say that nothing has been achieved but the development of a language. But this is a tremendous accomplishment by itself. It includes a terminology, a semiotic point of view, a grammar for using the terminology with this point of view, a decision as to what kinds of problems are important for the study of meaning, what kinds of phenomenas are important for understanding these problems, and what kinds of methods are useful to analyzing these phenomenas for the purpose of solving the problems of choice.

C. Further Study

"Found it," the Mouse replied rather crossly:
"of course you know what 'it' means."

Lewis Carroll: A
Caucus Race and a
Long Tale.

The suggestions made in this section are rather specific. They

relate to extensions of the particular experiments discussed in the body of this thesis for the purpose of improving our knowledge of the symbolic rheme.

1. Generalized O & R Truth Test

Ogden and Richards [213] discussed an instrument for discerning which dimension of semiosis was most significant for the meaning of particular words by determining what kind of truth concept was applicable to indicative sentences whose truth turned on the term in question. For example the meaning of the word 'dog' in its usual sense is primarily semantic since scientists of the proper sort have been interested in determining the truth of the sentence, "Dogs have backbones.". The concept of scientific truth is applicable to the term 'dog'. However the meaning of the word 'my' is primarily pragmatic rather than semantic since only the custodians of certain social institutions (i.e. a cop) would be interested in determining the truth of the statement, "This is my diamond bracelet.", uttered by a man carrying a set of burglar tools. It is not the object that is important, nor any other facts of the cognitive world. No scientist would be seriously interested in determining the truth of this statement *qua* scientist. The important facts are social and legal. What are the social conventions (laws against burglary) in force in the location (social boundaries and jurisdiction) where the suspect was picked up, and what kind of behavioral relationships did he participate in (theft, money transaction, or lapidarian creativity) to obtain the right to use 'my' in association with the words 'diamond bracelet'? The concept of social truth is applicable to the word 'my' rather than the concept of scientific truth.

By refining and generalizing this notion of different kinds of truth, all the meaning components of the symbolic rheme could be mapped out by finding kinds of truth applicable to every word in NL. The problem that must be solved in carrying out this test is to make the generalization completely, systematically, and consistently, i.e., the different truth concepts are non-overlapping, and completely exhaust the total concept of truth in some uniform way that fits with all the lexical facts. This was essentially the approach used in generalizing Ogden and Richards' concept of *levels of failure* used in Chapter V. We may note that the logician's concepts of logical or L-truth, analytic, or A-truth, and simple, or E-truth is a partial beginning of this task that is applicable to the semantic aspects of meaning.

2. Generalized Hayakawa Test

The generalized Hayakawa test, or wrong word override, can be developed from the Hayakawa example, given in IV.I.1, in which one of the three contexts of a word -- semiotic, physical, and social -- completely override the meaning of a single, incorrectly used word. This test can be used to clarify the distinctions between the three concepts of *context* and the mutual relationships between the context components -- tagmension, extension, and contosion -- and the other six components of meaning.

The problem to be solved in setting up this test, is to find a systematic way of determining which component of which sign (the sentence in which the wrong word is used, or one of its neighboring rhemes in the same sentence, or even a neighboring pheme) is doing the

overriding and which component, or components, of the wrong sign is being overridden. There is a possibility here of determining some of the relationships between rheme and pheme.

3. Generalized Jenkins Test

The Jenkins paradigm is itself a generalization of the Razran paradigm, discussed in IV.G.3, in which semantic conditioning is used as an exploratory tool to test for individual components of meaning and to compare them to other components similarly isolated [1172].

In the Jenkins paradigm, this is generalized so that two components of meaning are isolated in the same experiment and compared and contrasted simultaneously [137]. This leads to some confusion in interpretation since Jenkins does not have anything like a menetic model or language with which to unravel the various interrelationships. In the cited reference he introduces 'contextualism' which is just the semiotic viewpoint without the technical language of menetics.

In the generalized Jenkins test we maintain the Jenkins experimental methodology but revert back to Razran's original viewpoint of a hierarchy of levels and components of meaning especially as elaborated and expanded upon by Rommetveit [259] and using the language of menetics and prototheories of menetic structure developed in this thesis. We can thereby compare each pair of menetic components systematically with each other and develop an understanding of the processing structure of the human mind for the symbolic rheme from the viewpoint of a broad range of psychological experiments.

The primary problem to be encountered with this test is the detailed design of each experiment so that each component is very

carefully isolated from all other components and so that each pair is carefully compared to each other systematically from a broad range of task viewpoints.

4. Generalized Skinner Test

Skinner's Law of Verbal Summation was discussed in IV.P.13 where it was noted that Skinner's original verbal summator methodology could be improved in two ways. In that section, I described how his experiment could be modified so as to eliminate the effect of the tagmatic level on the relationship shown by the Zipf constellation and so as to also increase our understanding of the eidontic-ontotic relation in other ways as well. But I also mentioned that the effect of perseveration, discovered in the Skinner experiment, could be used as a tool for mapping out semiotic structure in general. This is because perseveration tended to occur at many different levels simultaneously in the original experiment. Kinds of perseveration specifically mentioned by Skinner include: phrase; grammatical structure; dialects, or languages; sense; etc. The discussion of this generalization of Skinner's methodology was beyond the scope of IV.P and so will be taken up here.

The point of the generalized Skinner test is to discover ways of redesigning Skinner's experiment so that what is measured is perseveration and so that perseveration only occurs at one level in one experiment. Individual components can thereby be isolated and studied for later comparison and contrast. A Jenkins type modification so that exactly two components are isolated simultaneously (perseveration would occur on exactly two levels simultaneously) could then be possible so that this examination could be made more systematic and comprehensive. The

question arises of whether all nine levels hypothesized in this thesis could be isolated by this method and whether any additional components could be found.

The interesting experimental methodological problem associated with this generalization concerns discovery of the number of different experimental methods by which preservation can be made to occur on exactly one (or exactly two) levels. This would have to be determined systematically and completely for the above questions to be answerable.

An entirely different generalization of Skinner's methodology concerns what in IV.P.13 was called the 'Skinner Effect'. This was there interpreted as showing that the onset of eidension can be summated. An interesting question concerns whether any of the other components can be described as having such an 'onset', and whether such an onset, if existing, is summateable or not. It is not at present clear whether an experimental methodology adequate for answering such questions is available, or not.

5. Generalized Bruner Test

As is the case with all the other paradigms of experimental psychology discussed in this section, the Bruner paradigm is not a single experimental paradigm, but a whole schemata of paradigms. The systematizing point of view of the Bruner experiments, is the development of capability for processing additional levels of semiotic structure as the human child grows and develops. In [31] Bruner et al concentrated on showing the hierarchical relations of indexical coding, iconic coding, and symbolic coding. However, other studies [148; 1433; etc.] tend to show that these are closely related to sensory memory, short

term memory, and long term memory; and to extension, intension, and cognition. Bruner's experiments could be modified so as to show the development of various components of meaning at different ages in the child, thus isolating individual components of meaning as well as giving additional insight to their hierarchical relations. Although Bruner's experiments were confined to semantic development, there is no inherent limitation to this mode of development. Affective growth and development (pragmatic meaning) and perceptual growth and development (syntactic meaning) could also be easily studied by this methodological approach.

6. Other Generalized Psycholinguistic Tests

The paradigms mentioned so far in this section have all been generalizations of particular experiments or methodologies studied earlier in this thesis. But there is no limit to the types of methodologies and experimental paradigms that could be imagined for the experimental study of semiotics and mentic relationships. It should be expected, in fact, that almost any experimental paradigm of perceptual psychology, cognitive psychology, and affective psychology could be generalized and adopted for this purpose. In fact, it has been one of the principle methodological themes of this thesis, that many of the methodologies of philosophy, logic, linguistics, and the many other semiotic sciences can be so generalized and utilized.

7. Generalized Eidometer Test

A very wide range of eidontic deviance experiments were discussed in IV.P.16. There is no need to repeat any of that discussion at this point. It should be noted, however, that whereas the first six topics

of this section all suggested experimental schemes for investigating each of the menetic components and their interrelationships, the eidontic deviance experiments all have the purpose of investigating primarily only the ontotic and eidontic components and their interrelationships.

However, as noted on the last page of IV.P.16, even the eidontic deviance methodology can be modified to enable experiments to be conducted on the meaning components at other menetic levels. This leads directly into the next subsection.

8. Development of a Tagmatic Deviance Instrument

It is possible to develop an instrument for measuring tagmatic deviance using the same approach as was used to develop the eidontic deviometer. One suggestion for carrying this out is given on the last page of IV.P.16. The Georgia Tech Semiotics Lab has begun to explore several other possibilities, however, development is not yet far enough along to report any substantive progress.

9. Aphasic Analysis and Other Patholinguistic Approaches

The field of aphasic analysis may be best described as an unorganized and bewildering collection of a massive amount of data and facts with no satisfactory theory or even partial but universally accepted understanding developed to date. Perhaps the most significant suggestion to date has been Jakobson's suggestion to classify aphasic disorders according to their semiotic nature as affecting primarily the syntactic, semantic, or pragmatic aspect of language [799]. The language, conceptual tools, and theories of menetic structure developed in this thesis present an improvement which appears to offer significant advantages over Jakobson's proposals for classifying aphasic phenomena

[218]. Once aphasic data can be consistently and systematically classified, it in turn can be used to add to our understanding of menetic structures by showing us the ways in which our natural menetic processors (the mind) can malfunction. This same claim holds true for all the other phenomenas of patholinguistics: schizophrenia; autism; manic-depresiveness; etc.

10. Alcohol and Other Pharmacological Tests

The intake by the body of various pharmacological agents has varying kinds and degrees of effects on our ability to process signs and understand their meaning. Alcohol presents but one notorious example. These variations can have two distinct kinds of dependencies on the particular drug used. Firstly, as in the case of alcohol, the kinds and degrees of effects can depend on the concentration of the drug at some point, such as in the blood stream. Secondly the kinds of effects can depend on the particular kind of drug present while the degrees of the effect depend on the concentration. Both of these dependency relations present us with the opportunity to study systematically the structure of nature's finest menetic processor and thereby infer knowledge concerning the structure of the sign processed. For instance it is well known that as the blood-level concentration of alcohol increases, the human being's ability to process abstract cogcepts is affected long before his ability to process concrete concepts is affected. This relates to semantic structure. The ability to process concepts is affected long before the ability to process eicepts is affected. This relates to the relation between semantics and syntactics. For one final example, the ability to process eicepts is affected long

before the ability to process concepts is affected. This relates to syntactic structure.

11. Survey of Literature on Menetic Theories

Finally, all previous suggestions for further study presented in this section were suggestions for continuing the work and for carrying out the suggestions made within this thesis. It was mentioned in A.1, however, that one of my primary goals is to develop a scientific theory of meaning that would put menetics on a sound empirical basis, i.e., lead to what Kuhn calls a "scientific revolution" [154] in menetics. The qualitative structure presented in V is only a tentative beginning in this direction however, also as noted in A.1. We are now in a position with the linguistic difficulties behind us, to develop an adequate menetic theory.

From time to time thruout the present research I have encountered a citation to this menetic theory or cursorily skimmed over that menetic theory -- mainly during the early years of the research when I was attempting to develop the conceptual capability for disentangling all the empirical menetic results already available -- but I have not yet examined any of these theories in the level of rigorous detail that I deem necessary for abducting an adequate theory. It is now time to begin this work.

In outline the task is simple, in execution as long and involved, if not more so, than the present work. All of the previous, seriously proposed, menetic theories should be collected and analyzed, whether still in high regard by some serious school of menetics, or not. Often the reasons why some theories known to be inadequate were considered

so can tell us more about the parameters of theory design than the knowledge of others presently accepted, even if only on a tentative basis.

These theories should be compared to all the known empirical data for which the theory is required to explain, including that contained in this thesis, but also including any of the much larger collection of data and laws not included in this thesis wherever they are deemed pertinent to the analysis. One of the results of this thesis has been to show that any adequate theory of meaning that explains *any* menetic phenomena must also explain much more kinds of facts and data than ever before thought necessary. Fortunately one theory need not account for all these. With a qualitative theory of menetic structure as presented in V, quantitative theories that explain small areas of interrelated phenomena may be developed. Examples of such theories are the theories of the Zipf-Jung Constellation, theories of memory coding, theories of abstraction and generalization, etc. But these partial theories are all interrelated by the overall theory of structure that holds them together. It is this interrelated system of theories which we must view as the only adequate explanation of even one menetic fact.

The inadequacies of all these theories -- the ones surveyed -- to explain any crucial data or facts should be completely and systematically cataloged so that eventually some intuitive metarelation between structure of menetic theories and types of inadequacies may be induced. It may then be hoped that by using the language of menetics, the insight gained by the type of theories and types of analysis contained in this

thesis, and the insight gained in the proposed survey of theories that an empirically adequate menetic theory may be abduced, or at least one more adequate than any of the previous theories.

Of course the test of the new theory, as of any scientific theory, is its ability to predict and/or explain the known facts as well as its ability to predict new laws and phenomena. The new theory must be subjected to the same critical analysis as each of its predecessors. However, once an adequate theory is achieved and verified, it will lead to a method of evaluating the empirical data both presently available and discovered in the future. Data, facts, laws, or phenomena have most value when they are conceived as crucial to the validation of menetic theory, less value when they help to determine the form of theories in less crucial ways, and very little value when they are seen as affecting the job of theory refinement in none or only trivial ways. Menetic theory, thus conceived, would become accumulative and self refining, as indeed, are all other truly scientific theories.



Charls Pearson
4:15 p on 75-11-14
Atlanta, Georgia

APPENDIX A
DICTIONARY OF MENETICS

1. BEHAVIORAL CONTEXT : SEE SOCIAL CONTEXT.
2. BEHAVIORISTIC : 1) LABEL CHARACTERIZING MENETIC AND PSYCHOLOGICAL THEORIES WHICH EMPHASIZE EITHER PURPORSION OR THE ERGCTIC LEVEL OF SIGNIFICATION. 2) ADJECTIVAL FORM OF PURPORSION. SEE ALSO PURPORSIONISTIC.
3. COGCEPT : 1) ONTOLOGICAL CHARACTERIZATION OF COGNISICN; IN THE NOETIC DIMENSION, A SIGN COGNOTES ITS COGNISION, WHICH IS A COGCEPT OF COGNITIVE MENTELLECTS. 2) ONTOLOGICAL MARKER FOR NOETICS. 3) GENERIC TERM INCLUDING, AS SPECIES, CERTAIN SENSES OF IMAGE, IDEA, AND THOUGHT. 4) THE NAME FOR ONTCLGICAL ENTITIES WHICH FORM COGNISIONS OF SIGNS.
4. COGNISEME : 1) A VECTEME WITH A NON-NUL COGNISION COMPONENT.
5. COGNISION : 1) THE NOETIC COMPONENT OF MEANING. 2) MEANING RELATED TO THE COGNITIVE MENTELLECT OF THE SIGN. 3) A COMPONENT OF MEANING IMPORTANT FOR PHILOSOPHICAL AND LOGICAL ANALYSIS, THINKING, AND REASONING.
6. COGNISIONISTIC : SEE MENTALISTIC.
7. COGNITIVE INTERPRETANT : SEE COGNITIVE MENTELLECT.
8. COGNITIVE MENTELLECT : 1) THE EXTERNAL NOETIC COMPONENT OF A SYMBOL. 2) A MENTALISTIC ENTITY PERTAINING TO THE OBJECTIVE REALM AND CONSISTING OF THE INTERNAL SIGN FORMED IN THE MIND OF A COGNIZING BODY AS A RESULT OF INTERPRETING THE SIGN IN QUESTION.
9. COGNOTE : 1) THE ACTION OF A SIGN IN DETERMINING ITS NOETIC MEANING COMPONENT. 2) IN THE NCETIC DIMENSION, A SIGN COGNOTES ITS COGNISICN, WHICH IS A COGCEPT OF ITS COGNITIVE MENTELLECT.
10. CONCEPT : 1) ONTOLOGICAL MARKER FOR HYPOTICS. 2) ONTOLOGICAL CHARACTERIZATION OF INTENSION; MAY OR MAY NOT EVENTUALLY BE EXPLICATED IN CARNAPIAN FASHION. 3) NAME FOR ONTOLOGICAL ENTITIES WHICH FORM INTENSICNS OF SIGNS; IN THE HYPOTIC DIMENSION, A SIGN CONNOTES ITS INTENSION, WHICH IS A CONCEPT OF PROPERTIES (ITS GROUND). 4) GENERIC TERM INCLUDING, AS SPECIES, PROPERTIES, RELATIONS, AND INDIVIDUAL CONCEPTS.

11. CONNOTE : 1) THE HYPOTIC ACTION OF THE SIGN IN STANDING FOR ANY OBJECT WITH RESPECT TO THE PROPER GROUND; THE ACTION OF A SIGN IN DETERMINING ITS HYPOTIC MEANING COMPONENT. 2) IN THE HYPOTIC DIMENSION, A SIGN CONNOTES ITS INTENSION, WHICH IS A CONCEPT OF ITS PROPERTIES, (ITS GROUND).
12. CONTEME : 1) A VECTEME WITH A NON-NULLENTENSION COMPONENT.
13. CONTEMENT : 1) THE CONTEMENTIC COMPONENT OF MEANING. 2) MEANING RELATED TO THE SOCIAL CONTEXT OF THE SIGN. 3) MEANING THAT HAS BEEN ENCODED INTO LANGUAGE BY SOCIETY BY ITS HABITS OF SOCIAL USAGE.
14. CONTEMENTIONISTIC : 1) LABEL CHARACTERIZING MENETIC AND PSYCHOLOGICAL THEORIES WHICH EMPHASIZE EITHER CONTEMENTION OR THE CONTEMENTIC LEVEL OF SIGNIFICATION. 2) ADJECTIVAL FORM OF CONTEMENTION.
15. CONTEMENT : 1) ONTOLOGICAL MARKER FOR CONTEMENTICS. 2) ONTOLOGICAL CHARACTERIZATION OF CONTEMENTION. 3) NAME FOR ONTOLOGICAL ENTITIES WHICH FORM CONTEMENTIONS OF SIGNS; IN THE CONTEMENTIC DIMENSION, A SIGN CONTEMENTOTES ITS CONTEMENTION, WHICH IS A CONTEMENT OF ITS SOCIAL CONTEXT.
16. CONTEMENT : SEE SEMIOTIC -, SOCIAL -, BEHAVIORAL -, PHYSICAL -, AND ENVIRONMENT.
17. CONTEMENTOTE : 1) THE CONTEMENTIC ACTION OF THE SIGN AS EXPRESSED BY THE PROPER SOCIAL CONTEXT; THE ACTION OF A SIGN IN DETERMINING ITS CONTEMENTIC MEANING COMPONENT. 2) IN THE CONTEMENTIC DIMENSION, A SIGN CONTEMENTOTES ITS CONTEMENTION, WHICH IS A CONTEMENT OF ITS SOCIAL CONTEXT.
18. CONTEMENTOTIC : 1) THE SEMIOTIC DIMENSION CONSISTING OF THE RELATIONS BETWEEN THE SIGN AND ITS BEHAVIORAL AND SOCIAL CONTEXT.
19. CONTEMENTOTICS : 1) THE STUDY OF THE CONTEMENTIC DIMENSION OF SEMIOTICS.
20. DEIOTIC : 1) THE SEMIOTIC DIMENSION CONSISTING OF THE RELATIONS BETWEEN THE SIGN AND ITS OBJECT.

21. DEICTICS : 1) THE STUDY OF THE DEICTIC DIMENSION OF SEMICTICS.
22. DENOTE : 1) THE DEICTIC ACTION OF THE SIGN IN STANDING FOR ITS OBJECT; THE ACTION OF A SIGN IN DETERMINING ITS DEICTIC MEANING COMPONENT. 2) IN THE DEICTIC DIMENSION, A SIGN DENOTES ITS EXTENSION, WHICH IS A SEPT OF ITS OBJECTS.
23. EICEPT : 1) ONTOLOGICAL MARKER FOR EIDONTICS. 2) ONTOLOGICAL CHARACTERIZATION OF EIDENSION. 3) NAME FOR ONTOLOGICAL ENTITIES WHICH FORM EIDENSIONS OF SIGNS; IN THE EIDONTIC DIMENSION, A SIGN IMPOTES ITS EIDENSION, WHICH IS AN EICEPT OF ITS SHAPE.
24. EIDENCEPT : SEE EICEPT.
25. EIDENSEME : 1) A VECTEME WITH A NON-NULL EIDENSION COMPONENT.
26. EIDENSION : 1) THE EIDONTIC COMPONENT OF MEANING. 2) MEANING RELATED TO THE SHAPE OF THE SIGN TYPE; TO LINGUISTIC SHAPE. 3) A COMPONENT OF MEANING IMPORTANT FOR ALL ART, BUT ESPECIALLY VISIBLE IN POETRY; IMPORTANT FOR ESTHETIC ANALYSIS.
27. EIDENSIONISTIC : 1) LABEL CHARACTERIZING MENETIC AND PSYCHOLOGICAL THEORIES WHICH EMPHASIZE EITHER EIDENSION OR THE EIDONTIC LEVEL OF SIGNIFICATION. 2) ADJECTIVAL FORM OF EIDENSION.
28. EIDONTIC : 1) THE SEMIOTIC DIMENSION CONSISTING OF THE RELATIONS BETWEEN THE SIGN AND ITS SHAPE.
29. EIDONTICS : 1) THE STUDY OF THE EIDONTIC DIMENSION OF SEMIOTICS.
30. EMOCEPT : 1) ONTOLOGICAL MARKER FOR EMCTICS. 2) ONTOLOGICAL CHARACTERIZATION OF EMOSION. 3) NAME FOR ONTOLOGICAL ENTITIES WHICH FORM EMCSIONS OF SIGNS; IN THE EMOTIC DIMENSION, A SIGN EMOTES ITS EMOSION, WHICH IS AN EMOCEPT OF ITS EMOTIVE MENTELLECT. 4) GENERIC TERM INCLUDING, AS SPECIES, FEELINGS AND EMOTIONS.
31. EMOSEME : 1) A VECTEME WITH A NON-NULL EMOSION COMPONENT.

32. EMOSION : 1) THE EMOTIC COMPONENT OF MEANING. 2) MEANING RELATED TO THE EMOTIVE MENTELECT OF THE SIGN. 3) A COMPONENT OF MEANING IMPORTANT FOR EXPLICATION OF FEELINGS AND EMOTIONS.
33. EMOSIONISTIC : 1) LABEL CHARACTERIZING MENETIC AND PSYCHOLOGICAL THEORIES WHICH EMPHASIZE EITHER EMOSION OR THE EMOTIC LEVEL OF SIGNIFICATION. 2) ADJECTIVAL FORM OF EMOSION.
34. EMOTE : 1) THE EMOTIC ACTION OF THE SIGN AS EXPRESSED BY ITS SOCIAL CONTEXT RELATIVE TO THE PROPER EMOTIVE MENTELECT; THE ACTION OF A SIGN IN DETERMINING ITS EMOTIC MEANING COMPONENT. 2) IN THE EMOTIC DIMENSION, A SIGN EMOTES ITS EMOSION, WHICH IS AN EMOCEPT OF ITS EMOTIVE MENTELECT.
35. EMCTIC : THE SEMICTIC DIMENSION CONSISTING OF THE RELATIONS BETWEEN THE SIGN AND ITS EMOTIVE MENTELECT.
36. EMCTICS : THE STUDY OF THE EMOTIC DIMENSION OF SEMICTICS.
37. EMCTIVE INTERPRETANT : SEE EMOTIVE MENTELECT.
38. EMCTIVE MENTELECT : 1) THE EXTERNAL EMOTIC COMPONENT OF A DOLEME. 2) A MENTALISTIC ENTITY PERTAINING TO THE SUBJECTIVE REALM OF FEELINGS AND EMOTIONS AND CONSISTING OF THE INTERNAL SIGN IN THE MIND OF AN INTERPRETER WHICH IS EXPRESSED AS A RESULT OF INTERPRETING THE SIGN IN QUESTION.
39. ENVIRONMENT : SEE PHYSICAL CONTEXT.
40. ERGOTIC : 1) THE SEMIOTIC DIMENSION CONSISTING OF THE RELATIONS BETWEEN THE SIGN AND ITS INTERPRETER.
41. ERGOTICS : 1) THE STUDY OF THE ERGOTIC DIMENSION OF SEMIOTICS.
42. EXTENSEME : 1) A VECTEME WITH A NON-NULL EXTENSION COMPONENT.
43. EXTENSION : 1) THE DEICTIC COMPONENT OF MEANING. 2) MEANING RE-

LATED TO THE OBJECT OF THE SIGN, OR THE CLASS OF ENTITIES OF WHICH THE SIGN IS TRULY PREDICATED. 3) A COMPONENT OF MEANING IMPORTANT FOR SCIENTIFIC ANALYSIS, EPISTEMOLOGY, AND EXPLICATION OF TRUTH. 4) MY CONCEPT OF EXTENSION IS RELATED TO, BUT NOT IDENTICAL WITH: CARNAP'S EXTENSION; FREGE'S NOMINATUM; MARTIN'S DESIGNATION; HISPANUS'S SIGNIFICATION; AND MILL'S DENOTATION.

- 44. EXTENSIONISTIC : SEE REFERENTIAL
- 45. EXTERNAL : 1) EXTERNAL TO THE SIGN. 2) RELATED TO THE SIGN, BUT NOT IN AN INTRINSIC WAY. 3) RELATED TO THE EXTERNAL WORLD AS OBSERVABLE ASPECTS OF THE SIGN. 4) RELATED TO THE MEASURABLE PROPERTIES OF SIGNS AND THEIR INFORMATION MEASURES. 5) NOT TO BE CONFUSED WITH THE OPPOSITE OF INTERNAL RELATIONISM IN PHILOSOPHY. 6) DURING PROCESSING OF A SIGN BY AN INTERPRETER, THE EXTERNAL STRUCTURE REMAINS AT ALL TIMES EXTERNAL TO THE MIND OF THE INTERPRETER.
- 46. GROUND : 1) THE PROPERTIES WITH RESPECT TO WHICH A SIGN DENOTES ITS OBJECT. 2) THE COMMON NATURE REPRESENTED BY GENERAL TERMS.
- 47. HYPOTIC : 1) THE SEMIOTIC DIMENSION CONSISTING OF THE RELATIONS BETWEEN THE SIGN AND ITS GROUND.
- 48. HYPOTICS : 1) THE STUDY OF THE HYPOTIC DIMENSION OF SEMIOTICS.
- 49. IMPORT : SEE IMPOTE.
- 50. IMPOTE : 1) THE EIDONTIC ACTION OF THE SIGN IN HAVING A PROPER SHAPE; THE ACTION OF A SIGN IN DETERMINING ITS EIDONTIC MEANING COMPONENT. 2) IN THE EIDONTIC DIMENSION, A SIGN IMPOTES ITS EIDENSION, WHICH IS AN EICEPT OF ITS SHAPE. 3) FROM KAPLAN'S WORD IMPORT IN ANALOGY TO DENOTE.
- 51. INTENSEME : 1) A VECTEME WITH A NON-NULL INTENSION COMPONENT.
- 52. INTENSION : 1) THE HYPOTIC COMPONENT OF MEANING. 2) MEANING RELATED TO THE GROUND OF THE SIGN. 3) A COMPONENT OF MEANING IMPORTANT FOR SCIENTIFIC AND PHILOSOPHIC ANALYSIS. 4) MY CONCEPT OF INTENSION IS RELATED TO, BUT NOT IDENTICAL WITH: CARNAP'S INTENSION; HISPANUS'S SUPPOSITION; AND MILL'S CONNOTATION.

53. INTENSIONISTIC : 1) LABEL CHARACTERIZING MENETIC AND PSYCHOLOGICAL THEORIES WHICH EMPHASIZE EITHER INTENSION OR THE HYPOTIC LEVEL OF SIGNIFICATION. 2) ADJECTIVAL FORM OF INTENSION.
54. INTERNAL : 1) INTERNAL TO THE SIGN. 2) RELATED TO THE SIGN IN AN INTRINSIC WAY. 3) THE INTERNAL SIGN AS THEORETICAL CCNCEPT IS SEPARATED FROM THE EXTERNAL WORLD AS OBSERVATIONAL CONCEPT. 4) RELATED TO THE PROBLEM OF HOW SIGNS BEAR MEANING, WHAT MEAN-ING IS, AND HOW SIGNS CAN BE COMBINED TO FORM MESSAGES. 5) IN-TERNAL STRUCTURE IS ABSTRACTED FROM EXTERNAL STRUCTURE. 6) DUR-ING PROCESSING OF A SIGN BY AN INTERPRETER, THE INTERNAL STRUC-TURE REMAINS AT ALL TIMES INTERNAL TO THE MIND OF THE INTERPRE-TER. 7) NOT TO BE CONFUSED WITH INTERNAL RELATIONISM IN PHILO-SOPHY.
55. INTERPRETER : 1) COGNIZING BCDY WITHIN WHOSE MIND THE SIGN IS PROCESSED.
56. MEDIUM : 1) THE PHYSICAL MATERIAL IN WHICH THE SIGN TOKEN IS EM-BODIED AND VIA WHICH THE TOKEN INTERACTS WITH INTERPRETERS.
57. MENTALISTIC : 1) LABEL CHARACTERIZING MENETIC AND PSYCHOLOGICAL THEORIES WHICH EMPHASIZE EITHER COGNISION OR THE NOETIC LEVEL OF SIGNIFICATION. 2) ADJECTIVAL FORM OF COGNISION. SEE ALSO COGNISICNISTIC.
58. MENTELLECT : SEE COGNITIVE -, EMOTIVE -.
59. NOETIC : 1) THE SEMIOTIC DIMENSION CONSISTING OF THE RELATIONS BETWEEN THE SIGN AND ITS COGNITIVE MENTELLECT.
60. NOETICS : 1) THE STUDY OF THE NOETIC DIMENSION OF SEMICTICS.
61. OBJECT : THE EXTERNAL DEICTIC COMPONENT OF A SIGN. 2) SIGNS RE-PRESENT THEIR OBJECTS TO THEIR INTERPRETERS. PEIRCE SHOWED THAT THIS ASPECT OF OTHERNESS IS FUNDAMENTAL TO THE SEMIOTIC RELATION. 3) ALTHO AN OBJECT OF A SIGN MAY ITSELF BE A SIGN, IT MAY NEVER BE THE SAME SIGN OF WHICH IT IS THE OBJECT COMPO-NENT. 4) THE OBJECT OF A SIGN NEED NOT EXIST PHYSICALLY, VIZ. UNICORN, BEAUTY. 5) THE OBJECT MAY BE CONSIDERED PART OF THE PHYSICAL CONTEXT, OR ENVIFONMENT, OF THE SIGN, OR A CODING OF

THAT RELEVANT PART OF THE ENVIRONMENT FOR THE PURPOSES FOR WHICH THE SIGN IS USED.

- 62. ONCEPT : 1) ONTOLOGICAL MARKER FOR ONTOTICS. 2) ONTOLOGICAL CHARACTERIZATION OF ONTOSION. 3) NAME FOR ONTOLOGICAL ENTITIES WHICH FORM ONTOSIONS OF SIGNS; IN THE ONTOTIC DIMENSION, A SIGN ONTOTES ITS ONTOSION, WHICH IS AN ONCEPT OF THE MEDIUM.
- 63. ONTOSEME : 1) A VECTEME WITH A NON-NUL ONTOSION COMPONENT.
- 64. ONTOSION : 1) THE ONTOTIC COMPONENT OF MEANING. 2) MEANING RELATED TO THE MEDIUM OF THE SIGN TOKEN, OR THE LINGUISTIC MEDIUM. 3) THE MEANING OF SENSORY DISCRIMINATION AND SENSORY RECOGNITION.
- 65. ONTOSIONISTIC : SEE PHATIC.
- 66. ONTOTE : 1) THE ONTOTIC ACTION OF THE SIGN IN BEING EMBODIED IN A MEDIUM; THE ACTION OF A SIGN IN DETERMINING ITS ONTOTIC MEANING COMPONENT. 2) IN THE ONTOTIC DIMENSION, A SIGN ONTOTES ITS ONTOSION, WHICH IS AN ONCEPT OF THE MEDIUM.
- 67. ONTOTIC : 1) THE SEMIOTIC DIMENSION CONSISTING OF THE RELATIONS BETWEEN THE SIGN AND ITS EMBODIMENT, OR MEDIUM.
- 68. ONTOTICS : 1) THE STUDY OF THE ONTOTIC DIMENSION OF SEMIOTICS.
- 69. PHATIC : 1) LABEL CHARACTERIZING MENETIC AND PSYCHOLOGICAL THEORIES WHICH EMPHASIZE EITHER ONTOSION OR THE ONTOTIC LEVEL OF SIGNIFICATION. 2) LABEL CHARACTERIZING COMMUNICATION WHICH HAS THE PRIMARY PURPOSE OF EXERCIZING THE MEDIUM OF COMMUNICATION. 3) ADJECTIVAL FORM OF ONTOSION. SEE ALSO ONTOSIONISTIC.
- 70. PHYSICAL CONTEXT : 1) THE PHYSICAL PART OF THE UNIVERSE, EXISTING IN SPACE-TIME, AND SURROUNDING OR IN PROXIMITY TO EITHER THE OBJECT OF THE SIGN OR THE PLACE WHERE THE USAGE OF THE SIGN OCCURS. 2) A CODING OF THE RELEVANT PART OF (1) FOR THE PURPOSES FOR WHICH THE SIGN IS USED.

71. PRAGMATIC : 1) DIMENSION OF SEMIOSIS PERTAINING TO COGNOTICS, ERGOTICS, AND/OR EMOTICS. 2) PHILOSOPHIC ANALYSIS OF THE INTELLECTUAL MEANING OF THE SIGN WHICH EMPHASIZES PURPORSION, HUMAN ACTION AND RESULTS. 3) OPPOSED TO PRACTICAL AS PRAGMATISCH TO PRACTISCH. 4) PHILOSOPHIC ANALYSIS OF THE INTELLECTUAL MEANING OF THE SIGN WHICH EMPHASIZES THE SEMANTIC LEVELS OF SIGNIFICATION -- THIS WAS LATER CALLED PRAGMATISM TO DISTINGUISH IT FROM SENSE(2). 5) ONE OF MORRIS'S THREE PRIMARY DIMENSIONS OF SEMIOSIS; RELATING TO INTERPRETER, INTERPRETANT, AND INTERPRETATION.
72. PRAGMATICS : 1) THE STUDY OF THE PRAGMATIC DIMENSION OF SEMIOTICS.
73. PURCEPT : 1) ONTOLOGICAL MARKER FOR ERGOTICS. 2) ONTOLOGICAL CHARACTERIZATION OF PURPORSION. 3) NAME FOR ONTOLOGICAL ENTITIES WHICH FORM PURPORSIONS OF SIGNS; IN THE ERGOTIC DIMENSION, A SIGN PURPOTES ITS PURPORSION, WHICH IS A PURCEPT OF ITS INTERPRETER. 4) GENERIC TERM, POSSIBLY INCLUDING AS SPECIES, GOALS OF THE INTERPRETER AND PHYSIOLOGICAL SETS AND ACTIONS.
74. PURPORSEME : 1) A VECTEME WITH A NON-NUL PURPORSION COMPONENT.
75. PURPORSION : 1) THE ERGOTIC COMPONENT OF MEANING. 2) MEANING RELATED TO THE INTERPRETER OF THE SIGN AND THE WAY IN WHICH THE SIGN IS USED. 3) A COMPONENT OF MEANING IMPORTANT FOR SOCIAL, PSYCHIATRIC, AND ESTHETIC ANALYSIS. 4) MY CONCEPT OF PURPORSION IS RELATED TO, BUT NOT IDENTICAL WITH KAPLAN'S PURPORT.
76. PURPORSIONISTIC : SEE BEHAVIORISTIC.
77. PURPORT : SEE PURPOTE.
78. PURPOTE : 1) THE ERGOTIC ACTION OF THE SIGN IN EXPRESSING ITS INTERPRETER; THE ACTION OF A SIGN IN DETERMINING ITS ERGOTIC MEANING COMPONENT. 2) IN THE ERGOTIC DIMENSION, A SIGN PURPOTES ITS PURPORSION, WHICH IS A PURCEPT OF ITS INTERPRETER. 3) FROM KAPLAN'S WORD PURPORT IN ANALOGY TO DENOTE.
79. REFERENTIAL : 1) LABEL CHARACTERIZING MENETIC AND PSYCHOLOGICAL THEORIES WHICH EMPHASIZE EITHER EXTENSION OR THE DEICTIC LEVEL OF SIGNIFICATION. 2) ADJECTIVAL FORM OF EXTENSION.

80. SEMANTIC : 1) DIMENSION OF SEMIOSIS PERTAINING TO DEICTICS, HY-
POTICS, AND/OR NOETICS. 2) PHILOSOPHIC ANALYSIS OF THE INTEL-
LECTUAL MEANING OF THE SIGN WHICH EMPHASIZES COGNITIVE KNOW-
LEDGE, TRUTH, AND REALITY. CALLED PRAGMATICISM BY PEIRCE.
3) ONE OF MORRIS'S THREE PRIMARY DIMENSIONS OF SEMIOSIS; RELAT-
ING TO THE OBJECT, ESSENTIAL PROPERTIES OF THE OBJECT, AND OUR
COGNIZING OF THESE PROPERTIES, OF THE SIGN.
81. SEMANTICS : 1) THE STUDY OF THE SEMANTIC DIMENSION OF SEMIOTICS.
82. SEMIOTIC CONTEXT : 1) THE RELATIONS GOVERNING SIMULTANEOUS OCCUR-
RENCE OF SIGNS IN A SEMIOTIC SYSTEM. 2) THE OTHER SIGNS WHICH
MAY, OR MAY NOT, APPEAR WITH AND/OR SURROUND THE ACTUAL USAGE
OF A SIGN. 3) PART OF THE SEMIOTIC CONTEXT OF 'DOG' IN 'THE
DOG CHASED THE CAT.', IS 'THE --- CHASED THE CAT.'. 4) THE
SEMIOTIC CONTEXT IN A LINGUISTIC SYSTEM IS CALLED A LINGUISTIC
CONTEXT.
83. SEPT : 1) ONTOLOGICAL MARKER FOR DEICTICS. 2) ONTOLOGICAL CHAR-
ACTERIZATION OF EXTENSION. 3) NAME FOR ONTOLOGICAL ENTITIES
WHICH FORM EXTENSIONS OF SIGNS; IN THE DEICTIC DIMENSION, A
SIGN DENOTES ITS EXTENSION, WHICH IS A SEPT OF OBJECTS. 4) A
GENERIC TERM SIMILAR, BUT NOT NECESSARILY IDENTICAL TO, SETS
AND CLASSES.
84. SHAPE : 1) THE MEANS BY WHICH TWO DIFFERENT TYPES MAY BE DISTIN-
GUISHED FROM EACH OTHER WHEN THEY ARE BOTH EMBODIED IN THE SAME
MEDIUM; THEIR DISTINGUISHING CHARACTERISTIC.
85. SOCIAL CONTEXT : 1) THE RELATIONS GOVERNING THE SOCIAL USAGE OF
SIGNS. 2) THE BEHAVIORAL CUSTOMS AND SOCIAL CONVENTIONS IN
WHICH A SIGN IS USED. 3) THE CODING OF THOSE BEHAVIORAL CUS-
TOMS AND SOCIAL CONVENTIONS RELEVANT TO THE USAGE OF A SIGN AND
KNOWLEDGE OF WHICH IS NECESSARY FOR A COMPLETE UNDERSTANDING OF
THE FULL MEANING OF THE SIGN.
86. STRUCTURE : THE RELATIONS BETWEEN A SIGN AND EACH AND EVERY COM-
PONENT OF THE SIGN. SEE EXTERNAL, INTERNAL, PRAGMATIC, SEMAN-
TIC, AND SYNTACTIC.

87. SYNTACTIC : 1) DIMENSION OF SEMIOSIS PERTAINING TO ONTOTICS, EID-
ONTICS, AND/OR TAGMATICS. 2) PHILOSOPHIC ANALYSIS OF THE INTEL-
LECTUAL MEANING OF THE SIGN WHICH EMPHASIZES SYSTEMIC KNOWLEDGE,
AND GENERATION AND TRANSFORMATIONS OF SIGNS. 3) ONE OF MORRIS'S
THREE PRIMARY DIMENSIONS OF SEMIOSIS; RELATING TO THE EXISTENCE
OF THE SIGN, ITS SHAPE, AND ITS RELATIONSHIPS WITH OTHER SIGNS.
88. SYNTACTICS : THE STUDY OF THE SYNTACTIC DIMENSION OF SEMIOTICS.
89. SYSTEMIC : 1) LABEL CHARACTERIZING MENETIC AND PSYCHOLOGICAL
THEORIES WHICH EMPHASIZE EITHER TAGMENSION OR THE TAGMATIC LEV-
EL OF SIGNIFICATION. 2) ADJECTIVAL FORM OF TAGMENSION. SEE
ALSO TAGMISTIC.
90. TAGCEPT : 1) ONTOLOGICAL MARKER FOR TAGMATICS. 2) ONTOLOGICAL
CHARACTERIZATION OF TAGMENSION. 3) NAME FOR ONTOLOGICAL ENTI-
TIES WHICH FORM TAGMENSIONS OF SIGNS; IN THE TAGMATIC DIMENSION,
A SIGN TAGTOTES ITS TAGMENSION, WHICH IS A TAGCEPT OF ITS SEM-
IOTIC CONTEXT.
91. TAGMATIC : 1) THE SEMIOTIC DIMENSION CONSISTING OF THE RELATIONS
BETWEEN THE SIGN AND ITS SEMIOTIC CONTEXT.
92. TAGMATICS : 1) THE STUDY OF THE TAGMATIC DIMENSION OF SEMIOTICS.
93. TAGMENSEME : 1) A VECTEME WITH A NON-NULL TAGMENSION COMPONENT.
94. TAGMENSION : 1) THE TAGMATIC COMPONENT OF MEANING. 2) MEANING
RELATED TO THE SEMIOTIC CONTEXT OF THE SIGN. 3) A COMPONENT OF
MEANING IMPORTANT FOR LOGICAL AND MATHEMATICAL ANALYSIS.
95. TAGMISTIC : SEE SYSTEMIC.
96. TAGTOTE : 1) THE TAGMATIC ACTION OF THE SIGN IN HAVING A PROPER
SEMIOTIC CONTEXT; THE ACTION OF A SIGN IN DETERMINING ITS TAG-
MATIC MEANING COMPONENT. 2) IN THE TAGMATIC DIMENSION, A SIGN
TAGTOTES ITS TAGMENSION, WHICH IS A TAGCEPT OF ITS SEMIOTIC
CONTEXT.

97. UNDERSTAND : 1) WE UNDERSTAND A SIGN WHEN WE KNOW ITS MEANING.
2) HENCE UNDERSTANDING HAS A SIMILAR STRUCTURE TO MEANING AND A
LIKE NUMBER OF COMPONENTS.
98. VECTEME : 1) A SIGN WITH A MINIMAL ELEMENT OF ONE COMPONENT OF
MEANING AND NULL ELEMENTS FOR ALL OTHER COMPONENTS.

APPENDIX B
BIBLIOGRAPHY

A PARTIAL BIBLIOGRAPHY FOR NATURAL LANGUAGE MENETICS

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IULC _ INDIANA UNIVERSITY LINGUISTICS CLUB
 PAS _ PROCEEDINGS OF THE ARISTOTELIAN SOCIETY
 SUP _ SUPPLEMENTARY VOLUME
 TRANS. _ TRANSACTIONS
 U P _ UNIVERSITY PRESS

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APPENDIX C

ADDITIONAL TERMINOLOGY OF THE LANGUAGE OF MENETICS

In Appendix C, I complete the terminology of the Language of Menetics begun in Section III.C and listed in Table 7. While these terms were not specifically needed for the examples of language usage given in Chapters IV and V, they are required for systematic completeness and begin to show the power of the new language for investigations outside of the explicit areas of meaning and/or semiotics.

Section 1 contains terms that are related to semiotic analysis and meaning components. In Section 2 are psychological terms related to meaning, and finally terms for the relations between value, meaning, and definition are defined in Section 3.

1. Logic, Semioticians, and Theories of Meaning

I first define a 'VECTEME' to be a sign with a minimal element of one component of meaning and null elements for all other components. The question of what constitutes minimal and null elements will be taken up at the proper time.

A vecteme with a non-null ontosion component is called an 'ONTOSEME'. I have not discerned any logic which is primarily concerned with the ontotic dimension but Hartley and Gabor's names are often associated with ontotics and their concepts of *information capacity* and *channel capacity* are ontotic measures. A sign whose medium hangs together reliably is called 'REALIZABLE'.

A vecteme with a non-null eidension component is called an 'EIDENSEME'. A sign whose shape hangs together reliably is 'WELL-FORMED'. When the word

'formula' is used in place of 'sign' as in some sections of formal logic, such a sign is called a 'WELL-FORMED-FORMULA', (WFF).

There is no separate or special logic that I have been able to discover that is primarily concerned with the eidontic dimension but a set of formation rules is associated with each logic and these are primarily eidontic in nature. Probably Kolmogorov's and Bloomfield's names are mostly closely tied to eidontic studies thru Kolmogorov's eidontic measure called 'algorithmic information' which is a measure of the complexity of the shape of a sign and Bloomfield's studies in phonemics which has to do with the linguistic shape of words.

A vecteme with a non-null tagmension component is called a 'TAGMENSEME'. A sign and its semiotic context that hangs together reliably is called 'PROVABLE', or 'DERIVEABLE'.

Again there seems to be no special or separate logic primarily concerned with tagmatics, but the transformation rules associated with each logic are primarily tagmatic in nature. The calculuses which are logics abstracted of their interpretations are also tagmatic in nature.

When discussing this dimension Noam Chomsky immediately comes to mind since he has put so much effort into the study of syntax (the tagmatics of NL) and in decoding tagmension -- the meaning coded into the syntax of natural language. No tagmatic measures have been developed in rigorous detail but several, such as Chomsky's measure of 'grammaticalness', have been proposed. Carnap and Bar-Hillel's measure of semantic information appear to actually be a tagmatic measure, as noted by Kemeny [1434]. And Rashevsky's measure of topological information [251] appears to be a tagmatic measure.

A vecteme with a non-null extension component is called an

'EXTENSEME'. When the extension of a sign hangs together reliably it is called 'TRUE'. The reliability component for deictics is called 'TRUTH'. Baldwin's Q-word for the object of the sign is 'WHAT'.

The predicate logic of zero and first orders (and conceivably of all orders) requires the deictic dimension for complete understanding because of the inherent nature of the notions of 'truth' and 'interpretation'. The most powerful methods of predicate logic developed to date -- model theory -- may be categorized as deictic methods.

There is no name more closely associated with deictic concepts than that of Aristotle who explicated the notion of 'truth' and syllogistic logic, altho it must also be remembered that Aristotle failed to distinguish clearly between the sign and its object.

No deictic measures have been developed but conceivably such measures as 'degree of extensional similarity' would be possible and useful.

A vecteme with a non-null intension component is called an 'INTENSEME'. When the intension of a sign hangs together reliably it is called 'ANALYTIC' or 'NECESSARY'. Baldwin's Q-word is 'HOW'. The reliability component for hypotics is called 'A-TRUTH'.

I think that Carnap has shown beyond all reasonable doubt (even if not completely rigorous in places) that modal logic (alethic modality) is a study primarily concerned with the hypotic dimension (altho he used the word 'semantic' in two senses -- as synonymous both with my word 'deictic' and also my word 'hypotic' -- to explicate this).

Mill, Frege, and Carnap are most often identified with work in the field of intension and hypotics altho Peter of Spain (alias Petrus Hispanus, Pope John XXI, Pedro Juliani), John Duns-Scotus, and other

scholastics deserve more recognition by modern semioticians for their work in this area.

Such hypotic measures as 'degree of synonymy' may be possible to develop.

Ogden and Richards originally developed their theory of meaning because of their interest in cogcepts. A vecteme with a non-null cognition component is called a 'COGNISEME'. Measures of intelligence such as IQ are possibly noetic measures when explicated on a sound basis.

Epistemic logic, because it includes the concept of 'knowledge' which is something that occurs in the mind of the cognizing body and involves the cognitive interpretation of signs, must require an essentially noetic analysis. When the cognesion of a sign hangs together reliably it is called 'L-TRUE'. The realiability component for noetics is called 'L-TRUTH'.

I have not looked at moral logic in any great detail, but there is a strong possibility that a proper understanding of it will require an essentially contotic analysis.

No contotic measures have been proposed nor will any be suggested by this study, but 'ought' is a word whose meaning seems to be predominantly contotic. Malinowski's name is best associated with the study of this symbolic dimension to-date. A vecteme with a non-null contension component is called a 'CONTENSEME'.

Morris, Quine, and Kaplan have been quite active in analyzing purporsion. The logic of commands may turn out to require an ergotic analysis. Possible ergotic measures are the response rate for the interpretation of signs as measured in the psychology experiments of Hick [1435] and Hyman [1436], and the difficulty of interpretation as

discussed by Flesch [94]. 'Do' is an example of a word whose meaning is primarily ergotic. Pragmatism* is a philosophy that emphasizes the role of purporsion in menetics. A vecteme with a non-null purporsion component is called a 'PURPORSEME'.

If there is such a thing as a logic of emotions it would probably be principally concerned with the emotic dimension and might for this reason be called 'EMOTIC-LOGIC'. The psychological measurement of anxiety is a possible emotic measure and 'good' is an example of a word whose meaning is primarily emotic. A vecteme with a non-null emosion component is called a 'EMOSEME'. I know of no name that is closely associated with this dimension of analysis, except possibly Aldrich [2].

2. Psychological Terms Related to Meaning

I do not want to make too much of this subject as I know that the terms in it are controversial and may lead to a misunderstanding of my central program. Furthermore I do not believe that these terms will form any necessary part of my theory or even my thinking leading up to that theory. Nevertheless a language of meaning would be less than complete without some mention of psychological terms associated with meaning if only because the association has been made so often by so many different writers. But more importantly I think this begins to show the power of the Language of Menetics as a tool for exploration, explication, and explanation in other areas of human interest. For example, in Chapter VI it was suggested that the structure of the symbolic rheme can be used as a tool for analyzing aphasia and the effects of psychotopes.

For another example there may be some close relations between theories of psychology and theories of meaning that have caused various

* But not pragmatism.

writers to attach psychological labels such as 'referential', 'behavioristic', etc. to theories of meaning. Some of the more popular labels will be listed here under each semiotic dimension or I will suggest one where none now exists.

Other psychological concepts that have received separate labels to distinguish their relations to the various symbolic dimensions of semiosis include: 'mode of understanding', 'form of intelligence', 'type of wisdom', 'form of inquiry', 'stages of action', 'portions of the nervous system', and 'mode of reasoning'. Kaplan has described a close relationships between meaning, knowledge, and understanding: "We UNDERSTAND a sign when we know the meaning of the sign.", [139, p142].

Hence 'understanding' has a similar structure to meaning and a like number of components.

Altho I have run across no separate word for a psychological characterization of ontotic theories of meaning, the word 'PHATIC' is often used to describe any communication of this type and could serve as a psychological description if such were needed. 'ONTOSIONISTIC' could also be used for the same purpose. No separate term that I know of has been proposed to distinguish the understanding of the ontotic component of a sign, or any of the other psychological characteristics associated with the ontosion of the symbol.

Altho 'EIDENSIONISTIC' could serve to characterize theories of eidontic meaning, no special words seem to exist in the literature for either this or other psychological concepts related to meaning. One specific field of study, the analysis and decoding of shapes of signs has been called 'CRYPTANALYSIS' but this refers more to the secrecy associated with such studies than to the subject matter -- shapes. The

study of eidontic theories has been called 'PHONEMICS' and/or 'MORPHOLOGY'.

Tagmatic theories of meaning have been called 'SYSTEMIC' theories by at least one author and 'TAGMISTIC' could probably serve as well. The study of tagmatic theories has been called variously 'SYNTAX' and 'GRAMMAR'; and 'DEDUCTION' refers to a method of tagmatic reasoning. In the tagmatic dimension of logic, syntax is the study of 'CORRECT' deduction. Hadamard described Poincaré's analysis of mathematical understanding in purely tagmatic terms:

To understand the demonstration of a theorem, is... to know not merely whether all the syllogisms of a demonstration are correct, but why they link together in this order rather than another [113, p104].

Deictic theories of meaning have traditionally been called 'REFERENTIAL' or 'EXTENSIONISTIC'.

Leibniz attempted the first explication of 'understanding' and said that we understand a term clearly when we know to what things it applies [1430, p13.918d]. Thus we have a 'CLEAR' understanding of a term when we know its extension.

Deictic intelligence has been called 'INTUITION' and the wisdom it gives rise to is 'KNOWLEDGE' and 'BELIEFS' whose study is called 'EPISTOMOLOGY'. Deictic inquiry takes the form of 'NATURAL-HISTORY'. Morris [206] has referred to this form of inquiry as designative, however, 'DENOTATIVE' is more consistent with the present terminology. 'OBSERVATION' seems to refer to a form of deictic reasoning. Morris has called the stage of action associated with deictic concepts 'PERCEPTUAL', but because of the likelihood of confusion with 'purceptual' we might better call it the 'CEPTUAL' stage. Deictic concepts appear to be most closely

related to the 'SENSORY NERVOUS SYSTEM'.

I have not found any special term characterizing hypotic theories of meaning, so we may refer to them as 'INTENSIONISTIC' theories.

Leibniz said that we understand distinctly when we are able to enumerate how a thing is represented by a term [1430, p13.918d]. Thus we have a 'DISTINCT' understanding of a term when we know its essential properties, or intension.

Hypotic intelligence has been called 'INTELLECT' and the wisdom it gives rise to 'UNDERSTANDING', but this is a narrower use of the term that in my use of 'mode of understanding', or Lee's use of 'understanding' [910]. The study of understanding (in this sense) does not seem to have been given a separate name, but perhaps we could refer to it as 'INTENSIONOLOGY' if the need arises. 'SCIENCE' is concerned with Hypotic inquiry which is perhaps what is best meant by the term 'CONOTATIVE' inquiry. The hypotic stage of action is the 'CONCEPTUAL' stage which appears to be most closely related to the 'CENTRAL NERVOUS SYSTEM'. Peirce's notion of 'INDUCTION' seems to refer to a form of hypotic reasoning. This may explain why induction is the most efficacious mode of reasoning for science.

Noetic theories of meaning have traditionally been termed 'MENTALISTIC', usually with a perjorative connotation. 'COGNITIONISTIC' could serve for the same reference but from a neutral standpoint. Alston used the label 'ideational theory' to refer to any theory of meaning that construes meanings in this way, [5]. Noetic intelligence could be called 'IMAGINATIVE'. Morris suggested that the AUTOMATIC-NERVOUS-SYSTEM was

related to mentalistic meaning, however it is more likely that this system is related to the emotic dimension than the noetic. The noetic form of inquiry is 'PHILOSOPHY', or 'THEORETICAL' inquiry. Peirce's term 'ABDUCTION' describes the noetic mode of reasoning.

Since the contotic dimension has received little separate study to date, no special name for contotic theories of meaning have appeared. 'CONTENSIONISTIC' may therefore serve. The word 'CULTURE' when referring to a kind of wisdom possessed by a person would appear to refer to contotic wisdom whose study is 'EHTICS' and gives rise to 'SOCIOLOGY' as a field of inquiry.

Ergotic theories of meaning have been called 'BEHAVIORISTIC', they could also be called 'PURPORSIONISTIC', while philosophies that emphasize purporsion are called 'PRAGMATISM' supposedly after Charles Peirce, however, he separated himself from this view with his "pragmatism". Notice that according to this terminology, American pragmatism and Vienesese positivism are both forms of pragmatism.

We have an 'ADEQUATE' understanding of a term when we know its purporsion. This term was first used by Leibniz for a different concept of understanding [1430, p13.918d]. 'CREATIVE' intelligence is associated with ergotic wisdom which is called 'EXPERIENCE'. But note that 'OBEDIANCE' is also a form of ergotic wisdom since one cannot obey a command unless he first knows how to. The study of ergotic wisdom is called 'BEHAVIORISM' and this leads to 'TECHNOLOGY' which is the 'PRESCRIPTIVE' form of inquiry. This involves the 'MANIPULATORY' stage of action and the 'SOMATIC' or 'MOTOR' nervous system. The ergotic mode of reasoning has been called 'SYNCRETION'.

Emotic theories of meaning could be called 'EMOSIONISTIC'. Emotic intelligence could be called 'EMOTIONAL'. Morris' suggestion regarding the 'AUTONOMIC-NERVOUS-SYSTEM' seems to apply best to emotion. Emotic response gives rise to FEELINGS whose wisdom is SENSITIVITY and whose study is ESTHETICS. Application of esthetics is called 'CRITICISM' which is the APPRAISIVE form of inquiry. The emotic stage of action is CONSUMATORY.

3. Value, Meaning, and Definition

A few scattered terms associated with value and meaning have appeared in the literature, and most of these have been summarized in [208]. The principle concepts which appear to break into components parallel to the meaning components are *value*, *value dimension*, and *evaluation*. Many terms associated with definition have appeared in the literature, but I have not seen a suggestion that these may be related to the various components of meaning in any systematic manner. The suggestions in this section may be regarded as a first approximation for a genetic analysis of definition.

The term 'PROPER' has been used as the evaluation term for the eidontic dimension and eidontic definition has been called 'ABBREVIATION'. This is used most often in mathematics.

The term 'CORRECT' has been used as the evaluation component for the tagmatic dimension, while tagmatic definition has been called 'CONTEXTUAL' or 'DEFINITION-IN-CONTEXT'. Russell's definition of the meaning of a definite descriptive phrase is an example of a contextual definition. As such it captures only the tagmension of this meaning.

Deictic value has been called 'SIGNIFICANCE' and the deictic value dimension 'DETACHMENT'. The deictic evaluation term is 'VALID'. It is interesting to speculate that the value dimension and the symbolic

dimension are identical, the different terminology simply having developed in different literatures. Deictic definition is usually called 'OSTENSIVE-DEFINITION'.

The term 'CONVINCING' has been used as the evaluation component for the hypotic dimension and ATTRIBUTIVE definition defines the intension of a term.

Contotic definition is called the 'METHOD-OF-RULE-GIVING' in the sense of voluntary human rules as used by Robinson, [257 , pl29f].

'DOMINANCE' has been used as the ergotic value dimension and 'ADEQUATE', 'APPROPRIATE', and 'PERSUASIVE' have been suggested for ergotic evaluation. OPERATIONAL definition defines the purporsion of a term.

'DEPENDENCE' has been suggested as the name of the emotic value dimension, and 'EFFECTIVE' for emotic evaluation. The definition of emosion has been called 'PERSUASIVE' definition. Robinson describes this as "real definition as the adoption and recommendation of ideals.", [257].

4. Summary

The terms in Appendix C have not been as systematically studied as those in Section III.C, but by presenting these preliminary observations on the relations between the terminology of the literature and the systematic and comprehensive terminology of the Language of Menetics, a way is shown for expanding the new language in a direction that should prove most fruitful for future empirical research in these areas.

VITA

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