THE ROLE OF SEMIOTICS
IN GRAPHIC DESIGN EDUCATION

A Thesis
Presented in Partial Fulfillment of the Requirements
for the Degree Master of Arts

by

Hans Cornelis van Dijk, Diploma,
School voor de Grafische vakken, Utrecht, The Netherlands

The Ohio State University
1978

Approved by

[Signature]
Adviser
Department of Industrial Design
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INTRODUCTION

The purpose of this thesis is to describe and evaluate various concepts, models, and methods derived from the general theory of signs (semiotics) and to suggest a way in which they may be applied in the education of graphic designers. It is assumed that the triadic sign relation suggested by Peirce and Morris and recently reaffirmed by Eco, the sign classification according to Peirce and Morris, and the breakdown of semiotics into three levels of abstraction, i.e., syntactics, semantics, and pragmatics could contribute to the theory of graphic design. Such a theory is needed to clarify and validate certain didactical dimensions. To a lesser degree, it is hoped that such a theory will contribute to a professional raison d'être for graphic design.

In this thesis, an attempt will be made to:

1. Describe the specific nature and means of semiotics in relation to the field of graphic design.

2. Delineate the place and relation of identifiable components, including a typology of signs, as they seem relevant to the practice of graphic design.

3. Formulate basic concepts and describe basic methodologies as they can be applied to the education of graphic designers.

The procedure to be followed in developing this thesis will be the critical reading of selected semiotical studies and materials from related areas. Related studies and projects by graphic designers will be reviewed and evaluated in the context of semiotic study.
The applicability of various semiotic concepts and methodologies will be demonstrated and evaluated by means of student projects.
CHAPTER I

SEMIOTICS AND GRAPHIC DESIGN

Practical and Didactic Dimensions

Human communication is negotiated by means of signals and signs. The ability of a sign or a complex of signs to convey information and elicit meaning is a concern to graphic design.* Traditionally, graphic design has been concerned with external (aesthetic) properties of signs as well as the economy of reproduction of such signs. During the last 15 years, however, it has become increasingly clear that graphic design should turn its attention to the informational quality of signs, because a sign is capable of arousing a variety of interpretations. The graphic designer is realizing more and more, to paraphrase Maldonado (1965), that his task is to coordinate structural and functional relations in order to produce objects or situations that communicate clearly and concisely from the point of view of the producer as well as of the user. In order to be responsible for the

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*I will use the term graphic design rather than the term visual communication design, which is perhaps more in vogue today. I find this latter term too inclusive and vague. It covers such a large field and includes, beyond the more traditional concerns of the graphic designer, such things as kinesics, musical codes, systems of objects, and aesthetic facts, that I feel the term to be misleading. So, when I use the term graphic design, it denotes that area of visual communication design which deals with the industrial multiplied graphic sign which we encounter quite regularly in our daily lives, i.e., books, pamphlets, posters, packaging graphics, directional and informational signs, product identification, vehicle lettering, display systems, corporation graphics, television and film graphics, architectural graphics, man-machine communication systems, etc.
economy of communication, the designer needs to have insight into and understanding of the way man assigns a meaning quality to a signal and how man responds to such a sign. The graphic designer needs to be able to ascertain which signals under which conditions can carry a specific message and therefore become signs. Finally, the designer needs to know how someone under certain conditions will consider something to be a sign and consequently will make a behavioral response. Although at some point in the design process, the designer will have to be concerned with the kind of response in terms of human values, it is not the purpose of this paper to be concerned with such ideological questions.

The pursuit of meaning is, of course, not new. But to look at a variety of signs with informational value which have a language potential is a notion postulated about 1900 by the American pragmatist philosopher, Charles S. Peirce and the French linguist, Ferdinand de Saussure. It was not until the 1960's that serious theoretical and descriptive studies were made regarding sign systems other than those of verbal language.

Traditionally, philosophers have focused their attention on the meaning of words or sentences of the spoken and written language. For various reasons, they have avoided investigating the meaning of things other than linguistic systems, which they consider much more precise and definite (Cohen, 1975). But the graphic designer can, by the nature of his professional involvement, leave linguistic meaning to the philosopher and focus his attention on the area of nonverbal,
mainly visual stimuli, and consider appropriate means to produce meaning. As Stankowski points out, it is the responsibility of the designer to make connections between theory and science and his own field of endeavor.

... das spezifisch Visuelle (kann) nicht allein von Theoretikern oder anders gelagerten Disziplinen eingebracht werden ... Wir müssen durch Zusammenarbeit mit Theoretikern, Wissenschaftlern und Fachleuten aus unserem Nachbarberufen ander Stellung von Grundlagen mithelfen.¹

The emerging idea of visual language systems and the design for such systems can be found in recent research, such as the concern for cross-cultural communication (Krampen, 1965); man-machine communication (Maldonado, 1963); trademark classification (Weckerle, 1972); semiotic glossary development (Maldonado, 1963); structural analysis of typefaces (Gerstner, 1972); information design (Stankowski, 1971); development of visual rhetoric (Bonsiepe, 1963), to name a few. It is not to be argued whether these efforts deal with true languages or not. While all languages may use a system of signs, not every sign-system is a language (Bense, 1973, 101, 102). In light of theories of sign development and sign use, called semiotics many of the so-called sign systems are probably based on incomplete theories. To help improve the graphic designer's understanding of the nature of signs and processes of human communication, it seems necessary to

develop and clarify terms and models that explain what a sign, especially a graphic sign, is. It will also be necessary to explore the production and recognition of signs. It will be necessary to develop methods of inquiry to determine when a visual stimulus is a semiotic sign capable of facilitating human communication.

Whereas there seems to be sufficient praxeological need to warrant the study of the theory of semiotics in relation to graphic design, it seems especially important to consider the theory in a didactic context. But before I continue, I must state that it is not my intention to contribute to a general theory of semiotics as such. A general theory is clearly the domain of philosophy and involves, besides questions of ontology and epistemology, issues of ideology—the feud between Idealism and Marxist Materialism, for example (Agrest, A., and Gandelonas, M., 1973, Oppositions 1).*

*The designer will eventually, in solving problems be confronted with ideological questions. Although he can ignore them, as many do, he can also follow Eco's suggestion and use the potential allowed by semiotics to arouse "revolutionary" attitudes and thus may be of help in planning for the receiver of a message to interpret it in his own way rather than in some conditioned manner.

"If the circumstance helps one to single out the subcodes by means of which the messages are disambiguated this means that, rather than change messages or control their production, one can change their content by acting on the circumstances in which the message will be received. This is a 'revolutionary' aspect of a semiotic endeavor. In an era in which mass communication often appears as the manifestation of a domination which makes sure of social control by planning the sending of messages, it remains possible (as in an ideal semiotic 'guerilla warfare') to change the circumstances in the light of which the addressees will choose their own ways of interpretation. In opposition to a strategy of coding, which strives to render messages redundant in order to secure interpretation according to pre-established plans, one can face a tactic of decoding where the message as expression form does not change but the addressee rediscovers his freedom of decoding." (Eco, 1976, p. 150)
Thus, while a general theory of semiotics will provide the consistent framework, this study will focus on sign types and their use in graphic design.

Regarding design education, the development of a precise terminology and modes of sign production will help the pedagogue and the student in sign development and sign evaluation. Fuzzy aesthetic dimensions, especially, which traditionally seemed to invite authoritative and dogmatic evaluations (Worth, 1969), can now be described in more detail. How aesthetic qualities contribute to enhance the informational value of a sign can be examined more precisely. Semiotics will, as I hope to show, aid the instructor in developing precise concepts and design processes, which in turn will aid in structuring learning situations. As will be shown later, concepts and processes such as transformation, coding, etc. have allowed the substantiation of ideas such as "visible language": that systems of visual signs can be semiotic and therefore can be called languages. The theory of semiotics will aid students in controlling the content of objects they create. Systems of sign classification will help students to structure their efforts not only in personal visualizing terms, but also to relate their sign production to other fields such as architecture, music, or those concerned with kinesics, proxemics or medical semiotics. A complete description of the field of semiotics has been proposed by Eco (1976, 9-14).

However, is semiotics is to be used to communicate information across professional boundaries, it will be necessary to develop and
agree on a common terminology* (Morris, 1938; Maldonado, 1963).

Finally, the process of semiotics—semiosis, which "... is the process
by which empirical subjects communicate, communication processes being
made possible by the organization of signification systems" (Eco, 1976,
316)—will allow the student to place his various specialized concerns
within the larger framework of human communication.

The Relation Between Sign Systems and Systems of Communication

Although all semioticians seem to agree that signs and processes
of communication are interdependent, they also contend that signs can
be studied independently from acts of communication while the reverse
is not true for communication. This is one of the main assumptions of
this study.

Semiotic provides a basis for understanding the main forms
of human activity and their interrelationship, since all
these activities and relations are reflected in the signs
which mediate the activities.¹

If one accepts Watzlawick's theory that all human behavior is
communication, it may not be enough to study and interpret significant
aspects of human behavior solely through signs. Such an approach

*Designers especially seem to be offended by a terminology that
tries to precisely describe various aspects of their products. But
these expressions are, as Gallie (1952, 110) points out "... quite
as necessary for any detailed analysis and classification of signs as
are the unfamiliar verbal, alphabetical, and numerical symbols employed
by chemists for the purposes of chemical analysis and classification."

¹Charles Morris, Foundation of the Theory of Signs, (Chicago:
seems to lack a holistic, contextual focus necessary to study human communication in its cultural setting. But as Eco (1976, 8) points out, it is possible to differentiate the relation or distinction between semiotics and communication.

Communication, as previously stated, takes place by means of stimuli called signals, and it is through these signals that a relation is created between the source of the signal and some destination. Most often the destination, especially if it is a human being, is prepared to deal with the signal in terms of some meaning; the destination will interpret the signal in a certain way, determined by some convention or code. Such a situation can be modeled as follows:

\[
\text{NOISE} + \\
\text{SOURCE} \rightarrow \text{TRANSMITTER} \rightarrow \text{SIGNAL} \rightarrow \text{CHANNEL} \rightarrow \text{SIGNAL} \rightarrow \text{RECEIVER} \rightarrow \text{MESSAGE} \rightarrow \text{DESTINATION} + \text{CODE}: \\
\]

Figure 1
The Communication Process

However, there are also communication systems—machine to machine—in which the signal conveys information but is not interpreted; the receiver's response is a predetermined mechanical relationship with the source: it is not capable of the process of semiosis.

Semiosis is the process by which empirical subjects communicate, communication processes being made possible by the organization of signification systems.¹

Thus, it seems that, in determining processes of signification, one does not have to deal with processes of communication, whereas systems of communication make use of systems of signification.

The meaning of signs can be determined by observing the sender-receiver relationship. But this can also be accomplished in the absence of a receiver (Eco, 1976, 8). Information and signification are distinguished from one another by a response by the destination, but this behavior is not absolutely necessary for a definition of semiotics. The process of semiosis exists as long as a sign is capable of arousing a response in "every possible addressee even if no addressee exists or even will exist" (Ibid., 8). This relationship between sender and receiver, even though the latter may be absent, as the focus in the study of signification is also supported from a behavioral point of view. Watzlawick (1967, 22) suggests that it is preferable "to focus less on the sender-sign or receiver-sign relationship and more on the sender-receiver relations, as mediated by communication." Signs, as will be shown later, are selected by the sender on the basis of a desired response in the receiver the correlation of which is governed by a code.

Limitations of the Study

There are basically two types of limits to this study. They are determined by the theory of semiotics and by the activities of the field of graphic design. The first limitation can be identified by studying that which semioticians define as the proper concern of
semiotics. In the following section, a definition of semiotics will be developed, and limitations will be determined by various empirical boundaries which describe to what degree meaning units of graphic design are the proper subjects for inquiry. These boundaries are imprecise and will shift in relation to the growth of the field and specific research to be carried out (Eco, 1976, 6). For example, new means of transportation have eased and increased the frequency of international travel. This necessitated some kind of sign-system transcending language and cultural barriers. The development of such signs was characterized by various stages of modification before a code was finally accepted.

![Traffic Signs]

Figure 2
Traffic Signs

An overview of various attempts by graphic designers to regard their work in a semiotic context will follow the definition of semiotics.
Definition of Semiotics

The idea of signs and their ability to convey information which can have meaning to the receiver is not a new one.

Man moves in society through the use of signs. Not only are words signs, but also gestures, images, non-linguistic sounds, like the chimes of Big Ben. Obviously devices (such as flags) created by man in order to indicate something are signs, but so are, in ordinary language, the thread of smoke that reveals a fire, the footprint in the scud that tells Robinson Crusoe a man has passed along the beach, the clue that permits Sherlock Holmes to find the murderer. As the ancients knew very well, there are artificial and natural signs.¹

Sign usage has always been a strong force in the survival and development of man. But the idea of dealing with signs in terms of generalities, considering signs a branch of logic, or believing that a theory of signs supersedes or leads to logic (Peibleman, 1946, 141) did not emerge until about the turn of the century. At that time, the pragmatist philosopher, Charles Sanders Peirce, and the linguist, Ferdinand de Saussure, independently of one another, postulated their theories dealing with the idea that anything can evoke a certain meaning under certain circumstances (Eco, 1975).

But the theory of semiotics deals not only with "something" having meaning, but especially with the function of something standing for something else. Besides studying the relation between a sign and the object it stands for, the theory of semiotics specifically takes

into account what the sign means to some person and the conditions under which "something" is taken account of. Thus, semiotics is specifically concerned with the sign, which, in Peirce's words, is "something which stands to somebody for something in some respect or capacity" (Feibleman, 1964, 88). Peirce further insisted on a triadic model to explain "sign-action," whose characteristic property is that a sign (S) stands for an object (O) to some interpretant (I) (Gallie, 1952, 115).

The idea of interpretant becomes the cornerstone of Peirce's theory because it holds that, in a communication situation, the meaning potential of a sign can only be ascertained to the degree that someone interprets the sign and "made or was prepared to make some appropriate response to the sign in question" (Gallie, 1952, 119). Thus, the interpretant gives rise to another sign, or rather, the interpretant becomes a further sign that stands in some way in relation to the object just as the original sign stands in some way in relation to this same object.

A sign is anything which determines something else (its interpretant) to refer to an object to which itself refers (the object) in the same way, the interpretant becoming in turn a sign, and so on ad infinitum.¹

This process is called semiosis.

The significance of the possibility of a sign being interpreted

¹Charles Sanders Peirce, quoted in Umberto Eco, Ibid., p. 12.
by a further sign is not to cause one to indulge in constructing an endless series of signs but rather to make one appreciate the fact "... that our competent use of our understanding of any given sign is always a matter of degree" (Gallie, 1952, 127). This variability indicates that every sign is essentially incomplete. Consequently, every sign can be understood in several different ways while, at the same time, the meaning of a sign is open to development. The recognition of this possibility seems significant to those who constantly use signs for specific purposes (graphic designers) or to those who invent new usages for signs or develop new signs (artists). The variation of interpretation of a sign and its appropriateness to different situations is an idea which not only has a strong functional significance but is also a possible powerful methodology for the graphic designer in his role of developing innovative or creative alternative solutions to problems of human communication.

The idea that everything can act as a sign for someone, as well as the importance of the context under which something acts as a sign for something else, was further advanced by Charles Morris (1938). On the first point, he states that "Semiotics ... is not concerned with the study of a particular kind of object, but with ordinary objects in so far (and only in so far) as they participate in semiosis" (Ibid., 4). The contextual stresses that give rise to a specific interpretant are those that resolve "... the question of what characteristics of the object or situation are actually taken account of in virtue of the presence of the sign vehicle alone" (Ibid., 5). So the process of
semiosis involves, besides the object, the sign and someone who interprets the sign under certain conditions.

Besides this triadic relation of signs, Morris distinguished several dyadic abstractions by which the relations of signs might be studied. They are defined as follows:

Syntactics: signs and their formal relations to other signs.

Semantics: signs and their relations to the objects they stand for.

Pragmatics: signs and their relations to users (interpreters).

Following is a diagrammatic representation of these abstractions:

![Diagram of semiotic abstractions]

Figure 3

Semiotic Abstractions and Their Interactions

The relationship between sign and interpretant, which Eco (1975) calls the sign-function and which, he holds, will solve all problems of sign classification, received significant attention and was developed especially by de Saussure. He did not focus on the sign as such, but
on the "rules" or "laws" that connect the interpretant to its sign, which is determined by or determines the social and cultural structure of society. As Barthes (1968, 13) points out, de Saussure extracted from the complexity of social interaction those "... systematized set of conventions necessary to communicate, indifferent to the material of the signals which compose it, and which is a language (langue); as opposed to which speech (parole) covers the purely individual part of language (phonation, application of the rules and contingent combinations of signs)." Although it could be concluded that de Saussure's general science of signs (or semiology as he coined it) is mainly concerned with linguistic phenomena, Barthes (1968, 9) clarifies de Saussure's position by stating that "... whatever their (signs) substance and limits; images, gestures, musical sounds, objects and the complex associations of all these, which form the content of ritual, convention or public entertainment: these constitute, if not languages, at least systems of signification."

Systems of signification are distinguished from processes of communication in that the former requires an interpretive response from a human receiver, while in the latter, the response does not require interpretation (as in machine-to-machine communication). Signification is a process which, by means of a code, couples an object, something acting as a carrier of meaning or sign-vehicle, with an absent something (Eco, 1976, 8). Barthes (1968, 42-48) identifies the same process and calls the sign-vehicle the signifier—a mediator of a material nature—while the absent something or mental representation
of this thing is called the **signified**. The result of this interaction is commonly referred to as the sign. Eco (1976, 48-50) however, prefers to talk about sign-function, thus emphasizing the dynamic and complex relationship of the two functives and the rules or code that correlates them in a certain communicative instance. Barthes (1968, 10) holds that, in the end, sign systems resulting from images and objects cannot exist independently of language. But all semioticians agree that nonlinguistic systems of communication are or can be systems of signification capable of defining, in part or in whole, the culture around us. This makes it necessary to inquire into sign systems independently of verbal language or linguistic models of analysis.

Another important point in de Saussure's approach, besides the separation between langue and parole, is that the langue is an independent system of rules and values, which can be acquired only after a period of learning. This suggests an **arbitrary** relationship between the signifier and the signified. Eco (1976, 15, 16) points out that the idea of arbitrariness limits the study of semiotics mainly to artificially produced sign systems and excludes natural signs. On the surface, this does not seem of consequence to graphic designers since they always seem to deal with artificially and intentionally produced signs. It does not, however, exclude natural signs entirely from the concern of graphic designers. A natural sign can be defined as a physical event coming from a natural source or as human behavior not intentionally emitted by its sender. Consequently, all signs that are not natural signs are artificial as well as intentional signs.
(Eco, 1976, 16, 17). A further distinguishing fact is that artificial signs are mediated signs in that their relation to the objects they stand for are learned by means of other signs. Natural signs are unmediated signs since they do not require other signs in order to relate to their objects. Natural signs, like spoken words or gestures, are limited by space and time, while artificial signs, like graphic markings, are not (Gelb, 1963, 3).

This time/space dependency of a natural sign suggests a causal relationship between the sign and its object. But one cannot automatically conclude that all causal signs are always natural signs, as the example of the weathervane should make clear. Some natural signs seem to take on intentional and mediated qualities, which indicates that the study of semiotics is not exclusively concerned with artificial, mediated signs. Natural signs can become instances of semiotic inquiry when they are considered in a cultural context and when they have certain systematic qualities.

There is a sign every time a human group decides to use and to recognize something as the vehicle of something else. ... In this sense, events coming from a natural source must also be listed as signs: for there is a convention positing a coded correlation between an expression (the perceived event) and a content (its cause or possible effect).¹

Smoke is a sign for an absent fire and it is also a sign-vehicle to the degree that a social group has decided to associate smoke with fire.

As such a natural sign changes from an unmediated and unintentional to a mediated and intentional sign. Thus, graphic design, which seemed concerned only with artificial, mediated signs, is also concerned with natural signs to the degree that they are mediated. Consequently, this study is concerned especially with all mediated signs, regardless of whether they are natural or artificial.

The idea that the sign is a composite of an absent something (the signified) about which one can talk by means of a sign-vehicle (the signifier) has already been identified by Peirce and Morris as well as by de Saussure and Barthes. Eco (1976) follows this trend, but emphasizes especially the rules or code that controls the interaction between signifier and signified. And rather than use the term sign, he talks about sign-function. The sign-function is established by a code, by a social and/or cultural convention, or by a structure connecting aspects from two semiotic dimensions, i.e., the expression plane and the content plane. The content plane represents a set of aspects from an imprecise world of facts and concepts which can be connected with a set of expressive devices—the expression plane—characterized by some form of structural interaction.

The process of semiotics explored thus far is characterized by a triadic relationship of artificial and natural signs which can be either mediated or not. These signs relate to an absent object by means of another sign called the interpretant. Meaning depends on the interaction of two forces, i.e., the signifier (or expression functives) and the signified (or content functives), the correlation of which is
governed by a code. The nature of the code is subordinate to the environment of systematized social and cultural conventions in which it operates. The study of the function and development of signs can be segmented into logically related fields of syntactics, semantics, and pragmatics. In the chapters to follow, each of the mentioned semiotic aspects will be explained in detail. Processes and concepts will be subdivided and expanded where necessary. The significance of these semiotic aspects to the practice of graphic design, as well as the control factor in this inquiry, will be demonstrated.

**Defining the Field of Study**

In describing the field of semiotics, Eco identifies "visual communication" and notes that:

Studies of this kind cover an area extending from systems possessing the highest degree of formalization, . . . through graphic systems, . . . color systems, . . . to the study of iconic signs, . . . we have the study of large iconographic units, . . . visual phenomena in mass communication, from advertisements to comic strips, from paper money systems to playing-cards and fortune-telling cards, . . . rebus, clothing . . . until finally we come to the visual study of architecture, . . . choreographical notation, geographic and topographic maps, . . . and film. . . .

All of the above listings are communication systems which use some form of graphic sign. Although graphic design as such is not mentioned directly, I understand it to be included because the graphic designer

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1 Ibid., pp. 11, 12.
will find himself involved with some or all of these areas throughout his career.

Very few designers have dealt seriously with semiotics in relation to graphic design. As far as can be determined, the first conscious recognition of the general theory of signs and its significance to design was made by Thomas Maldonado at the Hochschule für Gestaltung, Ulm, Germany. During the period 1957-1960, he developed a series of lectures on communication theory and semiotics. In an article in *Ulm* 5 (1959) titled "Communication and Semiotics," he proposes the idea that human communication takes place by means of signs (which is, of course, not very breathtaking), but that the sign, besides being a carrier of information, also gives rise to various statements of signification. The main sources for this approach seem to be operationalism and Peirce's system of logic as well as Charles Morris' triadic model of semiotics. Maldonado furthers his ideas, especially those regarding the communicative dimensions of form and the interconnectedness of culture, function, and meaning, in an article called "Notes on Communication" published in *Uppercase* 5 (1963). He firmly asserts that, to understand communicative behavior, one needs to look beyond the mere informational qualities of perceptive stimuli used in communication and to turn his attention to aspects of meaning as well. He demonstrates, furthermore, that the world of artifacts cannot be separated in terms of operative and communicative behavior. They are interconnected to the degree that "artifacts are operable in the extension--and only in the extension, that they are capable of
communicating a definite meaning unit to the operator; the signs on their part, are communicative in the extension—and only in the extension, that they can directly or indirectly influence a behaviour in an operative way" (Ibid.).

In the same publication, Maldonado proposes a glossary of semiotics for the purpose of striving towards an integrated and interdisciplinary "discourse" regarding semiotic studies. Besides drawing heavily from the terminology of Morris, Maldonado also includes contributions from areas such as linguistics, information theory, grammatology, social psychology, rhetoric, theory of science, mathematical logic, and ergonomics. Furthermore, the publication has two articles of a developmental/descriptive nature that apply various semiotic approaches. One, written by Maldonado and Bonsiepe, is on the development of a sign system for man-machine communication. It is a system for electronic computers which is entirely composed of logogrammatic entities arranged according to a precise semiotic classification system. The other article is by Bonsiepe and is titled "Persuasive Communication: Towards a Visual Rhetoric." In this descriptive article, he tries to develop a framework for a visual rhetoric based on verbal rhetoric, and he suggests that visual rhetoric is definitely interwoven with and actually depends on verbal statements. (This seems to support Barthe's hypothesis; see page 17.)

A next significant article, written by Martin Krampen, is titled "Signs and Symbols in Graphic Communication" (Design Quarterly 62, 1965). In it he suggests that semiotics "... can be useful in the analysis
of existing symbols as well as in the gradual discovery of a vocabulary and syntax in graphic communication." This publication is a popular compilation of examples drawn from visual perception, semantics, and sociology of mass communication. The publication furthers the notion of positivistic operationalism. In this respect, it is important to note that Krampen is a psychologist as well as a designer, and that he also received his design training at the Hochschule für Gestaltung. Among other things, he proposes a system of classification of graphic signs which seems inspired by Morris' definition of sign, while the rest of the article deals with the economy of "pictic" communication and its significance in cross-cultural exchange.

The idea of classification of graphic signs on the basis of the theory of semiotics is continued by Luc Vanmaijderen in a most interesting issue of Print Magazine of November/December 1969. This issue as a whole deals with various representations of man's sign-making and sign-using activities. Vanmaijderen's diagram and demonstration of types of signs seem to be based entirely on Maldonado's glossary, but it is pseudo-semantic as far as processes of coding and the sign-interpretant relation are concerned. The magazine has other interesting articles of a descriptive, pragmatic nature. Among other things, Margaret Mead talks about the anthropological basis for sign development. Krampen relates an eclectic research methodology for the development of international sign systems, which resulted in sixty-three concepts related to international travel. Another article lists the curious results about the little known ideological experiments by Charles K.
Bliss regarding symbolic logic and international communication.

The fascination that designers have with the word semiotics, or perhaps the deep need they have to rationalize their activities, finds expression in two publications by Walter Diethelm. The first one is *Signet, Signal, Symbol* (1972), a collection of logograms ordered according to an arbitrary division of the fields in which they are used. Included in this book is Hans Weckerle’s "Semiotic Classification of Symbols and Signs" which, at further inspection, seems to lack any semiotic foundation, given the loosely labeled sign classes. The second book, *Form and Communication* (1974) (note the similarity between the title and Maldonado’s concept of operational communication), is both visually stimulating and informative. But again, it fails to give any significant analysis of the sign-interpretant relation although this book suggests, in its structure, that it deals with sign and language development.

A slightly more successful attempt to rationalize the connection between visual stimulus and concept or meaning is made by Stankowski in the article "Leichter merkbar machen" (*Design 1*, 1971). Although the article makes no reference to semiotics, it might be considered a valid contribution in that it deals clearly and systematically (visually as well as verbally) with pragmatic values and the selection and developmental means of significant visual stimuli.

A complete and novel attempt to describe and organize signs (in this case type forms) is made by Karl Gerstner in *Kompendium für Alphabeten* (1972). Not only does he succeed in creating a structurally
integrated typology of letter and type forms, he also deals imaginatively with the relationship between sign, interpretant, and context. His suggestion of a morphological matrix for type form selection and generation fits entirely with the idea of semiosis and reminds one of Eco’s semiotic vectors of content and expression plane.

This brief review of surprisingly limited material dealing with the theory of graphic design makes several things clear. Given the role of graphic design in our society and considering the number of institutions which teach graphic design at college level, it seems that work towards a theory of graphic design is lacking. Also, the majority of studies by designers are based on incomplete or naive interpretations of the term semiotics. Attempts at developing a theory by Maldonado et al. are far and few between. The following activities are suggested for dealing with these gaps in the pedagogical and professional practice of graphic design:

1. Development of a theoretical basis for sign development (including a common terminology).

2. Development of a system of sign classification (especially graphic signs).


It is hoped that these aspects of a theory of graphic design, once developed, will contribute to the professional and praxeological existence of the field.
CHAPTER II

THE SIGN

Every message is made of signs; correspondingly, the science of signs termed semiotic deals with those general principles which underlie the structure of all signs whatever and with the character of their utilization within messages, as well as with the specifics of the various sign systems and of the diverse messages using those different kinds of signs.¹

Because graphic design deals with messages, although they are of a specific kind (the nature of which will be determined later), and, as Jacobson says, "every message is made of signs," I will try to deal with this single aspect, the sign, which qualifies all forms of communication.

What is a sign? By asking this question, one might unveil those aspects that are common to all signs as well as those properties that are particular to graphic signs. Mukařovský (1976, 3-9) states that signs are tokens of the collective consciousness which have transcended the images of the individual mind. But, whereas this observation clearly places signs within an evolutionary social/cultural context, it does not answer questions of a material and existential nature. Is a sign a perceptible stimulus? Is it a discrete physical or mental?


*Peirce recognized that signs are used not only in external communication but also, perhaps significantly so, in internal communication. His general theory of signs is based on his thesis that "we have no power of thinking without signs" and that "all thought is in signs" (Gallie, 1952, 109).
unit? Is a sign concrete? Is it a word or sentence? Is it a picture of something, is it a gesture? Or is it something in itself?

In everyday language, the sign is understood to have a physical quality; but in semiotic terms, it is a relational concept which ties a stimulus to an abstract something. Peirce formulated it most clearly when he stated that:

A sign is anything which is related to a Second thing, its Object, in respect to a Quality, in such a way as to bring a Third thing, its Interpretant into relation to the same Object, and that in such a way as to bring a fourth into relation to that Object in the same form, ad infinitum.¹

This triadic relation can be represented as follows:

```
      Object
     /    \
    /      \
Sign-Vehicle Interprentant
```

Figure 4
The Sign Process

It is the entire triadic relation which is called the sign in semiotic terms. In other words, when one uses the term sign, one denotes a process characterized by a stimulus (which I will call the sign-vehicle

according to Morris, [1938]) which is capable of representing an absent
something (the object) in someone's mind in a certain way (the
interpretant). Therefore, a sign is not a specific object or concretion.
It is what it is "in virtue of relations which participate in
constituting it" (Greenlee, 1971, 52). What is of specific concern is
not the concretion of the relation, the sign-vehicle, but the meaning
of the relation, which is determined by the function "standing for."

I should point out now that, although in the following
proceedings I seem to consider any of the three sign qualities in a
dyadic manner, i.e., sign to object, sign to interpretant, and
interpretant to object, I do not violate the triadic nature of semiotics.
When I compare S to O, this is always done in respect to some
interpretant, I. Conversely, S can only be interpreted by some I in
respect to some object, O, to which both S and I relate in a same
manner (Gallie, 1957, 116).

The Object

That which can be perceived, recognized, or thought about, and
likewise can be presented or represented by a sign, or can be pointed
at by a sign is an object. This includes physical objects as well as
mental constructs. Emphasis should be placed on objects which can be
represented so as to exclude perceivable stimuli which are not
significant. These latter stimuli could be called signals in case they
have a limited communicative function as, for example, signals in
machine-to-machine communication, i.e., when they have an intentional
quality. When they are unintentional, they are mere stimuli.

The semiotic dimension of signals is such that the rules or
codes which give meaning to the signals coincide with the signals them-
selves. Thus, the number of possible messages is never larger than the
code and the message cannot extend beyond the code (Jakobson, 1971,
705-708). An example of this is the thermostat system. The signal in
such a system can indicate only one of three definite states, i.e.,
that a room is too warm, too cold, or at the desired temperature. To
this signal, a furnace will give an appropriate response. Within this
closed system, no other interpretation or response is possible.

The world of physical, dynamic objects can be divided into three
categories: abstract, concrete, and collective objects. Abstract
objects are of a qualitative nature, like color or volume, etc.
Concrete objects are physically perceivable situations or experiences.
Collective objects are groups of objects such as human beings or the
student body; aspects of number or organization of single elements are
not considered (Peirce, in Bense, 1973, 70). The world of objects can
be further distinguished in terms of denotative and connotative
qualities. Denotation deals with the referential, objective relation-
ship between sign and object, while connotation is often understood to
represent the subjective, emotive dimension of a sign (Maldonado,
1963, 52).

A word of caution is necessary here about the usage of the term
object. One should not confuse the term, object, which is one of the
triadic elements of the process of semiotics, with the idea of common
object as an element of semiotic significance, i.e., objects as signs. Let me point out again Barthes' position regarding the semantization of everyday objects. This process is inevitable "... as soon as there is a society, every usage is converted into a sign of itself" (Barthes, 1968, 41). In a society, these objects become standardized and, as such, they are significant units conveying a particular meaning (for example, a raincoat protects one from rain).

The nature and quality of the object becomes important when one considers how or to what degree the sign represents the object. According to Peirce, "nothing functions significantly unless it is representative" (Greenlee, 1973, 51). Obvious questions, such as what representation really means or how abstract objects can be represented, etc., will be looked at in the next section when I deal with the nature of the sign in respect to specific applications.

The Sign-Vehicle

As stated earlier, the term sign, when it is used to point at the second aspect of the sign-function, this "something" standing for an absent object, is more complex than the model suggests. The term is ill chosen because it conflicts with the term sign as used to describe the entire relational process of something standing for something else in some capacity in someone's mind. Morris (1939) and others, notably Greenlee (1973), use the term sign-vehicle to identify a concretion of an actual instance of the signification of the sign itself. For instance, this sign-vehicle [image] is only one of a set of sign-vehicles
which possibly could signify the sign situation of /no left turn/. The concrete instance of the sign itself, whether physical or psychical, is the sign-vehicle and should not be confused with sign-situation marked by relational properties. In this respect, it may be better to follow Eco's (1976, 8) suggestion to speak of the sign-process when dealing with the relational aspects of the sign itself and of the sign-vehicle when talking about the article standing for the absent object.

The sign-vehicle considered as a possible choice from among a variety of concrete elements or expression plane implies another dimension, i.e., the content plane which harbors one or more abstractions of possible contents. The sign itself, or sign-process, is realized when two elements, each from one of the different planes, meet on the basis of some code. This interaction is temporary, a "... transitory correlation of elements" (Eco, 1976, 59), the code of which allows for the possibility that the elements from one plane can engage with new or other elements from the other plane, thus forming new signs. The laws, or habits, or codes which provide the conditions under which something becomes a sign are defined by a certain contest resulting from a variety of social forces. What one therefore recognizes to be signs are merely transitory, momentary realizations of a constantly shifting variety of possible interactions of planar elements. In other words,

... codes provide the rules which generate signs as concrete occurrences in communicative intercourse. Therefore the Classical notion of sign dissolves itself into a highly complex network of changing relationships. Semiotics suggests a sort of molecular landscape in which
what we are accustomed to recognize as everyday forms turn out to be the result of transitory chemical aggregations and so-called "things" are only the surface appearances assumed by an underlying network of more elementary units. Or rather, semiotics gives us a sort of photomechanical explanation of semiosis, revealing that where we thought we saw images there were only strategically arranged aggregations of black and white points, alternations of presence and absence, the insignificant basic features of a raster sometimes differentiated in shape, position, and chromatic intensity.\textsuperscript{1}

The separation between sign-vehicle and sign-content helps also to understand de Saussure's process of signification as outlined by Barthes:

The signification can be conceived as a process; it is the act which binds the signifier and the signified, an act whose product is the sign.\textsuperscript{2}

The signified is the mental quality of the sign, the concept of something. It is the mental reality of a thing rather than the thing itself. The

\textsuperscript{*}The idea of raster in relation to a significant image brings up the problem of the meaning of the individual units making up the raster. The aggregation of points of a raster results in a certain image dependent on a particular code. Consequently, one could consider the individual points as the most elementary units or kernels of the expression plane. In theory, each kernel of the expression plane should be connectible with a corresponding essential factor of the content plane. But the reality is, of course, that a dot is a dot and has no meaning in any other way. Variation in shape, position, or chroma does nothing to change the significance of this dot. It is merely a stimulus and singly cannot be connected to any content. Significance cannot be reduced to the elementary, binary, visual statement of . It is not important to discuss the number of such statements necessary to represent something. These are merely questions of perception and technology. Signification depends instead on the code, on the convention which states that a "something" represents something else. (See Figures 5 and 6)

\textsuperscript{1}Umberto Eco, \textit{A Theory of Semiotics}, (Bloomington: Indiana University Press, 1976), pp. 49, 50.

Figure 5

Raster Study
Figure 6

Raster Study
Ibid.
signifier is a mediator and, as such, requires some matter to it. It is of a material nature, i.e., it exists as sounds, objects, or images. Thus, signification requires both signifier and signified. A signifier has no signification if the signified is absent. One cannot communicate about the signified without signifiers. Systems of signification require signs made up from the dynamic interaction of signifiers and signifieds.

The Interpretant

Signification depends on representation. But it is not enough to say that something absent is represented by something present. What is required, as stated in Peirce's definition of semiosis, is interpretation. This does not necessarily mean that something has signification only when being interpreted. Something having meaning does not lose this quality just because someone is not dealing with it as such. This is why one speaks of interpretant rather than of the interpreter. The interpretant is a sign interpretative of another sign. It is more important—semiotically—to deal with signs which are capable of being interpreted by means of other signs. The actual interpretation of the sign or no interpretation at all does not change the fact that it is capable of signification.

Why is the interpretant such an important dimension? If one considers the sign-function or sign-relation to be defined by an initiating sign and a terminal sign, then one might determine "what possible signs can serve as the interpretant of a given sign" (Greenlee, 1973, 101). The following model of the sign-relation expresses this
openendedness in the dotted line connecting sign-vehicle and interpretant.

\[ O \]

\[ S \quad I \]

(Initiating Sign) \quad (Terminal Sign)

Figure 7
Sign-Interpretant Relation

The openendedness as to what the precise interpretant of a sign is, or the range of interpretants of a sign-function, is significant to those who continuously, by virtue of their profession, search for ways to creatively and effectively convey information to others. This calls to mind a matrix-like structure (like Gerstner's morphological box, 1972) or a multidimensional lattice stretching infinitely between the initiating sign and the terminal sign. The totality of this structure defines the true meaning of the sign. But one should not expect ever to be able to define this ideal picture since, by definition, the process of semiotics is of an ongoing, developmental nature by which changes in the context and the code will modify the interpretant and perhaps even the nature of the object.

Eco has stated that:

\[ \ldots \text{the object is grasped through a series of interpretants, and in this sense it is very imprudent to assume that the Interpretant can be recognized as appertaining to the same Object, since it is the Object which is defined by the Interpretant and not vice versa.}^{1} \]

\[ ^{1}\text{Umberto Eco, A Theory of Semiotics, (Bloomington: Indiana University Press, 1976), p. 61.} \]
At least one might expect the transformation of an interpretant to result in the transformation of the object to some degree. When one considers Eco's idea of the theory of the lie ([1976, 7], the notion that one can forever discuss an absent object, whether true or false, existent or non-existent, without ever having to verify the true physical nature of the object), it becomes clear that every stage in a discourse will redefine the nature of the object, while the true state of this object will be forever unattainable.

This leaves the question: What determines a particular interpretant? It is clear from Greenlee (1973, 99-100) that not everything can act as an interpretant. Notions of inference and causation are not general enough to explain all sign-interpretant relationships. Saying that the sign-interpretant relation is a cognitive one forces one to explain what cognition means by which semiotics becomes psychologistic. The most general statement that can be made—although it is far from being all-explanatory and satisfactory—which includes some logical determination as well as introspective and intuitive mediation, is that the sign-conventions one uses are formed by habits.
CHAPTER III

THE SEMIOTIC MODEL

Charles Morris, in his attempt to objectify the study of human language systems (the study of semiotics is not limited to human language as exemplified by Zoo-Semiotics), specified three levels of abstraction at which language can be studied. Although these categories are separated here for efficiency and clarity, they are not in real life. There, one uses language without a conscious regard for its structure, meaning, or application. Everyday language is an object for daily use and, as such, is properly called "object language." However, if, for reasons of scientific inquiry, one develops a set of symbols capable of describing rules of combination and transformation by means of which one can talk about an object language, one has a metalanguage. Morris' metalanguage, as stated before, specifies three categories, each of which describes a particular dyadic relation which can be selected from the triadic model of semiotics. In order they are syntactics, semantics, and pragmatics, and are defined as follows:

Syntactics: signs in relation to other signs.

Semantics: "... the relations of signs to the objects to which the signs are applicable."

Pragmatics: "... the relation of signs to interpreters."¹

The diagrammatic representation of the relationship of these categories can be found on page 15.

Since each category is established for separate analysis and can be described in terms of specific relationships or rules, I will now consider each area in more detail. Although the model of semiotic interactions is directionless and the categories overlap in daily use of a particular language, I choose to start with syntactics since, from a didactic point of view, this order could form the basis for instruction and application.

**Syntactics**

As Cherry (1966, 233, 224) points out, syntactics is the furthest abstraction and concerns the signs themselves as well as the manner in which they relate to one another. It deals with a formal, structural meaning—the degree to which the ordering of the parts results in a particular form. This ordering can be stated in terms of rules which are determined by observations (descriptive syntax), especially when human, active language is concerned. It is also possible to develop languages in which the rules of combination and transformation are entirely based on formal logic. Such artificial languages (like a calculus) were thought possible by Carnap (in Cherry, 1966, 225). The syntactical dimensions would fully cover the semantic ones so that the meaning would be included in the structure.

Maser (1973, 55-60) pointed out that syntax deals especially with the classification of signs on the basis of structural aspects,
i.e., on the basis of formal properties which are capable of forming systems which in turn can be used to structure other signs. Each such system is a syntax capable of determining the repertory of classification. The problem of syntax is therefore not merely a process of classification, but especially a problem of describing the classification process. In such a process, a subgroup is separated from a class of things by means of a particular aspect or aspects common to other members of the group. The members of the subgroup have qualities in common which other members of the larger group do not have.

In syntactical classification, the elements which are used to group the signs are features of those signs; only those signs are grouped which possess those features. Depending on the use of the features, two kinds of classification systems can be derived: inclusive and alternative. In inclusive grouping, the feature identifies a single subgroup separate from the total class; for example, in the total class of logos, I'm especially interested in those logos using arrows. In alternative grouping, the feature identifies two subgroups; for example, in a layout, one can discern aspects of structure and format by using the typographic grid as a feature. As another example, the Gestalt principle of figure-ground would sort a stimulus into the subgroups of figure and of ground.

Maser (Ibid., 55-93) identifies a variety of means of a mathematical nature which can be used in classification. Among others they are: ven diagrams; symbolic logic; Boolean algebra; relational
logic; combinatorial analysis; probability theory; topology and geometry; etc.

Besides classification, syntax is also concerned with generative rules that combine the sorted and related elements into logical systems. Morris (1938, 14) calls them rules of formation and transformation. Formation rules determine the permissible independent combinations of members of the set of selected elements. Transformation rules describe operations which determine the changing of one structure or combination of elements into another. An excellent visual example that shows the application of the rules of formation and transformation is the repetitive wallpaper pattern. An element or various elements are combined into a unit called identity. This identity is repeated on the basis of a two-dimensional network. From this basic pattern, variations can be derived by means of mathematical/symmetrical operations. A language of forms results. Typical applications of such principles can be found in the transformational drawings of M.C. Escher (fig. 8) and in the parque deformations of William S. Huff (fig. 9).

**Semantics**

The next abstraction of semiotics is semantics, which is concerned with the relation between the sign and that which the sign stands for. With regard to problems of the graphic sign, semantics is concerned with describing properties on the basis of which one can say that something represents something else and one can note the
Figure 8

Metamorphosis by M.C. Escher
Figure 9

Parque Deformations
degree of this representation. Such a description inevitably leads to
the classification of signs (Maser, 1973, 100).

Morris (1938, 21-26) discusses pure semantics versus descriptive
semantics. Pure semantics deals with the terms and theory necessary to
talk about the semantical elements. Descriptive semantics deals with
actual instances of a sign representing an object or situation. To the
designer, descriptive semantics is important. It provides him with
insight into the conditions under which the sign is said to represent a
certain object. The description of such conditions can be taken as the
rules which determine the semantical properties of a certain sign or
whether something qualifies as a sign at all.

Relevant explorations about the conditions of representation in
respect to the graphic sign can be found in the works of the Prague
School, Mukařovský (1976, 229-244), distinguishes the graphic art sign
from the graphic non-art sign on the basis of intentionality. In the
first place, the graphic sign (whether an art or non-art sign) is
distinguished from the natural sign on the basis of intentional versus
accidental organization. The intentional art sign is separated from the
intentional non-art sign because of a certain functionality of the
latter. It is a certain kind of intentional organization that separates
them. In the functional sign, this organization is related to some
external quality of the object that the sign stands for, i.e., it is
motivated by a particular purpose. In the artistic sign, intentionality
is derived from the sign itself; it is nonserving and motivated by the
relation it establishes with a reality beyond itself.
The artistic sign in contrast to the communicative sign is non-serving, that is it is not an instrument. The understanding that the artistic sign establishes among people does not pertain to things, even when they are represented in the work, but to a certain attitude towards things, a certain attitude on the part of man toward the entire reality which is directly represented in the given case. The work does not, however, communicate this attitude . . . but evokes it directly in the perceiver.¹

Gombrich, in "Meditations on a Hobby Horse or the Roots of Artistic Form (1963, 1-11), develops an argument regarding the conditions that determine the semantic qualities of a sign. He focuses on the idea of substitution, which is the degree to which an object can represent something else. In his article, an ordinary broomstick represented a horse.

To represent [as Gombrich quotes from the Pocket Oxford Dictionary] can be used in the sense of "call up by description or portrayal or imagination, figure, place likeness of before mind or sense, serve or be meant as likeness of . . . stand for, be specimen of, fill place of, be substitute for." A portrayal of a horse? Surely not. A substitute for a horse? Yes. That it is. Perhaps there is more in this formula than meets the eye.²

In his argument, Gombrich lists several qualities a sign must possess to be called a sign. Among these are: the substituting object must be capable of a minimum performance of function in respect to those of the original object; it (the potential sign) must also be capable of


imitation of certain relevant aspects (perceptual features); the meaning that can be attached to an object does not depend so much on abstraction as on projection. The latter explains why in one case—as in Gombrich's metaphor—the broomstick can serve as a horse, while in another case, this same stick can substitute for a sword. (This property relates to Peirce's contention that objects are capable of becoming signs, and that the interpretant is not fixed.)

Furthermore, the sign needs to conform to a certain conceptual mode to be accepted as a sign. In other words, the sign requires a certain visual correspondence with the original object. Specifically, this visual image needs to have a certain minimum number of visual features to be able to call up the required response in a receiver.

The greater the wish to ride, the fewer may be the features that will do for a horse. But at a certain stage, it must have eyes—for how else could it see? At the most primitive level, then, the conceptual image might be identified with what we have called the minimum image—that minimum, that is, which will make it fit into a psychological lock.1

Such a conceptual image can only be triggered if the sign has such motivating properties and is surrounded by or perceived in supportive contextual qualities that stimulate the perceiver to complete the process of semiosis.

Goodman, in "Languages of Art," (1969) attempts to deal with representation and significance in respect to a theory of aesthetics. The study of the nature of representation is important in respect to

1 Ibid., p. 8.
general aesthetics and a theory of the sign capable of explaining how something can act as a sign in various arts (visual, auditory, verbal) as well as in non-arts. Goodman rejects simple explanations like resemblance or imitation as the reasons why an object can represent the essence or a certain aspect of something else. For example, resemblance can be a condition for representation, but the reverse is not true. 
"... while a painting may represent the Duke of Wellington, the Duke doesn't represent the painting" (Ibid., 4). Representation depending solely on resemblance seems too simplistic an explanation, since in no way does it specify how a sign is to represent its object and to what degree. Imitation seems an even more naive way of explaining representation, because one cannot hope to be able to copy all aspects all at once. Even if one chooses to imitate only a few features, which ones would suffice? Goodman seems to adhere to Peirce's dictum that almost anything is capable of standing for something else. The essence of representation is denotation. Goodman specifically points out that all signs are potentially arbitrary marks, labels capable of representing because they belong to systems of varying reference. Such labels are organized or classified into systems on the basis of specific and general properties. The meaning of a sign can be ascertained only in respect to a relative system to which it has been assigned. Consequently, the meaning of a sign can change depending on the class to which the sign is changed.

As was pointed out earlier, describing the processes and kinds of representation leads to classification. A system that has received
the most attention in the literature (Maser, 1973, p. 100; Jakobson, 1971, pp. 335, 347; Greenlee, 1973; Bense, 1973) and which also seems to be efficient and comprehensive is that of Peirce. (Criticism, notably Eco's, regarding Peirce's sign classification will not be ignored and will be discussed later.)

The first member of this classification system, the **icon**, is determined on the basis of certain characteristics it has in common with the object it represents.

The sign for a quality or property characterizing an object such that it pictures, imitates this object, having in common certain features (at least one feature) with this object. Icons are for example pictures, samples, structures, models, schemata, predicates, metaphores, comparisons, equations, figures (logical, poetical, etc.) ... Since the Icon also represents a certain property of an object or type of object, its existence does not depend on a particular object, but it remains an Icon even when there exists no object with this property (ex. the sculpture of a Centaur).\(^1\)

The second member of Peirce's system is the **index** which has a dynamic or causal relation to its object.

A sign which has a direct, causal, real relation to its object; it has a direct reference to its object, it points at it. For example, a directional roadsing, an arrow, a symptom, an ordinal number, a proper name, an adjective, etc. Since the Index has a real relation to its object, this object is a definite, singular, time and space dependent object or experience.\(^2\)

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\(^2\)Ibid., p. 40.
The third and final member of this organization is the symbol whose relation to its object is of an arbitrary, conventional nature.

A sign which does not depend on a likeness or correspondence with its object nor does it depend on a real connection with its object. It depends on the interpreter, who freely chooses a vehicle as representation of an object, which then is applied in a conventional (habitual) manner in the communication process. The Symbol, which does not picture its object nor point at it directly, represents a type of object, not an individual object.\footnote{Ibid., p. 108.}

The function of this system of classification in respect to the graphic sign and the consequent subdivisions which can be derived from it will be discussed in a later chapter.

\textbf{Pragmatics}

According to Morris, pragmatics designates ". . . the science of the relation of signs to their interpreters" (Morris, 1938, 30). The term pragmatics is derived from the term pragmatism, but the former is qualified because ". . . it deals with the biotic aspects of semiosis, that is, with all the psychological, biological, and sociological phenomena which occur in the functioning of signs" (Ibid., 30). Pragmatics is a way of dealing with syntactics and semantics. In other words, it is a way of dealing with the relation between the signs and the meaning of the signs in respect to an absent something as far as is concerned ". . . real life, everyday, man-to-man communication--the
chatter and gossip, the courtesies and remarks which make up the bulk of effective human utterances. . ." (Cherry, 1966, 226).

At the level of everyday deciphering of messages, meaning is not determined by carefully matching the sign and an absent object, nor is truth ascertained by selecting an absolute interpretant from an infinite array of possible interpretants on the basis of a certain stimulus. Rather, the habits of the user and his functioning within a specific environment or context determine how a sign is decoded and responded to. ("Decoded" could be replaced by "encoded" because pragmatics does not concern itself only with the reception of messages; it is as much concerned with the sending of messages.) The make-up of the individual sign maker or user determines the exact interpretation of a sign. But when one is concerned with everyday language as an object-language, and when one wants to describe such object-language by means of a metalanguage, then the problem of pragmatics becomes one of stating pragmatic rules. Pragmatic rules are those, according to Morris, which are capable of describing "... the habit of the interpreter to use the sign-vehicle under certain circumstances and, conversely, to expect such and such to be the case when the sign is used" (Morris, 1938, 32). Pragmatic rules are rules which define the sign user's habits of sign combination and transformation (at the semantic as well as at the syntactic level) in accomplishing certain objectives. And so pragmatics includes the disciplines of ethics, aesthetics, politics, sociology, psychology, etc. (Maser, 1973, 126, 127). Again, as Maser (1973, 126-129) points out, pragmatics, like semantics and syntactics, is a
problem of classification. This time, the problem deals with the
response to signs on the basis of truth and value.

But another problem arises, especially when one looks at signs
in the larger context of human communication. Not only does one have to
deal with conditioned sign consumption, but also with selective behavior
regarding the identification of a range of possible truths. Classification
is concerned with determining truth on the basis of generally
accepted standards of behavior. Signs are seen as vehicles in the
stimulation of specific responses; signs are selected in the manipulation
of behavior. The sign is seen in a fixed relation to its object, the
interpretant of which is determined by standard responses and values.

On the other hand, when one considers the sign in relation to
an infinite array of possible responses, then pragmatics, within the
larger context of human communication, becomes a task of identifying
these possibilities. Truth is decided on the basis of intentions which
are revealed in the process of sign usage. No particular interpretant
is given priority over another one. The concept of intention seems to
be recognized by Eco (1976, 110-113) when he speaks of a "theory of
settings" in respect to sign usage, contexts, and circumstances. He
postulates the idea of a "theory of contextual and circumstantial
selection" or a "theory of settings" (Ibid., 110). Such a theory would
make the circumstances within which a sign is perceived part of the
semiotic system. Consequently, the relation between a sign and its
object can be viewed selectively, and while the "theory does not have
to list and to structure all the possible occurrences of a given
it has at least to list "... those which are culturally and conventionally recognized as the more statistically probable" (Ibid., 110). The aesthetic possibilities resulting from potential overlapping and intertwining of multiple paths of decoding a sign are obvious. It is perhaps a foregone conclusion to say that pragmatics as intention, as strategy is the tool of the poet, while pragmatics as stimulation, as consumption belongs to the manipulative mind of Madison Avenue advertisers.

Watzlawick (1967, 48-71) as well is concerned with pragmatics as determined by processes of human communication and behavior and the context affecting this behavior. He proposes a framework for analyzing communication or sign behavior which might be useful in developing Eco's theory of settings. Watzlawick is not concerned so much with the definition of truth or value in regard to a certain interpretation of the sign, but rather with describing properties of human behavior so universal that they can be stated as axioms. These axioms determine the choice one will make from among a number of equal settings in order to determine the meaning of a sign. In effect, such axioms allow for the synthesis of sign intention and sign stimulation. The range of possible choices of interpretation is defined by the type of selected behavior. And, as Watzlawick contends, all behavior is subordinated to this "calculus" of human communication.

**Axiom 1:** One cannot not communicate since all communication is behavior and one cannot not behave.

**Axiom 2:** Any message is characterized by a content aspect and a command aspect. The command aspect determines the relationship between communicants; it is information about information and, as such, can be considered as metalanguage.
Axiom 3: The communication process is of a sequential nature, the organization of which—the perceived point of departure or ending of a message sequence, the punctuation—is determined by the participants in the communication process.

Axiom 4: The signs humans use are simultaneously of a digital and analogical nature, although of varying degrees. Analogical refers to a certain likeness between the sign and its object (iconic or indexical). Digital refers to an arbitrary symbolic relationship between sign and object. (Jakobson calls these modes of representation similarity and contiguity, respectively.) Both modes are interdependent in human communication and determine the kind of relationship between two communicants, since digital language is important in describing relationships while analogical language is instrumental in expressing the relationship.

Axiom 5: Communication partners considered as equals can mirror each other's behavior; thus, their interaction can be called symmetrical. At other times, the partners, perceived in their differences, complement each other's behavior; this interaction can be called complementary.

Watzlawick's model, it seems, allows for an orderly and logical approach to Eco's theory of settings. His model suggests eliminating absolute-ness of values in respect to the meaning of signs. Thus, it exposes the dynamics of functional interaction between the communicants. A wealth of possible sign contents and (by the nature of axiom 1) consequentive behavior arises.

**Denotation and Connotation**

Implied in the above deliberations on the meaning and usage of a sign is a dual quality concerning the specificity or kind of meaning. It deserves to be discussed separately from semantics and pragmatics. When trying to determine the exact relationship between a sign and its object,
is one using objective or subjective criteria? In communicating to someone, we have probably all had the experience of receiving a response which we ourselves would not have given had we to respond to our own statement. So, we say something else in response to the return made by our communication partner, and so on and so forth. Thus, we are defining, narrowing down the possible relationships between the signs we use and the objects we are communicating about. In that way, we can be quite convinced, eventually, that we both are talking about the same thing and within the same or similar interpretation of that thing.

As was pointed out earlier by Goodman (see page 47), this objective quality of the sign (i.e., its meaning in terms of a specific class of aspects or specific object regardless of someone's private, personal response) is called the denotative quality of the sign. The subjective dimension of the sign, i.e., the meaning a sign has in respect to a specific user and his psychological, sociological, ethical, etc. context, is called the connotative quality of a sign. It has been found, especially from Maser (see pages 44, 50), that semantic classification is very much an objective process while pragmatic classification is of a subjective nature. One might therefore conclude that denotation is an aspect of semantic classification and that connotation is an aspect of pragmatic classification.

In the communication process, aspects of denotation and connotation interact; this interaction Guiraud (1971, 28, 29) calls the polysémic nature of the sign. There is a potential for ambiguity of meaning which the user resolves on the basis on a certain code. This
code is the result of the interaction of contextual factors and the structure of the content. For example, there is potential ambiguity when a 'stop' sign and a 'do not stop' sign are placed below one another on a street corner. This ambiguity is resolved by the sign user on the basis of the context of the situation, i.e., traffic regulations and the structure of the sign language, which allows for the separation of both signs on the basis of formal properties. There is a homology between the syntactical and semantical properties which resolves an apparent paradox. Or more specifically, in order to establish the meaning of a sign, one has to take into account not only the sign-object relationship but also the sign-interpreatant relationship. Either one taken separately results in misunderstanding or, at best, in an incomplete response.

The degree of connotation or denotation varies from language system to language system. Scientific language is definitely more denotative than connotative, while the reverse is true for poetry. The selection of connotative or denotative sign properties depends on pragmatic considerations, i.e., does one want to stimulate specific responses or does one want to provide strategies for alternative responses. As stated, the interplay between both modes is determined by a code or even by differing codes. But the suggestion that a selection between the two modes is made on the basis of subjective-objective polarity is disputed by Eco (1976, 54-57). Denotation and connotation, he says, are hierarchically related and are the domain of meaning. The actual selection someone makes from this hierarchy of meanings is the concern of pragmatics. He recognizes that the connotative meaning
of a sign is less stable than the denotative one. But the connotative meaning resulted from a different coding system which has to be seen in a hierarchical relation to denotative codes. Connotative codes are, in effect, subcodes. There is even the potential for multiple subcodes. A particular aspect of this interpretation is that for every connotative meaning there does not have to exist a denotative meaning, while for every denotative meaning there has to exist a connotative meaning. An interpreter can respond to a connotative meaning without knowing about the denotative one. For example, he will evacuate a building on hearing an alarm signal without knowing whether it signifies 'fire' or 'fire drill'. The consequence of this approach is that it allows for the semantical analysis of connotative dimensions regardless of the vague and hard-to-determine motivations and extraneous influences which are a part of pragmatics.
CHAPTER IV
A SIGN TYPOLOGY

What are the features used in the process of signification? Why should one be concerned with developing hierarchical or categorical systems for the grouping of particular sign-object relationships? Various visual communication designers, as pointed out in Chapter I, have developed classification systems. However, their reasons are often limited and their criteria incomplete and subjective, so that the results fail to offer much insight into the nature and mechanics of the correlation between sign and object.

van Malderen (1969) suggests that classification is necessary to create a dictionary of universally acceptable signs of which the sign-interpretant and sign-object relationship is fixed. This seems reasonable in respect to international transportation. But regarding the larger issues like language development and design for the ever-changing aspects of a fast moving industrial society—the need for creative responses demanded by a society in which docile consumption is rapidly being replaced by active communication—this rationale no longer suffices.

Weckerle (1972) suggests that classification is needed for storage and retrieval of signs so they can be easily tested for "efficacy and patentability." But since this model deals only with logotypes and trademarks, its significance will be appreciated only by patent lawyers and publishers of trademark dictionaries.
Diethelm in *Form and Communication* (1974) tries to present a cybernetics approach to visual communication design by showing examples of work developed on the basis of some logical, systematical form systems. His intent is, as he says, "the ways to signs" (p. 9). His ontology lacks a set of evaluative criteria capable of describing sign-object or sign-interpretant relations. Except by coincidence, most of his cases deal only with sign-to-sign categorization.

What, then, are serious questions regarding the nature of signs, and what purpose does the classification of observations about the sign-object relation have? Besides the main and absorbing question regarding the nature of the sign-object relation (i.e., is it representation, inference, habit, imitation, etc. as already alluded to in Chapter III), there are other questions which not only have consequence for the field of scientific inquiry into the nature of semiotics, but which also identify problems of consequence for visual communication designers. A serious problem of semiotics, according to Eco (1976, 172, 174) is the equivalence of language systems, especially the equivalence between verbal and nonverbal signs. This equivalence results in questions of theoretical consequence like: Do nonverbal systems really exist? Do they have a content and is this content similar to that of verbal signs? If there is an equivalence between different systems, does this similarity exist at the structural, perceptual, and behavioral level, etc.? The consequences of the answers to these and other questions will be felt by visual communication designers in their efforts to identify or produce signs in one language system having a similar or equivalent
relation to content or object of signs in a different language system; in the formation and transformation or translation processes they use; and in their attempts to define the functioning of a sign under varying conditions and in varying environments, etc.

Eco (1976, 174) points out that, in order to answer such questions, it is necessary to demonstrate that:

1. different types of sign systems really exist;

2. these sign systems do not depend on verbal language in establishing their relation to that which they represent; and

3. a single categorical structure can be used to describe and show relations between these various signs.

It should be clear that the solution to the first two problems depends on the solution to the third one. Such a structure should be capable of identifying and describing the features which connect the signs to their objects.

Jakobson (1971, 697-708) lists four aspects which form the basis for a classification system. They deal with:

1. the relationship between sign and object;

2. structural factors;

3. means of production; and

4. the intentionality/unintentionality of a sign.

In respect to the first, Jakobson discerns three types of relationships, i.e., contiguity, similarity, and convention. Factual, existential contiguity determines an indexical sign (note that Jakobson uses Peirce's triadic classification of sign-object relationship). "A mere community in some quality," a relative likeness sensed by an interpreter, a
factual similarity determines an iconic relation. Imputed contiguity, some learned, conventional connections between sign and object determine the symbolic sign. Jakobson recognizes the basis for Eco's criticism (which will be discussed later) regarding the apparent mutual exclusiveness of the sign categories as presented by Peirce. Jakobson states that any of these individual characteristics is presented to some degree in each type of sign.

There is no question of three categorically separate types of signs but only of a different hierarchy assigned to the interacting types of relation between the signans and signatum of the given signs, and in fact, we observe such transitional varieties as symbolic icons, iconic symbols, etc.\(^1\)

The structural factors Jakobson distinguishes are time and space.

Within the systems of auditory signs never space but only time acts as a structural factor, namely, time in its two axes, sequence and simultaneity; the structuration of visual signantia necessarily involves space and can be either abstracted from time, as in immobile painting and sculpture, or superinduce the time factor, as in the motion picture. The prevalence of icons among purely spatial, visual signs and the predominance of symbols among purely temporal, auditory signs permits us to interconnect several criteria relevant in the classification of sign pattern and further their semiotic analysis and psychological interpretation.\(^2\)

The significance of recognizing structural factors becomes apparent when they are connected with means of production. These latter are either directly organic or instrumental; for example, gestures, etc. are


\(^2\)Ibid., p. 701.
organic while painted signs are instrumental--some instrument has a
direct consequence on the nature of representation of an object. The
connection of an instrument with aspects of time and space directly
influences the evolution of a discourse. An example is cinema which
"... from a mere mechanical reproduction of various visual images has
swiftly changed into an intricate and autonomous semiotic system"
(Ibid., 702).

The fourth aspect of Jakobson's basis for a classification system
is the distinction between intentional and unintentional signs. For
example, the marks that a scout leaves behind him for the hunting party
to follow are intentional. The marks left behind by an animal which is
being followed by the scout are unintentional. In the first instance,
the signs are part of a communication system, whereas in the second,
the signs are bits of information which can be used, however, in a system
of communication. In effect, this distinction helps one to decide which
types of signs belong to purely semiotic systems and which ones do not.

Let me now return to the criticism of Peirce's sign classification
as expressed by Eco (1976, 178, 191-217). Eco's critique stems not so
much from his objection to the mutual exclusiveness between the sign
classes of icon, index, and symbol as postulated by Peirce, but rather
from his theory of sign-function which cannot accommodate this trichotomy.
It is the apparent motivation of icons and indices which, if accepted,
would invalidate Eco's argument that all signs are conventional, i.e.,
that the correlation between expression (sign-vehicle) and sign content
(which is not the actual object) is established by means of a habit-
formed code ("a system of correlational rules") (Ibid., p. 191). As follows from his statement that signs can be used to lie (which indicates that one can use signs regardless of the presence or actual existence of the object), the determination of the significance of the sign does not depend on some morphological correlation between sign and object. Even when some signs give the impression that they have some featural connection with the object, it is possible to demonstrate that the functioning of these signs depends on conventions. Therefore, Eco continues, any system of classification ought to recognize, besides the mode of signal production itself, the mode of sign-content correlation and the type of convention governing this correlation.

It would lead too far from the intent of this paper to engage in a detailed evaluation of Eco's proposed classification. It takes into account four parameters simultaneously, and it is the judgement of this author that an adequate system for the graphic sign can be developed by modifying Peirce's basic categories. A rationale for this can be found in Greenlee's (1973) analysis of Peirce's trichotomy.

In the first place, Peirce was not entirely ignorant of the possibility of conventionality of the iconic sign (nor of the indexical sign, as will be shown a little later). Says Greenlee:

To take the case of the icon, we noticed that Peirce himself points out that the likeness in question may be to a non-existent and hence imagined object, as when a map of a demolished town is taken to be iconic of the no longer existing town.¹

In view of Peirce's recognition that a sign can represent nonexistent objects, Eco's much heralded classification of semiotics as "the theory of the lie" is quickly reduced to mere manipulation of terms. The conventional possibilities of iconic signs is further developed by Greenlee and he comes clearly to the conclusion that "Symbolism (emerges) as one of the key concepts of a general theory of signs" (Ibid., 78). The concept of icon has to be modified.

It is not enough to say that the icon is a sign which designates merely by virtue of a resemblance with its object; it must further be said that it signifies by virtue of a rule of interpretation to the effect that it designate through certain (and not all) respects of similarity to its object.\(^1\)

When Greenlee continues his investigation, it turns out that the next sign of the trichotomy, the index, which has some causal connection to its referent, is no less symbolical than the icon. Causally determined signs derive their significance from some cultural convention which forces one's attention to some object and induces one to take it in a certain respect in favor of any other.

In short, the standpoint from which the index represents an object is conditioned not only by dynamical connection, but also by a convention of interpretation appointing it as a sign and selecting or abstracting the relevant aspect of representation. We shall find this fact conspicuously displayed in Peirce's favorite example, that of the weather-cock, a sign which might serve to represent a typical barnyard contrivance, or place for rendezvous, a turn in the road, or as it does typically, the direction of the wind. It signifies, in its typical use, as much by virtue of a

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\(^1\)Ibid., p. 78.
rule of interpretation, delimiting the range of possibilities of its reference and confining these to representation of the direction of the wind, as it does by virtue of a causal connection of its object, the wind. The two factors are inseparable.¹

Since Greenlee has shown that both icons and indexes are symbolic in nature, i.e., that besides some form of object-sign interdependence, they also require some form of habitual correlation, the need to discuss symbolic signs or the need for categorization almost disappears. But one has to realize that he is not trying to categorize signs for reasons of erudition. A well-defined structure, taking into account aspects of conditioning as well as kinds of representation, should allow further inquiry into the nature of signification. Such a structure should enhance the tasks of graphic designers in creating and evaluating signs. An effective and comprehensive classification should improve the scope of their work and their responsibility. It is therefore proposed to maintain Peirce’s trichotomy of icon, index, and symbol, but to enlarge and refine it with modified concepts derived from Eco.

There are, as stated, three main sign classes within which are recognized various subgroups.

1. Icons—those signs representing their objects on the basis of factual similarity.
   1.1 Topological similarity
   1.2 Structural similarity
   1.3 Material similarity
   1.4 Functional similarity

¹ibid., p. 89.
2. Indexes—those signs representing their objects on the basis of dynamic/causal contiguity.

2.1 Imprints
2.2 Symptoms
2.3 Clues
2.4 Pointers

3. Symbols—all signs correlated by some imputed contiguity to their object.

All signs, as Greenlee and Eco have shown, are symbolic in nature and are characterized by modes of convention. Certain cultural rules specify the conditions under which a sign-object relation is labeled in a certain way. The rule of interpretation or code determines the aspects on the basis of which a sign represents or resembles its object.

Let me now define the signs listed under 1, 2, and 3. A topological sign is a sign in which the factual similarity depends upon a relation between points in the object sphere and points in the sign. The difference between the actual physical existence and the perceptual representation of this reality is overcome by a rule, a code which motivated this perceptual representation (as in Eco's example of the photographic representation of condensation drops on a glass of beer on a hot summer day). Thus, signs of this type range from photographs of objects to simple outlines of objects to maps of an area where every point on the map somehow corresponds with a point of the real area the map depicts.

A structural sign is closely related to a topological sign.

In the latter, one is concerned with those features (perceptual) which
elicit a response similar to those of the original object, while changes in the factors not under consideration (for example, dimensionality, physical properties, etc.) do not affect this response. In structural signs, one concerns himself with the components that make up the whole of an object and the degree to which they are represented, but not necessarily in regard to their spatial and other formal properties. Signs of this kind are perspective representations and highly stylized signs (like in abstract painting) where the significant elements are represented but not in regard to their spatial organization.

The next group of signs having some form of factual similarity depends on material representation. Aspects of a material nature can represent the object after some initial period of experience with this object. An example of such a sign can be found in the recognition of an orange from among a group of different fruit, let's say apples. A material quality of the orange, i.e., its texture, is, under certain conditions, sufficient to represent an orange. Another example is the sample, i.e., a small piece of material can represent the entire object if the condition or code is established dictating that this sample has to be taken as such.

The fourth differentiation of the signs of factual similarity is that of functional representation (as in Gombrich's hobby horse). The sign, a certain feature or set of features, has to be capable of suggesting a certain function so that the sign user is incited to complete, in his mind or actually, such an action. Signs of such a nature are those graphic conventions that explain activities for operating
equipment (as, for example, the act of chopping by a kitchen machine) or visual signs that indicate a course of action (as specific movements in dance notation).

Signs are qualified by dynamic/causal contiguity either because of some motivation, as in the case of imprints, symptoms, and clues, or because of some form of directive intent like pointing. Imprints are unintentional marks made, for example, by animals to which we learn to respond because of some previous experience with these animals. Symptoms (like red bumps covering a human being that indicate the illness called measles) are signs whose motivation also depends on previous experience that ascribes the sign to a possible set of causes. Factual causation alone is not enough because one could imagine smoke without a fire. Clues are found objects from which one can infer the existence of something no longer present. Such inference can be made only because some rule makes the clue a member of a class of things to which the absent object belongs. It is the famous quiet aide of the detective. Pointers are those signs that one uses when confronted with someone whose language one does not speak. Objects are pointed at or the objects themselves are used as pointers so that the actual object does not refer to itself but to a larger class of things. There is the comical example of pointing at one's stomach (or rather rubbing it) in order to point out hunger. That this sign depends on a code is obvious. If one's partner does not know the first sign, one has to couple it with another pointer until, due to the appropriate response on behalf of the decoder, the significance of the sign is determined.
The last group of signs are all those signs which are determined solely by some form of convention or imputed contiguity. These signs use an expression continuum entirely alien to their objects and are correlated to their content in an arbitrary manner. Such signs are all kinds of graphic elements such as letters, mathematical symbols, musical notes, logotypes, or traffic signs as "stop", "no turn", etc.

The structure just described is, in one respect, Peirce's trichotomy, but it is enlarged and more finely calibrated so that, especially in the area of icons, a greater precision of classification is accomplished. The traditional group of indexes is now not only qualified by conventionality but also by motivation resulting from previous experiences. It is a structure which is by no means definite; it allows for simple enlarging through addition or differentiation if experience or change of habit requires this. What has been retained is a system of classification still comprehensive and manageable. While abandoning more naive notions of representation, the system remains functional for such practical fields as visual communication design.

Supersign

As discussed earlier, Jakobson made it clear that none of the classes of signs is independent from one another. Moreover, they are categorically related, i.e., factually similar signs are included in the dynamic/causal contiguous signs, while both are encompassed by signs of symbolic nature. This interaction—various sign modes including one another and a combination of sign modes representing the
totality of some object simultaneously—is called the **supersign**. The signs taken together represent an entire proposition (Eco, 1976, 231). Greenlee (1973, 79) expresses a similar idea which he labels **exhibitive import**. A supersign represents an object by means of certain types of signs which, taken together, form another mode of signification. Bense (1973, 107) recognizes the hierarchy of signs as well. The result of combining modes of signs results in higher order signs so that a supersign can be a super icon, super index, or super symbol. The import of this idea becomes clear in a quote from Peirce in regard of aesthetic communication:

> The design an artist draws of a statue, pictorial composition, architectural elevation, or piece of decoration, by the contemplation of which he can ascertain whether what he proposes will be beautiful and satisfactory.\(^1\)

Since the notion of supersign is still very underdeveloped, the discussion of its processes and properties has to remain limited at this time.

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CHAPTER V
SIGN PRODUCTION

Various design projects of a certain semiotic reference were developed for the education of graphic design students. Examples of these projects will be presented in the following pages. Each of these projects deals with specific modes of formation and transformation and with the sign-object as well as sign-interpretant relationship. Considerations of denotations and connotations are involved as well.

The types of formation and transformation these projects deal with, while considered significant, are not yet classified in a system for sign-production. The labels that identify the production processes are chosen rather intuitively, although each of them deals with a specific or combination of distinct operations. It seems necessary, though, to start working towards a consistent system of sign-production so that graphic designers can more precisely describe and select the operation which determines specific correlations of signs and their object and interpretant. In the given project, these dimensions interact rather freely, although sometimes there seems to be a bias towards the sign-interpretant interaction. The relationship between sign and interpretant is a more challenging dimension which specifically supports studies of sign mode translation (such as verbal-visual equations), identifies the range of design decisions a student has to make, and aids the student in his creative development as well. Projects of sign-object relation seem to be of a more traditional nature and become rather quickly studies of representation versus perception,
i.e., the abstraction of features and their level of informational content.

I believe that there are two vectors along which problems of (graphic) representation can be developed. These vectors are:

1. The vector with degrees of expression, i.e., the style of graphic representation, the form of the sign-vehicle.

2. The vector with types of interpretants.

The interaction of these vectors results in a morphology—a morphological matrix—which looks as follows:

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<table>
<thead>
<tr>
<th>TYPES OF INTERPRETANTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEGREES OF EXPRESSION</td>
</tr>
</tbody>
</table>
```

Figure 10
Morphological Matrix

Thus, for each sign there exists an array of interpretants (this array is not hierarchical, nor is the number of interpretants for all signs equal or fixed), while for each interpretant there exists a number of expressions of increasing abstraction. Theoretically, there should be a sign expression (sign-vehicle) of equal abstraction for any and all interpretants. But experience shows that, physically, it is not always possible to produce these equivalencies, nor will all variants be equally successful under the same conditions for use. Such a model holds promise for creative development and the search for alternatives
to given signs. Degrees of equivalence and their effectiveness could be tested and determined.

Introducing the morphological matrix now does not mean that all projects described here are the result of a rigorous analysis of semiotics and therefore represent the process of sign-production in some hierarchical order. Although the projects are based on certain semiotic theories or conventions, their origin and relation is still vague and tentative. The modes of production require further testing and refinement. But at least the projects start to define some basic problems and stimulate many more questions than they sought to answer.

Some of the projects deal with equivalencies at the structural or semantical level as influenced by processes of substitution. In other projects, contextual manipulation determined degrees of significance. Some projects (as the score) mainly concerned with sign-object relations and rules of logical formation in the end become supersigns. The development of a functional signage system allowed for investigation of denotative and connotative dimensions beyond the concern for syntactical consistency. What follows is a description and visual demonstration of each problem of sign-production developed thus far.

**Substitution** (Figures 11 and 12)

The student was provided with a photograph of some kind and asked to substitute some other pictorial elements for the main components of this picture. This substitution was to be done logically and
Figure 11.5
sequentially, i.e., one element at a time was to be substituted; the next change was to have some relation to the former and so on. The number of steps in which to complete the process was set at an arbitrary 20 (only some main steps are shown here). The logic of the substitutions was to be based on either the syntactical or semantical aspects of the image. In the end, each of the 20 plates had to display the same or similar reference to the original object (the provided photograph), while all plates were supposed to relate to one another in a similar manner.

Two examples are provided here: the first one deals mainly with syntactical correlations, and the second one deals more with semantic substitution. In example II, the number of elements and their relative spatial relation is maintained. The changing element in each plate has some formal correlation to its identity in the preceding plate and consequently to the original. In the end, the final solution relates to the original object in that the number of elements and their relative position are the same. There is, of course, no semantic correlation between the first and the last image or any in between. The point made in this example concerns the relation between structure and meaning and how one does not necessarily depend on the other even though, at the level of syntactical classification, a great consistency is maintained. What becomes clear is the arbitrariness of signs in respect to their original object and that meaning depends on conventions of representation.

The second series (fig. 12) shows a variant of the first one. This was the result of a mistaken, but in the end fortunate,
Figure 12.1
interpretation of the objectives of the project by a student. This solution mixes processes of subtraction and substitution. The subtractive operations do not seem to affect the sign-object relation a great deal, except that the informational quality changes. This approach fits the vector of degrees of expression of the morphological matrix. Some of the plates deal more with operations of substitution and are concerned with the sign-interpretant relation, demonstrating the flexibility of that dimension. The yield of this latter approach seems to be in the stimulation of a creative but logical search for alternatives of expression. On the negative side, it also demonstrates the consequences of a naive approach to verbal-visual equivalency, as one can see in the kitsch solution with the "table of contents." It reminds one of the pitfalls described by Whorf (1972, 134-159) concerning his notions of relativity of language and the difficulty of translating concepts from culture to culture. The idea that representation depends on some form of symbolic behavior is supported in some of the plates presented here, as in Whorf's writings.

Parallax (Figures 13 and 14)

The kind and amount of information one can convey about a situation or object by means of a sign depends on the contextual conditions of that sign. When one changes one's point of view (and I mean physically) in regard to some object or situation, different features are perceived, while features perceived earlier appear in a changing spatial position or disappear altogether. When one has to
represent a situation taking place in time, the sequence of the representation (the order in which the features are perceived) becomes a significant aspect.

The students were asked to represent (by means of photographic slides for speedy feedback) several discrete moments of an event taking place in time from as many as eight different points of view. Each different point of view was to address the same discrete moment of the event in question. Consequently, the result would take on the character of a two-dimensional interaction matrix. Along the horizontal dimensions of the matrix, the steps of the event were to be listed; each vertical dimension was to list the same step seen from eight different points of view. This result could be called, after Eco, the expression field about a certain content field. At the end of this process, the students were asked to edit from this entire expression field one sequence which most eloquently, effectively, aesthetically, etc. represented the event.

In reviewing the samples provided, one notes again the similarity with the interaction model presented on page 71, although, in this particular case, we are experimenting only with the vector of expressions. Variations in the sign-object relationship are studied by means of manipulating the environment and focusing in (literally as well) on the significant features by means of photographic operations like focus, cropping, angle, and lighting. Significant as well is the students' editorial involvement with the selection of the aspects of the event which characterize it. This is a pure semiotic task because it means determining the potential of movements, features, expressions, etc. to
Figure 13.1.2
Figure 13.2.6
Figure 14.1.5
Figure 14.4.2
act as signs. This assignment allows for studies concerning the sign-
interpretant relation as is demonstrated in one instance (series 14.4).
In this example, an event unrelated in content but having some synchrony
with the event in question can take on the quality of a sign. Of
course, some code to correlate this latter sign to the original event
has to be developed. In this example, the code was masterfully done in
the last slide (fig. 14.4.5) (to this effect, this last series of slides
is its own metalanguage as well). This process again suggests a
powerful methodology for developing effective communication situations.
It provides the student/designer with a large array of choices each
instance of which can be carefully evaluated in respect to information
content as well as its effectiveness in particular sequences. (For this
project, I'm indebted to Hitchcock's movie, North by Northwest, especially
the scene in which Cary Grant scrambles out of the cornfield onto the
dusty highway and tries to catch a ride.)

**Verbal-Visual Equivalency** (Figure 15)

In this project, the students selected a simple but expressive
text. In a number of steps, they translated from an entire symbolic-
verbal representation, through various iconic-symbolic modes of
representation, back to a wholly symbolic but nonverbal situation. In
effect, the study explores the semiotic problem of structural correlation
of different language systems. In this project, of course, the language
systems are all determined by the same type of production (graphic
tools) and are all of the same time/space dimension.
Figure 15.1
Figure 15.2
The type of sign correlation explored here is mainly that between sign and object. Denotative and connotative qualities mix freely. The main objective is to find equivalencies of either symbolic or iconic nature. Because this is a familiar situation for graphic designers, not much new is revealed about the problems of translation from one mode of representation to another. Its success as a project is mainly as a didactic tool in that it guides students into questioning the nature of representation. They begin to correlate aspects of sign typology with their intuitive/traditional searches for solutions. An extension of this process could be the description of the codes used in developing the various stages and classification of the signs on the basis of some morphology.

**Universal Signs** (Figures 16 and 17)

This is a project that combines rules of formation and transformation. It is as such the beginning of the development of a logical language. The subject concerned a set of universally applicable concepts, especially in regard to international transportation situations, i.e., entrance, exit, no entry, no exit, enter, do not enter, exit(ing), do not exit. The sign-object relation was to be either iconic, indexical, or symbolic, but one mode was to dominate the system and was to be applied with a high degree of consistency to all the different signs. A code which governs the sign-interpretant relation was to be selected or developed. This code was to be included in the sign system itself, i.e., as metalanguage. At first, I thought that all
Figure 17.2
Figure 17.3
Figure 17.5
Figure 17.7
Figure 17.8
Figure 17.9
solutions submitted would be of the symbolic or functional-iconic symbolic types, because so many of those have been developed before (fig. 16). I was surprised to find that at least one student submitted solutions with mainly iconic qualities (not to mention the illuminating humor this particular solution brought to this downtrodden subject) (fig. 17). I also believed that so-called universal signs could be only of a denotative nature (as the first sample shows), but the second series shows an entire range of connotative possibilities.

All solutions assumed a fixed interpretant relation which is warranted by the pragmatic conditions of the problem of international traffic signs. The interpreter was to respond in only one way to a given sign, thus other interpretants stimulated by the sign-vehicle were to be considered only if they did not lead away from the desired behavioral response. In this respect, the cartoon-like solution is highly speculative. But since none of the solutions were tested in respect to their pragmatic qualities, this whimsical proposal was equally valid. As a matter of fact, the solution in fig. 17 challenged, ironically though, rather ingrained notions about international signs. Both solutions show a high degree of consistency regarding the use of sign classes, and the syntactical dimensions are logically developed. Although these solutions seem to be systematic, I would not like to call them languages in the widest sense of the word. Sign systems of the type discussed here are not truly universal. It is not clear how the code governing rules of formation and transformation would be applied to other situations or objects that are part of the cultural class of
the signs in question.

**Score (Figure 18)**

Scoring an event to the degree that others can reproduce this event at some different time and in some different place involves problems of sign language development, the result of which should take on qualities of a supersign. As a supersign, the development of a score involves several or all of the properties and processes of formation and translation discussed before. One of the criteria for the development of the scores presented here was that they had to function, as much as possible, without the help of verbal language. Consequently, these scores had to have strong qualities of metalanguage in order to be understood, i.e., to function as tools in the reproduction of the original event. Thus, performing these scores would be, in effect, testing the validity of the sign code and the sign-object relationship as they have been developed by the individual student. This has not been done to date, but it promises an excellent method for pragmatic inquiries. Evaluation of the scores shown here would be mainly speculative at this point. Of course, syntactical dimensions and the sign-content relation could be validated, because this can be done in absence of the original event. In this latter respect, the didactic significance of the project finds its ground.
CHAPTER VI

CONCLUSIONS

The graphic sign is a semiotic sign. Concluding this means recognizing that the graphic sign is not an entity in itself, nor is it a mere stimulus (a signal) in the process of human communication. It means that the graphic sign is a triadic entity including an object, a sign-vehicle, and an interpretant. It means also, implicated by the interpretant, that the sign-object relation is not necessarily an existential one and that, in actuality, one can represent contents by means of sign-vehicles for which there exists no object at all. This extension of the graphic sign away from its traditional duality of sign-vehicle and object, by bringing into focus the interpretant, makes it possible to make the world of the graphic sign, and consequently its processes and operations, the concern of the theory of semiotics. Reversely, it should be possible to talk of the semiotics of the graphic sign. Given the large role the graphic sign plays in graphic design, it is only logical to conclude that the theory of semiotics plays a role in the processes and concerns of the graphic designer. Semiotics has a bearing on the understanding of the nature of the graphic sign, its production, and its usage. Semiotics should play a significant role in educating students for the profession of graphic design.

It has become clear from the preceding pages that one can distinguish signs on the basis of some motivation. One can separate natural signs from artificial signs and art signs from functional signs. But what became more important while the study continued was the
emergence of the idea of the code and its control over the nature and function of a sign. The code is a rule of habit, a type of conventional behavior that renders symbolic all signs regardless of their type and degree of representation. The power of this idea enlarges the potential of signs in that, on top of changing the sign-vehicle, one can now change the code and attach the same sign-vehicle to a different kind of content.

The delineation of semiosis into syntactics, semantics, and pragmatics proves quite useful, and not just for theoretical purposes. This trichotomy clearly becomes instrumental in classifying signs as well as in determining sign-production operations. It allows one to isolate factors which influence the formation and usage of signs and so makes them available to critical analysis and evaluation.

Semiosis suggests a potential which has not been discussed so far. It concerns curriculum development. It seems possible to structure a course of instruction for graphic design in the following manner: the first third of this instruction would deal with problems of syntax (the sign-object relation in terms of form, proportion, Gestalt principles, symmetry, etc.); the second third would deal with problems of semantics (representation in respect to sign-object as well as sign-interpretant correlation); the last third would deal with problems of pragmatics (the sign in relation to the user/subject; evaluation of sign-vehicle and codes).* One must keep in mind that, at any stage of

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*The breakdown of a curriculum into equal thirds is not absolute. Any breakdown in terms of real time can be determined on the basis of local needs.
the education process, this separation of syntax, semantics, and pragmatics can only be one of degree because of the artificiality of this breakdown, which is not reflected in the everyday use of signs. But at least one could focus more on one aspect over the other two, and vice versa. (A curriculum of the kind suggested here can currently be found at the Department of Industrial Design, The Ohio State University, as well as at the Department of Graphic Design at the Rhode Island School of Design.)

What this model of semiotics makes clear is the systemic nature of the sign. It takes into account all factors influencing the sign; it tries to include within the process of semiotics aspects which thus far were considered to lie beyond the boundaries of semiotics. Such aspects, such as ideology, politics, etc. were considered separately and independently from the nature and functioning of the sign. The inclusion of such aspects removes the temporary, dependent character from the sign and places it in the center of human culture. There exists a reciprocal interaction between man and sign. Man knows by means of signs, and what he knows he can criticize by means of these same signs. In effect, he can criticize himself.

The role of a sign-typology should be clear to any graphic designer. Not only does it bring order to a chaotically appearing world of signs, but it especially brings into focus the relation between object and type of representation. It places some emphasis on the role of the sign producing instrument and on factors of space and time. It distinguishes natural signs and artificial signs, unintentional and
intentional signs. It points out that signs can be motivated by a
code of behavior rather than by the object it represents. As such,
this classification system eliminates naive notions about degrees of
information and types of representation. Codification determines the
selection of the mode of representation and even controls the degree to
which the medium becomes the message: only if we accept it as such.

The original sign typology suggested by Peirce, that is, a
classification of icons, indexes, and symbols, is maintained and
extended. Eco, as stated, had suggested doing away with this system
altogether, because of certain problems with signs of iconic representa-
tion. This proposal for a system which would simultaneously recognize
factors of sign production, type of representation, and degrees of sign
complexity leads to an overly complex model of continuously shifting
modes of expression. No sign could ever be fixed in this scheme of
vacillating modalities. Although this concept in itself might be true
to the reality of the sign, it did not seem useful in the daily practice
of graphic designers, nor would it clarify much in educating graphic
designers. So, Peirce's model of classification, with its added
subdivisions, thus far takes adequate care of the immediate needs of
graphic designers. This does not mean that the question of classification
is resolved. Graphic designers should be open to new approaches and
continue to test the current model. It is still a question, for
example, whether there exists a true indexical graphic sign.

The selected rules or operations of formation and transformation
identified thus far are sketchy and tentative. Although these rules
allow for serious and creative experimentation, especially in regard to the sign-interpretant relation (as the examples demonstrate), there is not enough consistency yet in the way these operations relate to semiosis. These operations of formation and transformation are not exclusive enough, and never could be truly independent from one another. This limited exclusiveness is conditioned by the nature and usage of language, i.e., the continuous interaction, the inseparability of object-language and metalanguage.

But it seems possible, with the help of the morphological matrix, to focus production operations more precisely on the sign typology and on the division of the semiotic process. However, one should not overlook the possible harm such a rigorous approach could bring to the forming of a creative human being, of a creative graphic designer. Perhaps, in the didactic process of graphic design education, it is at times necessary to remain "fuzzy". At least one should consider the rigor of the approach in terms of subjective and objective criteria. An inclusive method of sign-production is justified when educating for creative individuality, while exclusive concepts of sign-production are necessary for testing and evaluating signs to be used in functional situations. It should be pointed out that the number of operations is limited so far and, most likely, more and more specialized operations can be developed.

Perhaps the most important contribution of the morphological matrix is that it allows the designer to escape from his self-imposed straightjacket of form concerns. This matrix operates as a semiotic
tool in that it brings into relation simultaneously the object, the
sign-vehicle, and the interpretant. In doing so, it points to an almost
infinite array of sign possibilities.

This study is just a beginning. It has identified a structural
basis to view the world of signs. It has pointed a way to implement
semiotics in a curriculum of design education. But in its broadness
lies its shortcomings. Significant questions were identified too late
and consequently they could be answered only tentatively. Problems
regarding the sign-interpretant relation (a classification perhaps) and
problems of sign-mode equivalency have to be studied more closely. As
previously stated, operations and sign-production should be tested in
respect to the morphological matrix. Appropriate methodologies for
such testing--and evaluation--must be developed as well. Also, develop-
ing strategies for sign usage, as suggested by Barthes' concept of
multiple readings of texts, should be considered in depth, especially
concerning functional texts. The consequences of such strategies for
the sign-vehicle are not clear.

But at the very least, besides the didactic potential of
theories of semiotics, systems of sign-classification, and methods of
sign-production, semiotics provides us with an attitude. Consequently,
we are forced to consider with renewed interest our everyday utterances,
gestures, and scribbles.
BIBLIOGRAPHY


